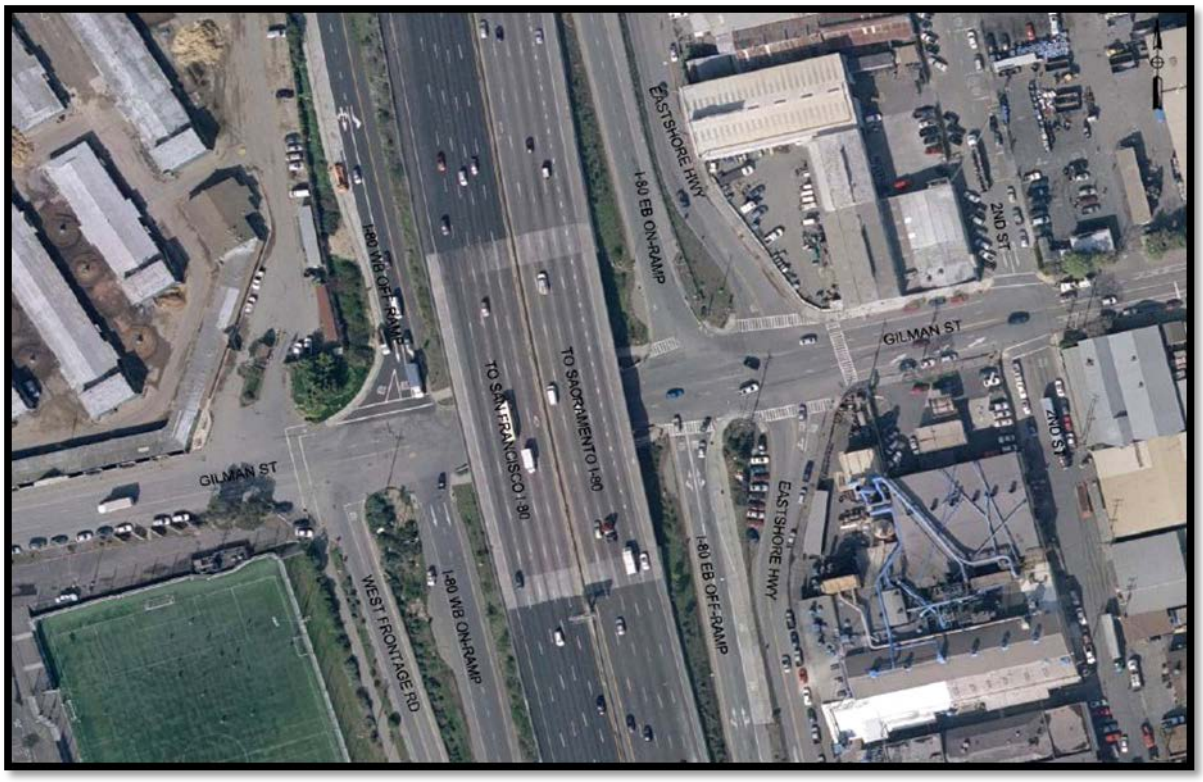
Water Quality Assessment Report
I-80/Gilman Street Interchange Improvement Project



Alameda County, California
Cities of Albany and Berkeley
04-ALA-80-6.38/6.95
EA 04-0A7700/Project ID 0400020155

August 2018

Caltrans

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STATE OF CALIFORNIA
Department of Transportation

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EXECUTIVE SUMMARY

The Interstate 80 (I-80)/Gilman Street Interchange Improvement Project (Project) is located in Alameda County at the I-80/Gilman Street interchange in the cities of Berkeley and Albany (Post Miles [PM] 6.38 to 6.95). Within the limits of the proposed Project, I-80 is a conventional 10-lane freeway with 12-foot-wide lanes and 11-foot-wide shoulders. Gilman Street is a 4-lane major arterial with 11-foot-wide lanes and 6-foot-wide shoulders that passes underneath I-80. The I-80/Gilman Street interchange is a four-lane arterial roadway (Gilman Street), with two lanes in the east/west direction that are intersected with four I-80 on- and off-ramps, West Frontage Road, and Eastshore Highway. The purpose of the project is to simplify and improve navigation, mobility, and traffic operations; reduce congestion, vehicle queues, and conflicts; improve local and regional bicycle connections and pedestrian facilities; and improve safety at the I 80/Gilman Street interchange. Current conditions, along with an overall increase in vehicle traffic, have created poor, confusing, and unsafe operations in the interchange area for vehicles, pedestrians, and bicyclists.

The Project's Build Alternative proposes to reconfigure the I-80 ramps and intersections at Gilman Street. The I-80 ramps and frontage road intersections at each ramp intersection would be combined to form a single roundabout intersection on each side of I-80. Gilman Street would be reconstructed on the west from the parking lots at Tom Bates Regional Sports Complex along Gilman Street to the eastern side of the 4th Street intersection. Work would also include reconstruction of West Frontage Road and Eastshore Highway within the Project limits. Improvements associated with installation of the roundabouts would extend approximately 280 feet south on West Frontage Road from the Gilman Street interchange and approximately 250 feet north and 1,010 feet south on Eastshore Highway from the Gilman Street interchange. Work associated with reconfiguration of the eastbound I-80 off-ramp and on-ramp would extend approximately 820 feet south and 280 feet north of the interchange. Work associated with reconfiguration of the westbound I-80 off-ramp and on-ramp would extend approximately 370 feet north and 230 feet south of the interchange. There are no proposed improvements to the freeway mainline. The Project would also include a new bicycle/pedestrian overcrossing. The structure would be located south of Gilman Street with two staircases incorporated into the overcrossing, one on each side of I-80. There would also be retaining walls on the east and west side of the overcrossing; they would be approximately 6-feet-tall at the highest point and taper down to zero. The Build Alternative includes a two-way cycle track on the south side of Gilman Street between the eastern I-80/Gilman Street ramps and 4th Street. The addition of the two-way cycle track would require installation of a traffic signal at the intersection of 4th Street and Gilman Street. Improvements would be made along 4th Street to Harrison Street to 5th Street to provide bicycle connectivity between the Codornices Creek Path and the two-way cycle track on Gilman Street. Additional pedestrian and bicycle improvements include upgrading the 3rd Street/UPRR crossing at Gilman Street to accommodate the cycle track.

West of the I-80/Gilman Street interchange, the existing San Francisco Bay Trail (Bay Trail) would be extended approximately 660 feet west along the south side of Gilman Street from its current terminus at the intersection of West Frontage Road and Gilman Street to just beyond Berkeley's city limits. Existing Pacific Gas & Electric (PG&E) overhead electric lines along Gilman Street, West Frontage Road, and Eastshore Highway would be relocated as part of the

Build Alternative. A separation device would be installed underground along Gilman Street to separate trash, mercury, and polychlorinated biphenyls (PCBs). An existing East Bay Municipal Utility District (EBMUD) recycled water transmission line would be relocated and extended as part of the Project. Approximately 1,100 feet of a new 12-inch recycled water transmission pipeline within Eastshore Highway from Page Street to Gilman Street and approximately 1,050 feet of pipeline within Gilman Street from 2nd Street to the Buchanan Street extension, are part of the Build Alternative. Approximately 1,100 feet of an existing 10-inch EBMUD recycled water pipeline located within California Department of Transportation's (Caltrans) right-of-way (ROW) along the eastbound Gilman Street off-ramp shoulder, would be abandoned in place or removed. A new City of Berkeley sewer line would be installed underneath Gilman Street, beginning at a point east of the Interchange and ending on the west side I-80 at the approximate entrance to the Tom Bates Sports Complex parking lots. Construction of the roundabout would expand the ramp intersection to the north and would require relocation of the Golden Gate Fields entrance and exit gate to their stables. The Build Alternative would relocate the entrance and exit gate to the Gilman Street Extension.

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 avoidance and/or minimization measures for potentially adverse impacts.

The Project is within the San Francisco Bay Regional Water Quality Control Board (RWQCB) jurisdiction. The Project's receiving waterbodies are the San Francisco Bay Central, as defined by the San Francisco Bay RWQCB in the *San Francisco Bay Basin (Region 2) Water Quality Control Plan* (Basin Plan), Schoolhouse Creek, and Codornices Creek. Runoff from the Project is either collected or conveyed through a system of culverts or sheet flows directly into the San Francisco Bay Central, Schoolhouse Creek, or Codornices Creek. Schoolhouse Creek is located outside the Project limits and runs under Virginia Street, crossing I-80 at approximately PM 6.15. Sheet flow from 5th Street would discharge into Codornices Creek. Codornices Creek is located at the border of the Project limits on 5th Street, crossing I-80 at approximately Post Mile 6.91. No work is proposed at this creek crossing. The San Francisco Bay Central and Codornices Creek are included on the Clean Water Act (CWA) 303 (d) List of Water Quality Limited Segments. Caltrans and the cities of Berkeley and Albany are named stakeholders for the mercury, PCBs, dioxin-like PCBs, and trash Total Maximum Daily Loads at the San Francisco Bay Central.

The Project lies within the East Bay Plain sub-basin of the Santa Clara Valley groundwater basin (Basin No. 2-9.04). The East Bay Plain sub-basin covers 77,800 acres of Alameda and Contra Costa counties and has a total storage capacity of 2,670,000 acre-feet. This sub-basin has the existing beneficial uses of municipal and domestic, industrial process and service, and agricultural water supplies. The available log of test borings identifies groundwater to be

encountered approximately 7 to 8 feet below current grade. Dewatering activities are expected be necessary for placement of the pedestrian bridge overcrossing footings and retaining wall piles.

The Project proposes work within Caltrans' ROW, the City of Berkeley's ROW, and Golden Gate Fields, located in the City of Albany's ROW, and therefore, the Project would be subject to the Caltrans NPDES Permit (Order No. 2012-0011-DWQ) and the San Francisco Bay Municipal Regional Permit (Order No. R2-2015-0049). Treatment BMPs would be required under these permits because the overall Project would create and/or replace one acre or more of impervious area within Caltrans' ROW, and create and/or replace 10,000 square feet (0.23 acres) or more of impervious roadway surface within the City of Berkeley's and City of Albany's ROWs. These permits include requirements for implementation of permanent best management practices (BMPs) to avoid impacts to water resources. Feasible treatment BMPs for this Project include bioretention devices, basins, media filters, and tree well filters. The Project in Caltrans' ROW is required to consider the Alameda County hydromodification assessment criteria per the *Memorandum of California Department of Transportation Post-Construction Stormwater and Hydromodification Standards* (San Francisco Bay RWQCB 2008). Per the Alameda County Clean Water Program's Hydromodification Susceptibility Map Application, the majority of the Project area is within an area that is tidally influenced or primarily depositional. The portion of 4th and 5th Streets along Harrison Street is within the Codornices Creek's special consideration area; however, the Project does not propose adding impervious area to these streets. Although the Project would increase the impervious area from the pre-project condition, hydromodification impacts are minimal or not anticipated. Permanent groundwater, biological, and human use impacts are not anticipated.

The Project would have a disturbed soil area (DSA) of more than 1 acre and has the potential to cause water quality impacts to the San Francisco Bay, Schoolhouse Creek, and Codornices Creek during construction. Temporary impacts include sediment from grading and excavation activities, pollutants from accidental spills, and work at the Gilman Street outfall. The Project would be required to comply with the requirements of the State Water Resources Control Board (SWRCB) Construction General Permit (CGP) (Order No. 2012-0006-DWQ). In compliance with the CGP, the Contractor for the Project would be required to prepare and submit a Storm Water Pollution Prevention Plan (SWPPP). To determine the applicable monitoring and sampling requirements during construction, the SWPPP would include the determination of the Project's risk level. Based on the site of the Project and the current planned improvements, the Project is classified as Risk Level 2 under the CGP. Construction site BMPs for stormwater would include move-in/move-out locations, temporary covers, temporary fiber rolls, temporary silt fence, temporary drainage inlet protection, temporary construction entrances/exits, street sweeping, clear water diversion, temporary concrete washout facilities, and job site management. Groundwater would be temporarily impacted due to placement of the pedestrian bridge overcrossing footings and retaining wall piles. Construction site BMPs for groundwater may include non-stormwater use for dust control, desilting basins/tanks, and transport to publicly owned treatment works dewatering operations. If the Project area contains contaminated groundwater or groundwater that may release contaminated plumes when disturbed, applicable dewatering permits would be obtained during the PS&E phase. There would be minimal temporary impacts to biological and human use characteristics of the aquatic environment due to centralized work at the Gilman Street outfall and lane/road closures during construction.

Construction site BMPs for biological characteristics may include clear water diversion, water quality monitoring for fish species, and management of invasive species. Construction site BMPs for human use characteristics would be similar to those for construction site stormwater BMPs.

The general approach of the Project is to avoid impacts. This Project would have minimal impacts to water quality if BMPs in compliance with the applicable NPDES permits, are incorporated.

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Acronyms

ACCWP	Alameda County Clean Water Program
ACFC&WCD	Alameda County Flood Control and Water Conservation District
Basin Plan	San Francisco Bay Basin (Region 2) Water Quality Control Plan
Bay Trail	San Francisco Bay Trail
BMP	best management practices
BSA	biological study area
Caltrans	California Department of Transportation
CGP	Construction General Permit
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CWA	Clean Water Act
DDT	dichlorodiphenyltrichloroethane
DPS	Distinct Population Segment
DSA	Disturbed soil area
EBMUD	East Bay Municipal Utility District
EBRPD	East Bay Regional Parks District
EPA	Environmental Protection Agency
ESA	environmentally sensitive area
ESU	Evolutionary Significant Unit
ºF	degrees Fahrenheit
FEMA	Federal Emergency Management Agency
HSG	Hydrologic Soil Group
I-80	Interstate 80
MRP	Municipal Regional Permit
MS4	Municipal Separate Storm Sewer System
NAVD 88	North American Vertical Datum of 1988
NEPA	National Environmental Policy Act
NIS	new impervious surface
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
PCB	polychlorinated biphenyls
PG&E	Pacific Gas and Electric
PM	Post Mile
PS&E	Plans, Specifications, and Estimates
RIS	replaced impervious surface
ROW	right-of-way
RSP	rock slope protection
RWQCB	Regional Water Quality Control Board
SWMP	Storm Water Management Plan
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TMDL	Total maximum daily load
TMP	Transportation Management Plan
UPRR	Union Pacific Railroad

U.S.	United States
USACE	U.S. Army Corps of Engineers
VOC	volatile organic compound
WDR	Waste Discharge Requirement
WQAR	Water Quality Assessment Report

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 avoidance and/or minimization measures for potentially adverse impacts.

1.2 Project Description

This section describes the proposed action and the Interstate 80 (I-80)/Gilman Street Interchange Improvement Project (Project) alternatives developed to meet the identified purpose and need of the Project, while avoiding or minimizing environmental impacts. The two alternatives include the Roundabout Alternative and the No Build Alternative.

The Project is located in Alameda County at the Interstate 80 (I-80)/Gilman Street interchange in the cities of Berkeley and Albany (Post Miles [PM] 6.38 to 6.95) (Figures 1 and 2). Within the limits of the proposed Project, I-80 is a conventional 10-lane freeway with 12-foot-wide lanes and 11-foot-wide shoulders. Gilman Street is a 4-lane major arterial with 11-foot-wide lanes and 6-foot-wide shoulders that passes underneath I-80. The I-80/Gilman Street interchange is a four-lane arterial roadway (Gilman Street), with two lanes in the east/west direction that are intersected with four I-80 on- and off-ramps, West Frontage Road, and Eastshore Highway. The purpose of the Project is to simplify and improve navigation, mobility, and traffic operations; reduce congestion, vehicle queues, and conflicts; improve local and regional bicycle connections and pedestrian facilities; and improve safety at the I 80/Gilman Street interchange. Current conditions along with an overall increase in vehicle traffic, have created poor, confusing, and unsafe operations in the interchange area for vehicles, pedestrians, and bicyclists.

1.2.1 Build Alternative – Roundabout Alternative

The Roundabout Alternative includes the reconfiguration of I-80 ramps and intersections at Gilman Street. The existing non-signalized intersection configuration with stop-controlled ramp termini would be replaced with two hybrid single-lane roundabouts with multilane portions on Gilman Street at the I-80 ramp terminals. The I-80 ramps and frontage road intersections at each ramp intersection would be combined to form a single roundabout intersection on each side of I-80. Gilman Street would be reconstructed on the west from the parking lots at Tom Bates Regional Sports Complex along Gilman Street to the eastern side of the 4th Street intersection. Work would also include reconstruction of West Frontage Road and Eastshore Highway within the Project limits. In addition, the northern and southern legs of the eastern roundabout would be reduced from two lanes to one lane entering the roundabout. The southbound and northbound

movements onto Eastshore Highway would instead be made via 2nd Street to Page Street or 2nd Street to Harrison Street. See Figure 1 and Figure 2 for the Project vicinity and location maps.

Improvements associated with installation of the roundabouts would extend approximately 280 feet south on West Frontage Road from the Gilman Street interchange and approximately 250 feet north and 1,010 feet south on Eastshore Highway from the Gilman Street interchange. Work associated with reconfiguration of the eastbound I-80 off-ramp and on-ramp would extend approximately 820 feet south and 280 feet north of the interchange. Work associated with reconfiguration of the westbound I-80 off-ramp and on-ramp would extend approximately 370 feet north and 230 feet south of the interchange. There are no proposed improvements to the freeway mainline. A metering light would be installed on West Frontage Road to regulate the volume of northbound traffic that enters the western roundabout.

The western roundabout intersection would consist of four approaching legs: eastbound and westbound Gilman Street, West Frontage Road, and I-80 westbound off-ramp. The eastern roundabout intersection would include five approaching legs: I-80 eastbound off-ramp, northbound and southbound Eastshore Highway, and eastbound and westbound Gilman Street. A left-turn pocket would be provided on Gilman Street for vehicles traveling eastbound turning onto northbound 2nd Street. Left turns would be restricted from westbound Gilman Street turning onto southbound 2nd Street.

Improvements on 2nd Street north of Gilman Street include reduced crossing distances, new striping, signing, new pavement, additional landscaping, and new light poles. South of Gilman Street, improvements on 2nd Street include a bulb-out on the southeast corner of the intersection and converting the road to one-lane southbound, while the other lane would be used as a designated parking/loading zone for businesses.

All modified roadways including ramps, frontage roads, and arterials would be improved. Improvements would include mill and overlay of pavement, striping, relocation of drainage inlets, lighting, and signage.

Several operational improvements would be incorporated into the Project. A metering signal would be installed on the northbound leg of the western roundabout to limit the volume of traffic that is bypassing the freeway using West Frontage Road. A queue cutting signal would be placed on the eastbound leg of the Union Pacific Railroad (UPRR) crossing at 3rd Street to prevent traffic from extending across the UPRR tracks.

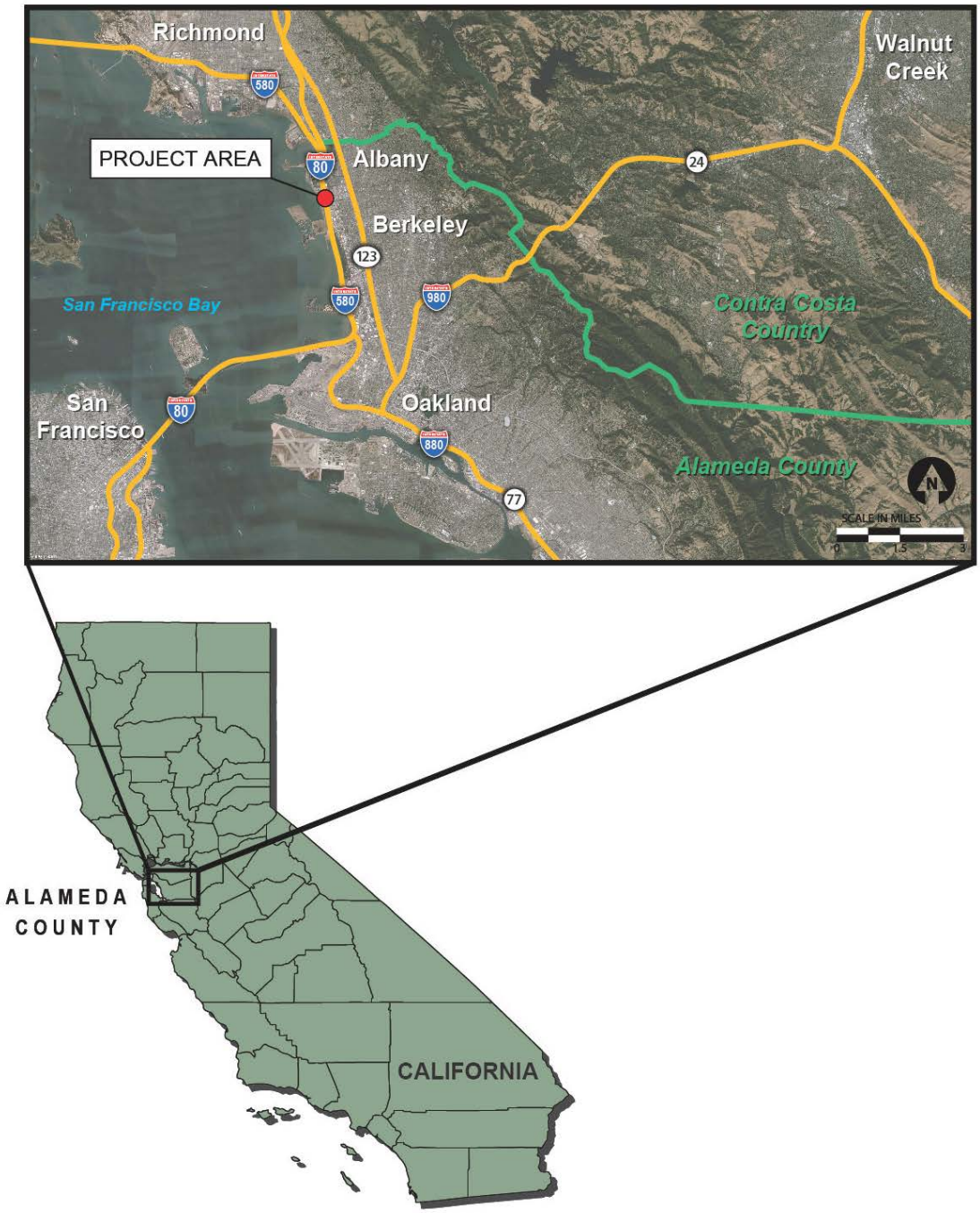

Figure 1. Project Vicinity

Source: Parsons

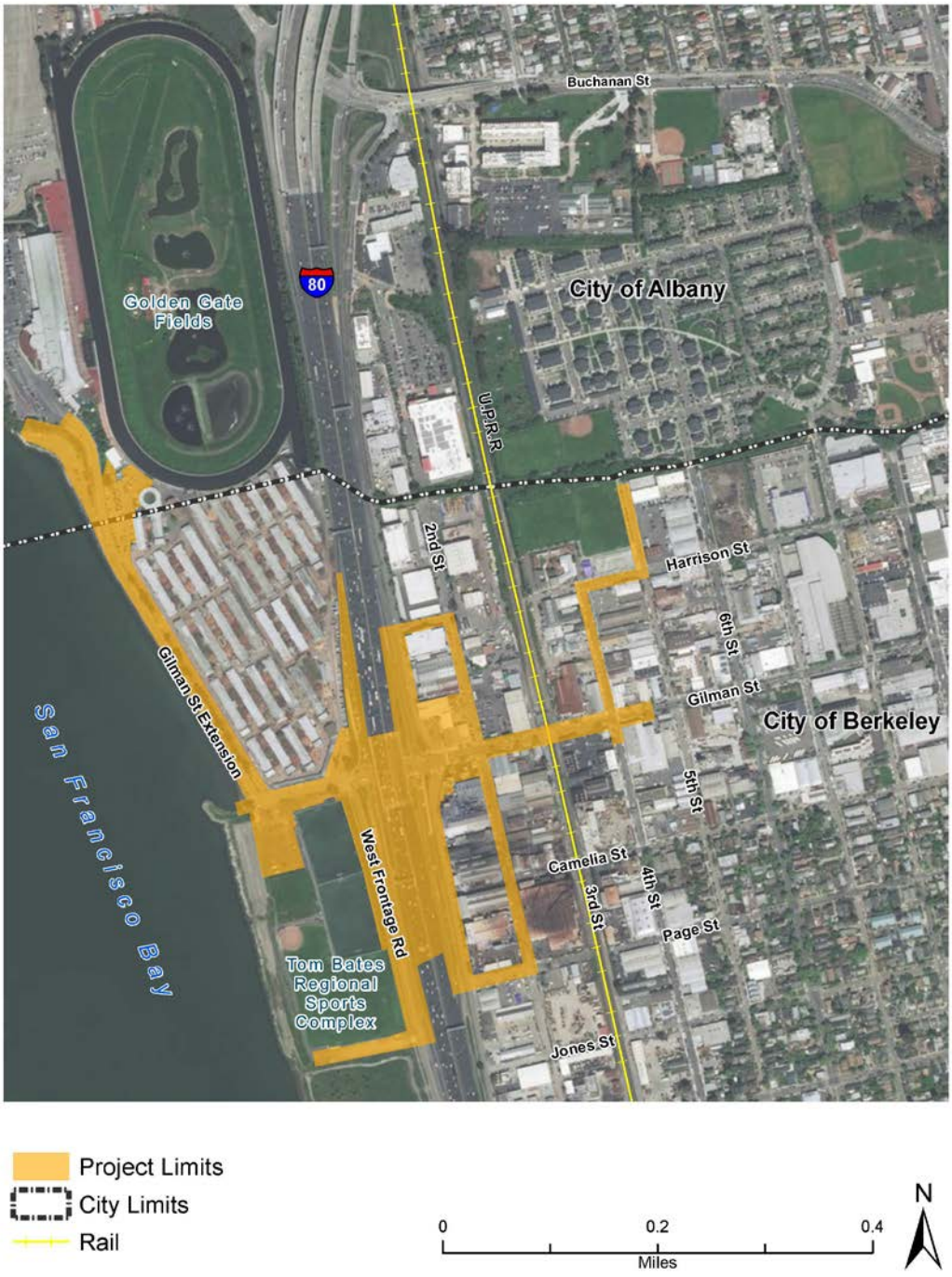

Figure 2. Project Location

Source: Parsons

1.2.1.1 Pedestrian and Bicycle Facilities

A shared-use Class I path consisting of 10-foot-wide travel way with a 2-foot-wide shoulder for pedestrians and bicyclists would be constructed on the south side of Gilman Street from 2nd

Street to the eastern roundabout. The shared-use path would extend south along Eastshore Highway, where it would then connect to a proposed bicycle/pedestrian overcrossing. The overcrossing would be constructed over I-80, merging into the existing San Francisco Bay Trail (Bay Trail) that runs parallel to West Frontage Road. The at-grade shared-use path would continue on the south side of Gilman Street under I-80 and terminate at the Bay Trail on the west side of the interchange.

The bicycle/pedestrian overcrossing would be similar to the existing bicycle/pedestrian overcrossing over I-80 at University Avenue. The structure would be located south of Gilman Street and have a minimum of three spans with a maximum span length of approximately 230 feet over I-80. The foundations for the pedestrian bridge would be located on 2-foot diameter Cast-In-Drilled-Hole piles 120 feet below the existing ground surface. There would be two staircases incorporated into the overcrossing, one on each side of I-80. They would be approximately 45-feet-long with a height of 25 feet to connect to the overcrossing. There would also be retaining walls on the east and west side of the overcrossing; they would be approximately 6-feet-tall at the highest point and taper down to zero. The maximum depth of the retaining wall piles is expected to be 50 feet below the ground surface.

Improvements would be made along 4th Street to Harrison Street to 5th Street to provide bicycle connectivity between the Codornices Creek Path and the two-way cycle track on Gilman Street. These improvements would consist of painted shared-lane markings, also known as sharrows, on the pavement throughout this corridor. Bicycle signage and pedestrian scale lighting would be constructed as part of the improvements.

Approximately 125 feet of new curb, gutter, and sidewalk beginning at the corner of Harrison Street and 4th Street and ending half-way down the block towards 5th Street would be constructed. Parallel parking would be added along this new section of curb and sidewalk. The bus stop located at the corner of 4th Street and Gilman Street would be removed.

The Build Alternative includes a two-way cycle track on the south side of Gilman Street between the eastern I-80/Gilman Street ramps and 4th Street. The two-way cycle track is separated from vehicle traffic with a minimum 3-foot-wide striped buffer and a parking lane in some locations. The addition of the two-way cycle track would require installation of a traffic signal at the intersection of 4th Street and Gilman Street. The northern curb line on Gilman Street would also be shifted 2 to 5 feet north. Along Eastshore Highway, the sidewalk, curb, and gutter would be replaced between Page Street and Gilman Street.

West of the I-80/Gilman Street interchange, the existing Bay Trail would be extended approximately 660 feet west along the south side of Gilman Street from its current terminus at the intersection of West Frontage Road and Gilman Street to just beyond Berkeley city limits. The proposed Bay Trail extension would be 10 feet wide, unstriped, with 2-foot-wide unpaved shoulders on either side of the trail. On-street parking would be reduced by approximately 18 spaces at the end of Gilman Street as a result of the new trail extension.

Additional pedestrian and bicycle improvements include upgrading the 3rd Street/UPRR crossing at Gilman Street to accommodate the cycle track. Improvements would include

relocating the gate, flashing beacons, addition of a bicycle signal, installation of medians, and improved striping and signage. All improvements would be approved by the UPRR and the California Public Utilities Commission.

1.2.1.2 Utilities, Landscaping, and Drainage

Existing PG&E overhead electric lines along Gilman Street, West Frontage Road, and Eastshore Highway would be relocated as part of the Roundabout Alternative. Some of these overhead lines may be placed underground. Minor drainage modifications would also be required to conform to the new roundabout alignment as well as drainage improvements associated with the two-way cycle track along Gilman Street. Utility relocations and new drainage systems may require trenching to a depth of approximately 6 feet.

A separation device would be installed underground along Gilman Street to separate trash, mercury, and polychlorinated biphenyls (PCBs). A tidal flap gate would be installed at the existing headwall of the 60-inch reinforced concrete pipe at the west end terminus of Gilman Street. Replacement of the existing headwall and associated riprap may include in-water work. Work below the ordinary mean high-water mark may be required. Dewatering or a coffer dam may also be required.

New light pole foundations and ramp metering poles would be 2 feet in diameter and would range from 5 to 13 feet deep near the roundabout. An existing East Bay Municipal Utility District (EBMUD) recycled water transmission line would be relocated and extended as part of the Project. Approximately 1,100 feet of a new 12-inch recycled water transmission pipeline within Eastshore Highway from Page Street to Gilman Street and approximately 1,050 feet of pipeline within Gilman Street from 2nd Street to the Buchanan Street extension are part of the Roundabout Alternative. The maximum excavations for the pipe trench would be approximately 24-inches-wide and 60-inches-deep. Approximately 1,100 feet of an existing 10-inch EBMUD recycled water pipeline located within California Department of Transportation (Caltrans) right-of-way (ROW) along the eastbound Gilman Street off-ramp shoulder would be abandoned in place or removed. A new City of Berkeley sewer line would be installed underneath Gilman Street beginning at a point east of the Interchange and ending on the west side I-80 at the approximate entrance to the Tom Bates Sports Complex parking lots.

Existing vegetation is sparse in the Project footprint and consists of ornamental plantings or ruderal vegetation. The Roundabout Alternative would remove existing landscaping and trees on the sidewalk along Eastshore Highway from Page Street to Gilman Street. In addition, trees and/or shrubs would be removed at the I-80 off-ramps, westbound I-80 on-ramp, and along the Bay Trail. Opportunities for new landscaping or artwork would be available in the center of each roundabout. Opportunities for tree replacements on site would be available.

1.2.1.3 Golden Gate Fields Access

The existing driveway entrance to Golden Gate Fields is located immediately adjacent to the westbound I-80 off-ramp at the end of the curb return on Gilman Street. Construction of the roundabout would expand the ramp intersection to the north and would require relocation of the Golden Gate Fields entrance and exit gate to their stables.

Alternate entrance and exit gate options for Golden Gate Fields were evaluated and discussed with Golden Gate Fields management in a series of meetings.

The Build Alternative would relocate the entrance and exit gate to the Gilman Street Extension. The existing gate would be connected to Golden Gate Fields Access Road allowing for the existing security shed to remain in place. The intersection of Gilman Street Extension with Golden Gate Fields Access Road would be improved and Gilman Street would be widened to the south to provide space for two, two-lane roads separated by a median. The Golden Gate Fields north east parking lot would be resized and restriped to allow room for the Gilman Street Extension/Golden Gate Fields Access Road intersection. The existing security shed leading to the north east and northwest parking lots would be moved north and reconstructed with new gates. The Golden Gate Fields north west parking lot would be restriped to maximize the parking spaces. Both parking lots would be repaved, restriped, and lighting and landscaping elements would be added. Golden Gate Fields internal access road and the Gilman Street Extension would be repaved and restriped between Gilman Street and the north east and north west parking lots. Fifteen new parallel parking spaces would be striped along the Gilman Street access road. There would be no net loss of parking for Golden Gate Fields.

The Roundabout Alternative is shown in Figure **3**.

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Figure 3. Roundabout Alternative Layout

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1.2.1.4 Property Acquisitions

Partial acquisitions would be required for ROW from Golden Gate Fields and East Bay Regional Parks District (EBRPD). Relocation of the driveway would be required from a property located on the south side of Gilman and 2nd Streets. Additionally, a permit to construct from Golden Gate Fields would be required to complete improvements on their property. Temporary construction easements would be required for construction equipment storage, staging, and laydown from EBRPD and various property owners along Gilman Street, 4th Street, Harrison Street, and 5th Street.

1.2.1.5 Construction Activities

Construction work for the Roundabout Alternative would be done primarily during daylight hours from 7:00 a.m. to 6:00 p.m.; however, there may be some work during night-time hours to avoid temporary roadway closures for tasks that could interfere with traffic or create safety hazards. Work hours along the internal access road in Golden Gate Field property would be limited to after 10:00 am to 5:00 pm. and night work would be restricted within or adjacent to Golden Gate Fields property. Examples of work activities include striping operations, traffic control setup, installation of storm drain crossings, and asphalt pavement mill and overlay.

Temporary lane and ramp closures and detours would occur. It is anticipated that temporary closure of existing bicycle or pedestrian facilities would occur at times and may require temporary rerouting of transit service due to intersection work. A Transportation Management Plan (TMP) would be developed and implemented as part of the Project construction planning phase. The TMP would address potential impacts to circulation of all modes of travel (i.e., transit, bicycles, pedestrians, and private vehicles). Roadway and/or pedestrian access to all occupied businesses and respective parking lots would be maintained during Project construction. The TMP would include an evaluation of potential impacts because of diverting traffic to alternate routes, and it would also include measures to minimize, avoid, and/or mitigate impacts to alternate routes, such as agreements with local agencies to provide enhanced infrastructure on arterial roads or intersections to deal with detoured traffic. The TMP may provide for contracting with local agencies for traffic personnel, especially for special event traffic through or near the construction zone.

The anticipated construction staging areas available include areas within the existing roadway ROW construction limits. An additional staging area may be required west of the Project on Gilman Street in one or two parking lots owned by EBRPD. Staging areas are shown on Figure **3**.

The following equipment is anticipated to be used during construction: auger drill rig, backhoe, compactor, concrete pump, crane, dozer, excavator, front end loader, grader, heavy duty dump trucks, jackhammer, vibratory roller, and pavement breaker.

1.3 Construction General Permit Risk Assessment

This Project would disturb more than one acre of soil and must comply with the Construction General Permit (CGP), which includes performing a risk level determination to determine the required monitoring and sampling of stormwater during construction. The risk level assessment is determined from the combined receiving water risk and sediment risk.

The Project has a high receiving water risk because one of the Project's receiving waterbodies, Codornices Creek, has the combined existing beneficial uses of cold freshwater habitat, fish spawning, and fish migration.

The sediment risk factor is determined from the product of the rainfall erosivity factor (R), the soil erosion factor (K), and the length-slope factor (LS). The R, K, and LS factor information is included in Appendix A of this report. Using the method described in the United States Environmental Protection Agency's (U.S. EPA) "Construction Rainfall Erosivity Waiver" fact sheet, for a construction duration of two years, the calculated R factor at the Project site is 80. The K factor, stated in Section 0, is 0.37. The Caltrans' *Water Quality Planning Tool* (2012) identifies the LS factor as 0.47 for the Project area. The product of these values is 14 (80 x 0.37 x 0.47); because this value is less than 15, the Project has a low sediment risk.

The high receiving water and low sediment risks result in the Project being classified as Risk Level 2. Therefore, in addition to implementation of standard construction site best management practices (BMPs), the contractor would be required to perform quarterly non-stormwater discharge visual inspections, and rain event visual inspections pre-storm, daily during a storm event, and post-storm. Risk Level 2 projects are also required to implement Rain Event Action Plans and comply with Numeric Action Level effluent limits for pH and turbidity. This assessment may be updated during the Plans, Specifications, and Estimates (PS&E) phase as more detailed Project information becomes available.

2 REGULATORY SECTION

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 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 would 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. EPA Section 404 (b)(1) Guidelines (U.S. EPA 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 if 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 the 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.," such as groundwater and surface waters that are 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 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 waterbody segments in their jurisdictions, and then set standards necessary to protect these uses. Consequently, the water quality standards developed for particular waterbody segments are based on the designated use and vary depending on such use. Waterbody 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 Waste Discharge Requirements), 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 IV of the Caltrans Statewide MS4, as it includes specific TMDLs for which Caltrans is the named stakeholder.

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

2.2.3.1 Municipal Separate Storm Sewer Systems (MS4)

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 storm water, that are designed or used for collecting or conveying stormwater." The SWRCB has identified the Department as an owner/operator of an MS4 pursuant to federal regulations. The Department's MS4 permit covers all Department 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.

The Department's MS4 Permit, NPDES No. CAS000003, SWRCB Order No. 2012-0011-DWQ (adopted on September 19, 2012 and effective on July 1, 2013), as amended by Order No. 2014-0006-EXEC (effective January 17, 2014), Order No. 2014-0077-DWQ (effective May 20, 2014) and Order No. 2015-0036-EXEC (conformed and effective April 7, 2015) contains three basic requirements:

1. The Department must comply with the requirements of the CGP (see below);

2. The Department must implement a year-round program in all parts of the State to effectively control stormwater and non-stormwater discharges; and

3. The Department stormwater discharges must meet water quality standards through implementation of permanent and temporary (construction) BMPs to the Maximum Extent Practicable, and other measures deemed necessary by the SWRCB and/or other agency having authority reviewing the stormwater component of the project.

To comply with the permit, the Department developed the Statewide Storm Water Management Plan (SWMP) to address stormwater pollution controls related to highway planning, design, construction, and maintenance activities throughout California. The SWMP assigns responsibilities within the Department 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 the minimum procedures and practices the Department 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. The proposed Project would be programmed to follow the guidelines and procedures outlined in the latest SWMP to address stormwater runoff.

2.2.3.2 Construction General Permit

Construction General Permit (NPDES No. CAS000002, SWRCB Order No. 2009-0009-DWQ, adopted on November 16, 2010) became effective on February 14, 2011 and was amended by Order No. 2010-0014-DWQ and Order No. 2012-0006-DWQ. The permit 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 Storm Water Pollution Prevention Plan (SWPPP) Developer (QSD) to develop and implement an effective SWPPP. All Project Registration Documents, including the SWPPP, are required to be uploaded into the SWRCB's on-line Stormwater Multiple Application and Report Tracking System (SMARTS), at least 30 days prior to construction.

2.2.3.2.1 Waivers from CGP Coverage

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 R factor of the **Watershed Erosion Estimate (=RxKxLS) in tons/acre is less than 5**. Within this CGP formula, there is a factor related to when and where the construction would take place. This factor, the 'R' factor, may be low, medium or high. 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.

In accordance with SWMP, a Water Pollution Control Plan 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.

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 determined. For example, a Risk Level 3 (highest risk) project would require compulsory stormwater runoff pH and turbidity monitoring, and pre- and post-construction aquatic biological assessments during specified seasonal windows.

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 would 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. Further information about regional and local requirements for the Section 401 Water Quality Certification is discussed in Section 2.3.3.

2.2.5 McAteer-Petris Act

California's McAteer-Petris Act, enacted in 1965, establishes policies for fill within the San Francisco Bay and tidally influenced waterways. These include:

- Public benefits from the proposed fill clearly exceeds the public detriment from loss of water areas,
- Further filling should be limited to water-oriented use (including but not limited to ports, water-related industry, airports, bridges, wildlife refuges, and water-oriented recreation and public assembly) or minor fill for improving shoreline appearance or access to the San Francisco Bay,
- Fill should be authorized for any purpose only when no alternative upland location is available for such purpose,
- The water area to be filled should be the minimum amount necessary to achieve the purpose of the fill, and
- That the nature, locations, and extent of any fill should be such that it will minimize harmful effects to the bay area such as the reduction or impairment of the volume of surface area or circulation of water, water quality, fertility of marshes or fish or wildlife resources or other conditions impacting the environment.

The San Francisco Bay Conservation and Development Commission (BCDC) manages the McAteer-Petris Act. The BCDC jurisdiction includes open water, marshes, and mudflats of the greater San Francisco Bay, and portions of most creeks, rivers, sloughs, and other tributaries that flow into San Francisco Bay as well as salt ponds, managed wetlands, and the shoreline band of land extending inland for 100 feet from the San Francisco Bay shoreline (BCDC 2015).

2.3 Regional and Local Requirements

2.3.1 RWQCB Basin Plan

The Project is within the jurisdiction of the San Francisco Bay RWQCB, Region 2. The *San Francisco Bay Basin (Region 2) Water Quality Control Plan* (Basin Plan) (2017) states the goals and policies, beneficial uses, and water quality objectives that apply to water bodies throughout the San Francisco Bay region, which includes the Project area. The Basin Plan has been adopted

by the SWRCB, U.S. EPA, and Office of Administrative Law. Excerpts from the Basin Plan are included in Appendix B of this WQAR.

2.3.2 MS4

The Project would include work along Gilman Street, Harrison Street, 2nd Street, 4th Street, 5th Street, Page Street, Eastshore Highway, West Frontage Road, and Buchanan Street extension, which are within the City of Berkeley's urban area, and are covered under the San Francisco Bay Municipal Regional Permit (MRP), Order No. R2-2015-0049. Work within the Golden Gate Fields is within the City of Albany's urban area, which is also covered under the MRP.

The Cities of Berkeley and Albany are member agencies of the Alameda County Clean Water Program (ACCWP). The ACCWP developed the *C.3 Stormwater Technical Guidance* (2017) to summarize the requirements of the MRP and provide guidance for low-impact development design strategies and specific BMP selection criteria. This manual provides technical guidance for project designs that require the implementation of permanent stormwater BMPs and hydromodification assessment, susceptibility, and management measures throughout Alameda County. Selection, placement, and design of stormwater treatment BMPs within the City of Berkeley's and City of Albany's ROW would adhere to the guidance document.

2.3.3 San Francisco Bay RWQCB Section 401 Water Quality Certification

The Project would require a Section 401 Water Quality Certification for work at the Gilman Street outfall. Per the *Memorandum of California Department of Transportation Post-Construction Stormwater and Hydromodification Standards* (CIWQS Place No. 212806 [BT]) (San Francisco Bay RWQCB 2008), the San Francisco Bay RWQCB requires Caltrans District 4 projects that are subject to a Section 401 Water Quality Certification to design bioretention devices for full stormwater treatment and implement hydromodification assessment and management measures, if applicable, per the local city/county stormwater design criteria. Bioretention devices would be designed per the Caltrans design criteria, and the hydromodification assessment would be done per the ACCWP's *C.3 Stormwater Technical Guidance* (2017). These requirements are discussed in Section 4.2.1.2 and Section 4.2.1.5, respectively.

3 AFFECTED ENVIRONMENT/EXISTING CONDITIONS

This section describes the existing conditions within the Project area. The Project limits are within the jurisdiction of the San Francisco Bay RWQCB, Region 2. The RWQCB refers to the San Francisco Bay adjacent to the Project as the San Francisco Bay Central in the Basin Plan and the *2014/2016 California Integrated Report (Clean Water Act Section 303[d] List / 305[b] Report)*; both naming conventions are used throughout depending on the source and intent of information presented.

3.1 General Setting

3.1.1 Population and Land Use

The 2016 U.S. Census Bureau (2016) determined the population of Berkeley to be approximately 121,240 and the population of Albany to be approximately 19,688. The land use immediately surrounding the Project area is highly urbanized. Locally, the land use within the existing interchange is dedicated freeway. Land use along Gilman Street consists primarily of manufacturing and industrial uses with commercial and residential land uses existing near Gilman Street to the east of I-80. Land use along Harrison Street consists of manufacturing, industrial, and open space. The area west of I-80 is designated as open space and waterfront/marina (City of Berkeley 2009). The Tom Bates Regional Sports Complex, which is within the Eastshore State Park, is located west of I-80. Land use at Golden Gate Fields is designated as commercial recreation (City of Albany 2016).

3.1.2 Topography

The Project area is relatively flat, sloping from east to west towards the San Francisco Bay. Along Gilman Street the elevations in North American Vertical Datum of 1988 (NAVD 88) range from 11.7 feet west of West Frontage Road to 13.8 feet at the I-80 eastbound ramp intersection. I-80 is elevated on fill north and south of Gilman Street and crosses over Gilman Street in an elevated bridge structure with a vertical clearance of approximately 15 feet (Caltrans 2014).

3.1.3 Hydrology

3.1.3.1 Regional Hydrology

Per the CalWater watershed delineation in Caltrans' *Water Quality Planning Tool* (2012), the Project area is mostly within an undefined Hydrologic Sub-Area (#203.30) of the Berkeley Hydrologic Area and Bay Bridges Hydrologic Unit, and a portion of Gilman Street Extension is within an undefined Hydrologic Sub-Area (#203.10) of the Bay Waters Hydrologic Area and Bay Bridges Hydrologic Unit. The Alameda County Flood Control and Water Conservation District (ACFC&WCD) identifies the Project area as within the Gilman Street, Codornices Creek, and Schoolhouse Creek watersheds.

3.1.3.2 Local Hydrology

The Gilman Street watershed drains the majority of the Project area to the west of the I-80 eastbound on- and off-ramps and most of the Project area on the north side of Gilman Street

(ACFC&WCD 2014a). The Gilman Street watershed is a storm drain system located between the Codornices Creek and Schoolhouse Creek watersheds. The Schoolhouse Creek watershed drains the portion from the south side of Gilman Street between the Eastshore Highway and the UPRR tracks. The Schoolhouse Creek watershed is a storm drain system, with some portions natural creek upstream of San Pablo Avenue (ACFC&WCD 2014b). The Codornices Creek watershed drains the small remaining portion of the Project area along 5th Street north of Harrison Street. The Codornices Creek watershed has a drainage system consisting of storm drains, engineered channels, and natural creeks. The natural creek portions are upstream of 8th Street (ACFC&WCD 2014a). See the Project's *Location Hydraulic Study Report* for further information (WRECO 2018a).

3.1.3.2.1 Precipitation and Climate

According to the Köeppen climate classification system, the Project area has a Mediterranean climate, characterized by hot, dry summers and mild, moist winters (George 2015). The Project area generally experiences precipitation between mid-October and mid-April. A climate summary for the nearest National Oceanic and Atmospheric Administration (NOAA) weather station with similar elevation and topography to the Project reports the following precipitation and temperature information (Western Regional Climate Center 2016):

Berkeley Station 040693

- Average annual rainfall for Berkeley is 23.41 inches
- Average temperatures range seasonally from 49.2 to 64.9 degrees Fahrenheit (ºF)

The maximum average temperature reported for the Project area was 71.8 ºF in September and the minimum average temperature was 42.7 ºF in December. The wettest month of the year is January with an average rainfall of 4.98 inches, and the driest month is July with an average of 0.03 inches. Winter storms are usually of moderate duration and intensity (Western Regional Climate Center 2016).

3.1.3.2.2 Surface Waters

The Project's receiving waterbodies are the San Francisco Bay Central, Schoolhouse Creek, and Codornices Creek. There are no surface waters within the Gilman Street watershed. Runoff from the Project is either collected or conveyed through a system of culverts or sheet flows directly into the San Francisco Bay Central**,** Schoolhouse Creek, or Codornices Creek**.** Schoolhouse Creek is located outside the Project limits and runs under Virginia Street, crossing I-80 at approximately PM 6.15. Sheet flow from 5th Street would discharge into Codornices Creek. Codornices Creek is located at the border of the Project limits on 5th Street, crossing I-80 at approximately PM 6.91. No work is proposed at this creek crossing.

Surface Water Quality Objectives/Standards and Beneficial Uses

Water quality objectives are numeric and narrative objectives used to define the appropriate levels of environmental quality, to protect beneficial uses, and to manage activities that can impact aquatic environments. The San Francisco Bay RWQCB Basin Plan (2017) lists the following narrative and numeric water quality objectives for the region's surface waters: bacteria, bioaccumulation, biostimulatory substances, color, dissolved oxygen, floating material,

oil and grease, population and community ecology, pH, radioactivity, salinity, sediment, settleable material, suspended material, sulfide, taste and odors, temperature, toxicity, turbidity, and un-ionized ammonia. The water quality objectives from the Basin Plan (2017) are included in Appendix B.1 of this WQAR.

Protection and enhancement of existing and potential beneficial uses are primary goals of water quality planning. The Basin Plan (2017) does not list any beneficial uses for the Project-related drainage outfalls to the Gilman Street watershed or Schoolhouse Creek, but it does list the following beneficial uses for the San Francisco Bay Central and Codornices Creek.

Table 1. Listed Beneficial Uses for Project Receiving Waters

Water Body	Beneficial Uses												
	IND	PROC	COMM	SHELL	COLD	EST	MIGR	RARE	SPWN	WILD	REC-1	REC-2	NAV
San Francisco Bay Central	E	E	E	E	-	E	E	E	E	E	E	E	E
Codornices Creek	-	-	-	-	E	-	E	E	E	E	E	E	-

Source: San Francisco Bay RWQCB 2017

Notes:

- IND - industrial service supply
- PROC - industrial process supply
- COMM - commercial and sports fishing
- SHELL - shellfish harvesting
- EST - estuarine habitat
- MIGR- fish migration
- RARE - preservation of rare and endangered species
- SPWN - fish spawning
- WILD - wildlife habitat
- REC-1 - water contact recreation
- REC-2 - non-contact water recreation
- NAV - navigation
- E - existing

Detailed descriptions of the beneficial uses from the Basin Plan are included in Appendix B.2 of this WQAR.

Water Quality Impairments and Total Maximum Daily Loads (TMDL)

The *2014/2016 California Integrated Report (Clean Water Act Section 303[d] List / 305[b] Report)* (SWRCB 2018) does not list the Gilman Street watershed or Schoolhouse Creek as pollutant impaired. The San Francisco Bay Central and Codornices Creek are impaired with pollutants listed in Table 2. Of these pollutants, Caltrans and the cities of Berkeley and Albany are named stakeholders for the mercury, PCBs (including dioxin-like PCBs), and trash TMDLs at the San Francisco Bay Central under their MS4 permits.

Table 2. 303(d) Listed Pollutants

Water Body	Pollutant	Potential Source	Estimated TMDL Completion Date
Codornices Creek	Temperature, water	Source Unknown	2021
	Trash	Source Unknown	Attainment by 2029
San Francisco Bay Central	Chlordane	Source Unknown	2013
	DDT (Dichlorodiphenyl-trichloroethane)	Source Unknown	2013
	Dieldrin	Source Unknown	2013
	Dioxin compounds (including 2,3,7,8-TCDD)	Source Unknown	2019
	Furan Compounds	Source Unknown	2019
	Invasive Species	Source Unknown	2019
	Mercury	Atmospheric Deposition Industrial Point Sources Municipal Point Sources Natural Sources Nonpoint Source Resource Extraction	U.S. EPA Approved February 12, 2008
	PCBs	Source Unknown	U.S. EPA Approved March 29, 2010
	PCBs (dioxin-like)	Source Unknown	U.S. EPA Approved March 29, 2010
	Selenium	Source Unknown	U.S. EPA Approved August 23, 2016
	Trash	Source Unknown	2021

Source: SWRCB 2018

3.1.3.2.3 Floodplains

The Federal Emergency Management Agency's (FEMA's) Flood Insurance Rate Maps were researched for floodplain information. The Zone VE floodplain associated with San Francisco Bay extends within the Project area and covers Gilman Street west of I-80, which is within the Project limits. Zone VE represents coastal flood zone areas with velocity hazard (wave action) and inundated by the 100-year base flood. The base flood elevation for the floodplain within this

area is 9 to 10 feet NAVD 88. These water surface elevations account for storm surge and wave run-up. The surface elevations in the Project area range from approximately 9.0 to 20.0 feet NAVD 88, which are just above the height of the water surface during the 100-year flood in Zone VE.

A majority of the Project area east of I-80 is identified as being within shaded Zone X. This zone represents areas of 0.2% annual chance flood. The shaded Zone X area is likely attributed to Codornices Creek where, according to FEMA, shallow flooding occurs rather than typical valley floodways and floodplains. The edge of the Project layout lies adjacent to the Zone AO—associated with Codornices Creek—with an average flood depth of 2 feet. The Zone AO floodplain represents areas subject to inundation by 1-percent-annual-chance shallow flooding (usually sheet flow on sloping terrain) where flood depths are between one and three feet. Project areas outside of Zones VE, AO, and shaded Zone X are in the unshaded Zone X, which represents areas outside the Special Flood Hazard Area and above the elevation of the 0.2% annual chance flood. See the Project's *Location Hydraulic Study Report* for further information (WRECO 2018a).

3.1.3.2.4 Municipal Supply

The Caltrans *District 4 Work Plan* (Caltrans 2017) does not identity any drinking water reservoirs and recharge facilities along I-80 or near the Project area. The San Francisco Bay RWQCB Basin Plan (2017) does not identify the San Francisco Bay Central or Codornices Creek as having the beneficial use of municipal and domestic supply.

3.1.3.3 Groundwater Hydrology

The Project lies within the East Bay Plain sub-basin of the Santa Clara Valley groundwater basin (Basin No. 2-9.04). The East Bay Plain sub-basin covers 77,800 acres of Alameda and Contra Costa counties and has a total storage capacity of 2,670,000 acre-feet (California Department of Water Resources 2003). According to the *Preliminary Geotechnical Design Recommendations for I-80/Gilman Interchange Technical Memorandum* (WRECO 2016a), the available log of test borings identifies groundwater to be encountered approximately 7 to 8 feet below current grade.

3.1.3.3.1 Groundwater Quality Objectives/Standards and Beneficial Uses

The San Francisco Bay RWQCB Basin Plan (2017) identifies narrative and numerical groundwater objectives for the region (Appendix B.1). It states, "at a minimum, groundwater shall not contain concentrations of bacteria, chemical constituents, radioactivity, or substances producing taste and odor." The Basin Plan (2017) lists the following existing beneficial uses for the East Bay Plain groundwater sub-basin:

- Municipal and domestic water supply
- Industrial process water supply
- Industrial service water supply
- Agricultural water supply

Detailed descriptions of the beneficial uses from the Basin Plan are included in Appendix B.2 of this WQAR.

Although the groundwater basin has the above-listed existing beneficial uses, the groundwater is not used for water supply by the cities within the Project area.

3.1.4 Geology/Soils

Available log of test borings identifies the soils within the top 10 feet of the surface as very loose to loose sand and very soft organic clay (Bay Mud) with approximately 5 to 10 feet of the surface soils being fill material (Caltrans 2014).

The Natural Resources Conservation Service's "Web Soil Survey" (U.S. Department of Agriculture 2018) classifies the area as Urban Land. Urban Land is defined as land covered by buildings, roads, parking lots, and other structures. The soil within this unit is heterogeneous fill derived from various sources. Many areas designated under this map unit consist of reclaimed land adjacent to San Francisco Bay. The Urban Land soil unit has not been assigned a Hydrologic Soil Group.

3.1.4.1 Soil Erosion Potential

The erosion factor (K) indicates the erodibility of the fine-earth fraction of the soil. The factor is given as a percentage or fraction ranging from 0.02 to 0.69; the higher the value, the more susceptible the soil is to sheet and rill erosion by water. The Caltrans' *Water Quality Planning Tool* (Caltrans 2012) identifies the K value of the area to be 0.37 (Appendix A), which suggests the soils have a moderate potential for erosion. However, the Caltrans *District 4 Work Plan* (Caltrans 2017) does not identify any slopes prone to erosion along I-80 near or within the Project area.

3.1.5 Biological Communities

The following sections summarize the information from the *Natural Environment Study* (WRECO 2018b), which provides detailed information regarding the biological communities within the biological study area (BSA), as defined in the *Natural Environment Study*.

3.1.5.1 Aquatic Habitat and Wetlands

Estuarine habitat is located in the far western portion of the BSA, just beyond the rock slope protection that forms the existing shoreline of San Francisco Bay. The entire San Francisco Bay is classified as Essential Fish Habitat for species managed under the Pacific Coast Salmon Fishery Management Plan (FMP) and also for species managed under the Coastal Pelagic Species FMP and Pacific Coast Groundfish FMP.

A wetland delineation was conducted in 2016 in areas that exhibited characteristic wetland vegetation and/or hydrologic indicators (WRECO 2017). The USACE did not take jurisdiction over any of the delineated features within the BSA. The USACE did take jurisdiction over a small depression located in the southeast corner of the Tom Bates Sports Complex near the Bay Trail, but this depression is not located within the BSA or the Project footprint.

A wetland delineation addendum was prepared in 2018 that encompassed areas that have been added to the Project area since the original wetland delineation was performed in 2016 (Johnson Marigot Consulting 2018). The wetland delineation addendum did not identify any new wetlands

within the BSA. The only jurisdictional feature delineated within the BSA was the San Francisco Bay. Field marks observed indicative of the high-tide line included: a line of algae along the shoreline protection, fine shell and debris along the beach, and deposition of floating debris near the algae colonization on rock slope protection (RSP). The mean high water mark was determined to be 5.62 feet (NAVD 88).

There are no special aquatic sites within the BSA. Near the Gilman Street outfall, the beach is sandy and is therefore not considered to be a mudflat. Additionally, there are no vegetated shallows, which include eelgrass (*Zostera marina*) beds, within the BSA. However, eelgrass beds are located just beyond the western boundary of the BSA in the waters of San Francisco Bay near Golden Gate Fields (NOAA Fisheries 2014).

3.1.5.2 Special-Status Species

There are 19 special-status wildlife species that have the potential to occur within the BSA: green sturgeon (*Acipenser medirostris*)– southern Distinct Population Segment (DPS), steelhead (*Oncorhynchus mykiss irideus*) – central California coast DPS and Central Valley DPS, Chinook salmon (*Oncorhynchus tshawytscha*) – Central Valley spring run Evolutionary Significant Unit (ESU) and Sacramento River winter run ESU, western pond turtle (*Emys marmorata*), brant (*Branta bernicla*), northern harrier (*Circus cyaneus*), white-tailed kite (*Elanus leucurus*), American peregrine falcon (*Falco pereginus anatum*), short-eared owl (*Asio flammeus*), burrowing owl (*Athene cunicularia*), western snowy plover (*Charadrius nivosus ssp. nivosus*), California least tern (*Sternula antillarum browni*), saltmarsh common yellowthroat (*Geothlypis trichas sinuosa*), Alameda song sparrow (*Melospiza melodia pusillula*), pallid bat (*Antrozous pallidus*), Townsend's big-eared bat (*Corynorhinus townsendii*), and western red bat (*Lasiurus blossevillii*). There are no special-status plant species within the BSA.

3.1.5.3 Stream/Riparian Habitats

There is no stream/riparian habitat within the Project area. The nearest stream/riparian habitat, which is in the BSA, is located at Codornices Creek.

3.1.5.4 Fish Passage

Habitat connectivity within the BSA and in the vicinity of the BSA is limited due to the presence of the built environment. The riparian and aquatic habitat associated with Codornices Creek provides a mostly uninterrupted east-west dispersal corridor for wildlife, including fish, though several culverts may impede or limit connectivity. The creek also supports a spawning population of steelhead (Central California coast DPS) (Codornices Creek Watershed Council 2011). The Gilman Street watershed consists entirely of underground drainage culverts. Although fish or other aquatic species may incidentally enter these underground culverts, they do not provide connectivity to any upstream aquatic habitat of ecological value.

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4 ENVIRONMENTAL CONSEQUENCES

4.1 Introduction

The following sections present the potential temporary and permanent water quality impacts from the Project activities and standard BMPs that would be implemented to avoid these impacts.

Temporary water quality impacts can result from sediment discharge from DSAs and construction near water resources or drainage facilities that discharge to waterbodies. Permanent impacts to water quality result from the addition of impervious area; this additional impervious area prevents runoff from naturally dispersing and infiltrating into the ground, resulting in increased concentrated flow. The estimates for DSA, the added and removed impervious area, the replaced impervious surface (RIS), and the new impervious surface (NIS) for the Build Alternative are listed in Table 3. The DSA and impervious area values would be further refined during the PS&E phase once the limits of grading, construction staging locations, roadway geometry, and other areas of improvements have been further developed.

Table 3. Project DSA and Impervious Areas

Project Right-of-Way	DSA (acres)	Existing Impervious Area (acres)	Added Impervious Area (acres)	Removed Impervious Area (acres)	RIS (acres)	NIS (acres)
Caltrans	5.59	3.73	0.44	0.66	3.10	2.88
City of Berkeley	2.97	7.90	0.25	0.09	2.55	2.80*
City of Albany (Golden Gate Fields)	0.27	5.13	0.002	0.14	0.13	0.13*
Total	8.83	16.76	0.69	0.89	5.78	5.81

***** The MRP quantifies added and replaced impervious areas for treatment goals and does not take into account of removed impervious area.

4.2 Potential Impacts to Water Quality

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

The following sections describe the specific physical and chemical characteristics that can potentially be impacted by the Project. It is anticipated that the Project would result in minimal permanent changes to the physical and chemical characteristics of the aquatic environment.

4.2.1.1 Currents, Circulation, or Drainage Patterns

The Project would not alter the greater existing drainage pattern of the watersheds in which it is located. Proposed drainage facilities would ultimately connect to existing drainage facilities, which connect to the existing outfalls to the San Francisco Bay or Schoolhouse Creek. Locally, within the limits of the Project, existing drainage facilities are expected to be modified or removed, capped, or abandoned, and new drainage features installed to convey runoff. A tidal

flap gate is proposed at the Gilman Street outfall. This would reduce tidal backwater flow from entering into the Project area and water quality impacts to stormwater treated from BMPs. See the Project's *Location Hydraulic Study* (WRECO 2018a) for further information about the flap gate. The proposed road striping on 4th Street, Harrison Street, and 5th Street would not require new drainage facilities.

4.2.1.2 Suspended Particulates (Turbidity)

While the added impervious area could result in an increase of sediment-laden flow directly discharging to receiving waterbodies, the proposed added impervious area is minimal, especially in comparison to the existing impervious area, so the potential increase in sediment-laden flows is expected to be minimal. Additionally, any stormwater impacts would be avoided through the proper implementation of permanent erosion control, design pollution prevention, and stormwater treatment measures. These BMPs are summarized in Table 4.

Permanent erosion control measures would be applied to all exposed areas once grading or soil disturbance work is completed as a permanent measure to achieve final slope stabilization. These measures may include hydraulically applying a combination of hydroseed with a native seed mix, hydromulch, straw, tackifier, and compost to promote vegetation establishment, and installing fiber rolls to prevent sheet flow from concentrating and causing gullies. For steeper slopes or areas that may be difficult for vegetation to establish, measures such as netting, blankets, or slope paving could be considered to provide permanent stabilization.

Within the limits of the Project, existing drainage facilities are expected to be modified or removed, capped, or abandoned, and new drainage features installed to convey runoff. New drainage features such as energy dissipation devices (e.g. flared end sections and tee dissipaters) should be considered at drainage outfalls to reduce the velocity and dissipate flows as they discharge from the culvert. RSP should also be placed at culvert outfalls and within drainage ditches and swales where velocities may result in rilling or scouring. These drainage design features would limit increases in suspended sediment in storm drain systems and receiving waterbodies. These BMPs would be further considered and incorporated as appropriate during the PS&E phase.

This Project is required to implement treatment BMPs within Caltrans' ROW because the proposed improvements result in the creation or replacement of more than one acre of impervious area. The treatment BMP strategy for areas within Caltrans' ROW would comply with the Caltrans MS4 Permit and the *Memorandum of California Department of Transportation Post-Construction Stormwater and Hydromodification Standards* (San Francisco Bay RWQCB 2008).

Table 4. Permanent Project Features (BMPs)

Project Feature (BMP)	Purpose
Permanent Erosion Control	
Hydroseed	Water-based mixture of wood/paper fiber (straw), stabilizing emulsion (tackifier), fertilizer, compost, and native seed mix to be applied on unvegetated slopes.
Permanent Fiber Rolls	Degradable fibers rolled tightly and placed on the toe and face of slopes to intercept runoff.
Erosion Control Netting/Blankets	Netting/blankets placed on steep slopes to reduce soil erosion.
Slope Paving	Concrete slopes under bridge decks at abutments to provide erosion control and soil stabilization in areas that do not provide enough light for vegetation establishment.
Drainage Facilities	
Energy Dissipation Devices • Flared end sections • Tee dissipaters	Devices placed at pipe inlets and/or outlets to reduce scour and velocity of stormwater flows prior to discharge to receiving waters.
Rock Slope Protection	Angular rocks placed on streambanks, outfalls, and/or slopes to reduce soil erosion at locations where vegetation cannot be maintained.
Source Control Measures	
Drain Inlet Markers	Markers that inform people to not add pollutants into storm drains.
Protection of Existing Vegetation	Protection of existing trees and/or landscaped areas that would not be disturbed from Project activities.
Plant Selection	Selection of diverse species based on pest-and/or disease-resistance, drought-tolerance, and/or attraction of beneficial insects.
Irrigation Practices for Landscaping	Implementation of an effective irrigation system for landscaped areas and practices to conserve water.
Pesticide Management for Landscaping	Reduction of insect pests, plant diseases, and weeds without the use of pesticides and quick release synthetic fertilizers.
Treatment Measures	
Bioretention Areas	Areas that intercept stormwater runoff and remove sediment and pollutants through infiltration in vegetation and biologically active soils.
Basins	Areas that intercept stormwater runoff and remove sediment and pollutants through detention/infiltration.
Media Filters	Sand filters that remove sediment and total suspended solids (metals, trash, nutrients).
Tree Well Filters	Trees planted along sidewalks that infiltrate stormwater runoff from streets and treat sediment and pollutants.
Low Flow Pumps	Pumps attached to treatment BMPs that redirect polluted stormwater to an approved treatment facility for treatment.
Trash Control Devices	Devices designed to remove trash and other pollutants from stormwater runoff.

Source: Caltrans 2017, ACCWP 2017, City of Berkeley 2016, City of Albany 2012

This Project is also required to implement post-construction stormwater controls within the City of Berkeley's ROW and Golden Gate Fields, located in the City of Albany's ROW, because the proposed improvements are a road project that creates 10,000 square feet (0.23 acres) or more of newly constructed contiguous impervious surface. The Project is required to treat 2.80 acres of NIS in the City of Berkeley's ROW and 0.13 acres of NIS at Golden Gate Fields, due to being part of the common plan of development. The MRP prioritizes the use of low impact

development measures for stormwater treatment controls. These measures are harvesting and use, infiltration, evapotranspiration, and biotreatment. Other conventional treatment measures (e.g. basins and vaults) are allowable under special conditions outlined in the permit.

The Project would consider bioretention in Caltrans, the City of Berkeley, and Golden Gate Fields. Given the Project area has shallow groundwater and is within a densely urban environment, other conventional type treatment measures that capture and treat stormwater runoff may need to be considered for this Project; these devices could include basins, media filters, or tree well filters. In coordination with Caltrans and the cities of Berkeley and Albany, non-standard treatment measures could also be considered, such as the use of low-flow pumps to convey runoff to a treatment facility. The final drainage design, selection of treatment BMP types and locations, and determination of impervious area treated would be refined during the PS&E phase when detailed design information is developed.

4.2.1.3 Oil, Grease, and Chemical Pollutants

Trash, mercury, and PCBs are pollutants of concern at the San Francisco Bay Central, as defined by the San Francisco Bay RWQCB in the *2014/2016 California Integrated Report (Clean Water Act Section 303[d] List / 305[b] Report)* (SWRCB 2018). Heavy metals associated with vehicle tire and brake wear, oil and grease, and exhaust emissions are the primary pollutants associated with transportation corridors. Generally, roadway stormwater runoff has the following pollutants: total suspended solids, nitrate nitrogen, total Kjeldahl nitrogen, phosphorus, ortho-phosphate, copper, lead, and zinc. The pollutants are dispersed from combustion products from fossil fuels, the wearing of brake pads and tires, and tree leaves that have been exposed through aerial deposition. The Project is expected to ease congestion, leading to less deposition of particulates from exhaust and heavy metals from braking.

The Project would implement treatment BMPs to remove pollutants, including trash, mercury, and PCBs, from stormwater runoff before discharging into the San Francisco Bay. The goal of the Project is the fully treat the NIS of 5.81 acres; therefore, the implementation of treatment BMPs would avoid impacts to water quality.

The Project would implement source control measures within the City of Berkeley and Golden Gate Fields, located in the City of Albany. Source control measures applicable to the Project include markers on storm drain inlets, protection of existing vegetation, and proper plant selection, irrigation, and pesticide management for new landscaping (City of Berkeley 2016 and City of Albany 2012).

The Project would implement trash control measures to comply with the trash TMDL at the San Francisco Bay Central. The Project proposes a separation device that would be installed underground along Gilman Street to separate trash, mercury, and PCBs. The design of the separation device would be done during the PS&E phase.

4.2.1.4 Storm, Wave, and Erosion Buffers

The Project proposes modifications to coastal/estuarine areas in San Francisco Bay for installation of the tidal flap gate at the Gilman Street outfall. This area provides a buffer for

coastal erosion, including the existing beach to the west of the RSP as well as the RSP. There would be no impacts to the beach and RSP except for as required to install the flap gate. Within the proposed cofferdam, beach sediment would be removed to allow the existing headwall and wingwalls to be removed. Although some RSP would need to be temporarily removed to replace the headwall and wingwalls, RSP would be replaced after the headwall and wingwalls are installed. Therefore, the only anticipated change to coastal erosion buffers would be a change in the quantity of beach sediment downstream of the culvert outfall. However, sediment deposition during typical tidal cycles would replenish the sediment over time such that there would be no permanent impacts to storm, wave, and erosion buffers within the Project area.

4.2.1.5 Erosion and Accretion Patterns

The Project must consider hydromodification impacts because the Project would overall increase impervious area. In Caltrans' ROW, the Project is required to consider the Alameda County hydromodification assessment criteria per the *Memorandum of California Department of Transportation Post-Construction Stormwater and Hydromodification Standards* (San Francisco Bay RWQCB 2008). The cities of Berkeley and Albany would also adhere to this hydromodification assessment criteria.

Although the Project would increase the impervious area from the pre-project condition, hydromodification impacts are minimal or not anticipated. The majority of the Project area is within an area that is tidally influenced or primarily depositional. A portion of the I-80 westbound off-ramp and a portion of 4th and 5th Streets along Harrison Street are within the Codornices Creek's special consideration area; however, the Project does not propose adding impervious area to these locations. Therefore, hydromodification impacts are not anticipated at Codornices Creek, contingent upon coordination with the City of Berkeley. Mapping from the ACCWP's Hydromodification Susceptibility Map Application (2010) that identifies areas susceptible and not susceptible to hydromodification is included in Appendix C.

4.2.1.6 Groundwater

The Project area is highly urbanized, which limits areas of groundwater recharge. Long-term dewatering activities are not needed for the Project. Therefore, permanent impacts to the East Bay Plan groundwater sub-basin are not anticipated.

4.2.2 Anticipated Changes to the Biological Characteristics of the Aquatic Environment

The following sections summarize the information from the *Natural Environment Study* (WRECO 2018b), which provides detailed information regarding potential changes or impacts to the biological communities and environment for the Project.

4.2.2.1 Aquatic Habitat

As described in Section 3.1.5.1, there are no special aquatic sites within the Project area. However, with implementation of permanent BMPs that limit or prevent discharges of sediment, debris, material, and waste to storm drain inlets and receiving waters, including San Francisco Bay, there would be no direct or indirect impacts to special aquatic sites. ‘

As described in Section 3.1.5.4, the Gilman Street watershed consists of underground drainage culverts that are not hydraulically connected to natural creeks. Therefore, the installation of the flap gate on the outfall of the 60-inch culvert would not impede fish passage at the Gilman Street outfall. No work within the Codornices Creek riparian corridor is proposed; therefore, the Project would not impede fish passage at the creek.

There would be permanent impacts on San Francisco Bay. Permanent impacts would consist of the removal and replacement of the headwall and wingwalls of the outfall for the Gilman Street watershed and the adjacent RSP. Although a new headwall and wingwalls would be constructed and approximately 200 to 300 cubic yards of RSP would be placed around the new headwall and wingwalls, there would be no net fill placed within San Francisco Bay. Therefore, there would not be a permanent loss of aquatic habitat.

4.2.2.2 Wildlife Habitat

The Project does not anticipate encroachment into Codornices Creek. San Francisco Bay is identified as having beneficial use of wildlife habitat; however, no permanent impacts are expected. Should wildlife be encountered, the Contractor should work with appropriate Caltrans biologists in accordance with the Project specifications.

There are no anticipated permanent impacts to endangered or threatened species. Should wildlife be encountered, the Contractor should work with appropriate Caltrans biologists in accordance with the Project specifications.

4.2.2.3 Invasive Species

Invasive plant species were found within the Project area. The Project would comply with Executive Order 13112. This order is designed to prevent the introduction of invasive species and provide for their control in order to minimize economic, ecological, and human health impacts. Noxious weeds are defined and prioritized by the California Department of Food and Agriculture or the California Invasive Plant Council and will be identified at the site by Caltrans-approved biologists.

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

There are no natural sources of water supply identified within the Project area, so no permanent impacts are anticipated. Any manmade water supplies (e.g. potable or non-potable water lines) would be protected in place or relocated in accordance with the Project plans and specifications developed during the PS&E phase.

4.2.3.2 Recreational or Commercial Fisheries

The San Francisco Bay Central, as defined by the San Francisco RWQCB in the Basin Plan, has the beneficial use of commercial and sport fishing, and recreational fishing may be allowed along the Gilman Street shoreline. Commercial fisheries managed by NOAA are also present within the San Francisco Bay. The Project proposes work within the San Francisco Bay in order

to install a tidal flap gate on the Gilman Street outfall. Potential impacts on fisheries and aquatic habitat in San Francisco Bay would be avoided with standard construction site BMPs, water quality monitoring, and good housekeeping practices. Therefore, permanent impacts on recreational and commercial fisheries and fish habitat would be minimal. The Project's *Natural Environment Study* (NES) (WRECO 2018b) provides further information impacts on fisheries and associated project features.

Codornices Creek and the San Francisco Bay Central have the beneficial uses of both contact and non-contact water recreation. The Project would not encroach into Codornices Creek, and the road striping would not impact the creek's recreational uses. The Project would also improve access to the San Francisco Bay through construction of the proposed pedestrian overcrossing and two-way cycle track. Therefore, impacts to recreational or commercial fisheries are not anticipated.

4.2.4 Temporary Impacts to Water Quality

4.2.4.1 Stormwater

The Project would have potential short-term water quality impacts during construction. Project grading and excavation activities would have the potential to increase erosion and result in temporary water quality impacts. The Project would disturb an estimated 8.66 acres of soil during construction. Stormwater runoff over DSAs could potentially cause sediment-laden flows to enter storm drainage facilities sheet flowing discharge into Schoolhouse Creek or the San Francisco Bay or sheet flow discharges into Codornices Creek, increasing the turbidity, decreasing the clarity, and potentially impacting the beneficial uses of the bay. Generally, as the DSAs increase, the potential for temporary water quality impacts also increases. Additional sources of sediment include uncovered or improperly covered active and non-active stockpiles, unstabilized slopes and construction staging areas, and construction equipment not properly maintained or cleaned.

If fueling or maintenance of construction vehicles occurs within the Project site during construction, there is a risk of accidental spills or releases of fuels, oils, or other potentially toxic materials. An accidental release of these materials may pose a threat to water quality if contaminants enter storm drains, open channels, or receiving bodies. The magnitude of the impact from an accidental release depends on the amount and type of material spilled.

Temporary impacts to water quality during construction can be avoided by implementing temporary construction site BMPs. Typical construction site BMPs that should be considered for this Project is listed in Table 4. The selected BMPs are consistent with the practices required under the CGP. There are existing treatment BMPs within the limits of the Project that would need to be protected during construction. The actual minimum temporary construction site BMPs necessary for the Project to comply with the CGP, Caltrans, and cities of Berkeley and Albany standards would be determined during the PS&E phase.

The CGP, Caltrans, City of Berkeley, and City of Albany standards require the Project's contractor to implement a SWPPP to comply with the conditions of the CGP. The SWPPP would be submitted by the Contractor and approved by Caltrans prior to the start of construction. The SWPPP would detail the measures to address the temporary water quality impacts resulting from

construction activities associated with this Project. The SWPPP would also include the development of a Construction Site Monitoring Program that presents procedures and methods related to the visual monitoring, sampling, and analysis plans.

In compliance with the CGP, prior to any soil disturbance work, a Notice of Intent would need to be filed with the SWRCB's Storm Water Multiple Application and Report Tracking System. To maintain proper permit coverage under the CGP, in addition to filing a Notice of Intent, all dischargers must electronically file Permit Registration Documents, Notice of Termination, changes of information, sampling and monitoring information, annual reporting, and other required compliance documents through the SWRCB's Storm Water Multiple Application and Report Tracking System.

A temporary clear water diversion system may be necessary for the work at the Gilman Street outfall. Design and management of the clear water diversion system would adhere to the Caltrans *Standard Specifications* (Caltrans 2015). The installation and removal of the cofferdam may disturb the sandy substrate and result in an increase of suspended sediment concentrations during the following high tide, resulting in a temporary degradation of water quality. Because the substrate is predominantly sandy, suspended sediment is anticipated to fall out of suspension relatively quickly. However, the silt or clay content of the substrate, if any, would remain suspended for a longer duration. Nevertheless, these changes in water quality would be temporary, minimal, and localized to the immediate vicinity of the work site.

4.2.4.2 Groundwater

Dewatering activities are expected be necessary for this Project due to the shallow groundwater and work within the San Francisco Bay. Work that would likely require dewatering activities include placement of the pedestrian bridge overcrossing footings and retaining wall piles and installation and removal of the cofferdam at the Gilman Street outfall. Dewatering activities would comply with Caltrans' *Field Guide to Construction Site Dewatering* (2014), Caltrans' *Standard Specifications* (2015), and, if needed, a separate dewatering permit would be obtained prior to the start of construction. Further details of the dewatering activities are discussed in Section 5.2.1.

Table 5. Construction Site Project Features (BMPs)

Project Feature (BMP)	Purpose
Soil Stabilization	
Move-In/Move-Out	Mobilization locations where permanent erosion control or revegetation to sustain slopes is required within the project.
Temporary Cover	Plastic covers for stockpiles.
Sediment Control	
Temporary Fiber Rolls	Degradable fibers rolled tightly and placed on the toe and face of slopes to intercept runoff.
Temporary Silt Fence	Linear, permeable fabric barriers to intercept sediment-laden sheet flow. Placed downslope of exposed soil areas, along channels and project perimeter.
Temporary Drainage Inlet Protection	Runoff detainment devices used at storm drain inlets that is subject to runoff from construction activities.
Tracking Control	
Temporary Construction Entrances/Exits	Points of entrance/exit to a construction site that are stabilized to reduce the tracking of mud and dirt onto public roads.
Street Sweeping	Removal of tracked sediment to prevent them entering a storm drain or watercourse.
Non-Stormwater Management	
Dewatering Operations • Non-stormwater use for dust control • Desilting basins/tanks • Transport to publicly owned treatment works	Dewatering activities associated with stormwater and non-stormwater to prevent the discharge of pollutants from construction site.
Clear Water Diversion • Cofferdams • Berms	System designed to intercept and divert surface water upstream around a construction area and discharge downstream with minimal water quality impacts.
All other anticipated non-stormwater management measures are covered under Job Site Management.	
Waste Management and Materials Pollution Control	
Temporary Concrete Washout Facilities	Specified vehicle washing areas to contain concrete waste materials.
All other anticipated waste management and materials pollution control measures are covered under Job Site Management.	
Job Site Management	
General measures covered under job site management include: • spill prevention and control • materials management • stockpile management • waste management • hazardous waste management • contaminated soil • concrete waste • sanitary and septic waste and liquid waste	Non-stormwater management consists of: • water control and conservation • illegal connection and discharge detection and reporting • vehicle and equipment cleaning • vehicle and equipment fueling and maintenance • paving, sealing, saw cutting and grinding operations • thermoplastic striping and pavement markers • concrete curing and concrete finishing
Miscellaneous job site management includes: • training of employees and subcontractors • proper selection, deployment and repair of construction site Best Management Practices	

Source: Caltrans 2017

4.2.4.3 Biological Characteristics of the Aquatic Environment

The short-term impacts to biological characteristics of the aquatic environment during construction are expected to be minimal. There would be no work within Codornices Creek. Work at the Gilman Street outfall would be centralized at the outfall and not impact sensitive habitats at the San Francisco Bay. Installation and removal of the cofferdam would occur during low tide to prevent the stranding of fish in the work area and subsequently attracting birds that may forage on stranded fish. Water quality monitoring would be performed during and after installation and removal of the cofferdam as well as during dewatering activities to document changes in turbidity in compliance with water quality standards, permits, and approvals from the NOAA Fisheries and/or the California Department of Fish and Wildlife. In the event that high- or medium-priority noxious weeds were disturbed or removed during construction-related activities, the contractor would contain the plant material and dispose of it in a manner that will not promote the spread of the species. The contractor would be responsible for obtaining all permits, licenses, and environmental clearances for properly disposing of materials. Further information of BMPs listed in Table 5 and additional BMPs for biological resources are discussed in the Project's *Natural Environment Study* (WRECO 2018b).

4.2.4.4 Human Use Characteristics of the Aquatic Environment

The short-term impacts to human use characteristics of the aquatic environment during construction are expected to be minimal. Access to the San Francisco Bay and its recreational uses would be maintained during construction, although temporary lane or road closures could create delays for those attempting to access the San Francisco Bay from Gilman Street. Temporary staging areas within the Tom Bates Regional Sports Complex would be required to be returned to existing or better condition post-construction. There are minimal to no anticipated water quality impacts expected that would impact the human use characteristics of the aquatic environment.

4.2.5 Long-Term Impacts During Operation and Maintenance

The added impervious area would have a minimal increase to hydromodification and stormwater pollution effects because runoff from Project activities would be treated with stormwater treatment facilities and diverted into modified drainage systems. Pollution and runoff sources are not expected to change.

4.3 Cumulative Impacts

There may be cumulative impacts from a combination of this Project and other nearby projects, such as the EBRPD's planned Albany Beach project. However, because this Project and other concurrent or planned projects would be subject to NPDES requirements and have their own BMPs, cumulative impacts are not anticipated.

5 AVOIDANCE AND MINIMIZATION MEASURES

5.1 Avoidance and/or Minimization Measures for Water Resources

The Project is required to obtain a Section 401 Water Quality Certification from the San Francisco Bay RWQCB, a Nationwide 404 Permit from the USACE, and a permit from the BCDC for work at the Gilman Street outfall. The Project would also comply with additional federal laws for marine mammals, fish, and birds. Details of these permits and additional avoidance and minimization measures for water resources are discussed in the Project's *Natural Environment Study* (WRECO 2018b).

5.2 Avoidance and/or Minimization Measures for Stormwater and Groundwater

5.2.1 Temporary Dewatering Activities

Groundwater extracted from temporary dewatering activities would be managed based on the groundwater quality within the Project area. Clean groundwater could be used for dust control, collected on-site using desilting basins and/or tanks prior to discharging to receiving waters, transported to a publicly owned treatment works, as mentioned in Table 5. If the Project area contains contaminated groundwater or groundwater that may release contaminated plumes when disturbed, applicable waste discharge requirements or permits would be obtained during the PS&E phase. An active treatment system may also be necessary to treat contaminated groundwater exposed during excavation activities. Dewatering requirements, costs, and design of the active treatment system would be determined during the PS&E phase.

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6 REFERENCES

Alameda County Clean Water Program. (2010). *Hydromodification Susceptibility Map Application*. Version 1.

Alameda County Clean Water Program. (October 31, 2017). *C.3 Stormwater Technical Guidance*.

Alameda County Flood Control and Water Conservation District. (2014a). *Codornices (sic) Creek, West Albany Hill, and Gilman Street Watersheds*. <http://acfloodcontrol.org/resources-go/explore-watersheds/cordonices-creek-west-albany-hill-and-gilman-street-watersheds#map> (Last accessed: April 2018).

Alameda County Flood Control and Water Conservation District. (2014b). *Strawberry Creek and Schoolhouse Creek Watersheds.* <http://acfloodcontrol.org/resources-go/explore-watersheds/strawberry-creek-and-schoolhouse-creek-watersheds#map> (Last accessed: April 2018).

California Department of Transportation. (November 2003). *Discharge Characterization Study Report*. CTSW-RT-03-065.51.42.

California Department of Transportation. (June 2011). *Storm Water Quality Handbooks – Stormwater Pollution Prevention Plan (SWPPP) and Water Pollution Control Program (WPCP) Preparation Manual*. CTSW-RT-11-255.08.01

California Department of Transportation. (2012). *Water Quality Planning Tool.* (Last Accessed April 2018). <http://svctenvims.dot.ca.gov/wqpt/wqpt.aspx>

California Department of Transportation. (August 2014). *Project Study Report-Project Development Support (PSR-PDS) to Request Approval for Locally Funded project to Proceed to the Project Approval and Environmental Document Phase (PA/ED) on Route Interstate 80 at Gilman Street Undercrossing between 0.7 Mile East of University Avenue Overcrossing and 0.5 Mile West of Buchanan Street Undercrossing*.

California Department of Transportation. (July 2017). *Stormwater Quality Handbook: Project Planning and Design Guide*. CTSW-RT-17-314.11.1.

California Department of Transportation Stormwater Management Program. (October 1, 2017). *District 4 Work Plan Fiscal Year 2018-2019.* CTSW-RT-17-316.11.1.

California Department of Water Resources. (2003). *California's Groundwater Bulletin 118. Santa Clara Valley Groundwater Basin, East Bay Plain Subbasin.* Last updated: February 27, 2004.

California Regional Water Quality Control Board, San Francisco Bay Region. (November 19, 2015). *Municipal Regional Stormwater NPDES Permit*. Order R2-2015-0049, NPDES Permit No. CAS612008.

City of Albany. (2016). *Albany 2035 General Plan.*

City of Albany. (September 28, 2012). *City of Albany Stormwater Requirements Checklist.*

City of Berkeley. (January 14, 2016). *City of Berkeley Stormwater Requirements Checklist.*

City of Berkeley. (2009). *Existing General Plan Land Use Diagram.*

Codornices Creek Watershed Council. (2011). *Codornices as a Resource and Asset.* <http://www.codornicescreekwatershed.org/watershed.htm>. (Last accessed: May 2018).

Federal Emergency Management Agency. (2009a). *Flood Insurance Rate Map* for Alameda County, California and Incorporated Areas. Map Number 06001C0018G. Panel 18 of 725.

Federal Emergency Management Agency. (2009b). *Flood Insurance Rate Map* for Alameda County, California and Incorporated Areas. Map Number 06001C0056G. Panel 56 of 725.

Federal Emergency Management Agency. (2009c). *Flood Insurance Study* for Alameda County, California and Incorporated Areas. Flood Insurance Study Number 06001CV001A.

George, M.R. No date. Mediterranean Climate. UC Rangelands Research & Education Archive. <http://rangelandarchive.ucdavis.edu/Annual_Rangeland_Handbook/Mediterranean_Climate/>. (Last accessed: April 2018).

Johnson Marigot Consulting. (2018). *Wetland Delineation Report Addendum for the I-80/Gilman Street Interchange Improvement Project.*

National Oceanic and Atmospheric Administration Fisheries. (2014). *Eelgrass Data Management and Project Tracking, San Francisco Bay.* <http://www.sfei.org/projects/eelgrass-data-management-and-project-tracking#sthash.l3ndDD7t.dpbs> (Last Accessed April 2018).

San Francisco Bay Regional Water Quality Control Board. (July 21, 2008). *Memorandum of California Department of Transportation Post-Construction Stormwater and Hydromodification Standards* (CIWQS Place No. 212806 [BT]).

San Francisco Bay Regional Water Quality Control Board. (May 4, 2017). *San Francisco Bay Basin (Region 2) Water Quality Control Plan (Basin Plan).*

San Francisco Bay Conservation and Development Commission. (2015). *BCDC Jurisdiction and Authority*. < http://www.bcdc.ca.gov/bcdc-jurisdiction-authority.html> (Last Accessed May 2018).

State Water Resources Control Board. (July 17, 2012). *National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities.* Order No. 2012-0006-DWQ, NPDES No. CAS000002.

State Water Resources Control Board. (July 1, 2014). *National Pollutant Discharge Elimination System (NPDES) Statewide Storm Water Permit for State of California Department of Transportation.* Order No. 2012-0011-DWQ, amended by Order No. 2014-0077-DWQ.

State Water Resources Control Board. (October 3, 2017) *Final 2014/2016 California Integrated Report (Clean Water Act Section 303(d) List / 305(b) Report).* <https://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2014_2016.shtml> (Last Accessed April 2018).

United States Census Bureau. (2018.) *Quick Facts. Albany city, California; Berkeley city, California.* <https://www.census.gov/quickfacts/fact/table/albanycitycalifornia,berkeleycitycalifornia/PST045217> (Last Accessed April 2018).

United States Department of Agriculture, Natural Resources Conservation Service. *Web Soil Survey*. <http://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm> (Last Accessed April 2018).

United States Environmental Protection Agency. (Revised March 2012). *Stormwater Phase II Final Rule Construction Rainfall Erosivity Waiver Fact Sheet 3.1*. EPA 833-F-00-014.

Western Regional Climate Center. (2016). *Cooperative Climatological Data Summaries.* <http://www.wrcc.dri.edu/climate data/climsum> (Last accessed: April 2016).

WRECO. (2018a). *I-80/Gilman Street Interchange Improvement Project-Location Hydraulic Study Report.*

WRECO. (2018b). *I-80/Gilman Street Interchange Improvement Project-Natural Environment Study).*

WRECO. (2017). *I-80/Gilman Street Interchange Improvement Project-Delineation of Waters of the United States.*

WRECO. (2016a). *Preliminary Geotechnical Design Recommendations for I-80/Gilman Interchange Technical Memorandum*.

6.1 Preparer's Qualifications

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Appendix A Construction General Permit Risk Level Determination Documentation

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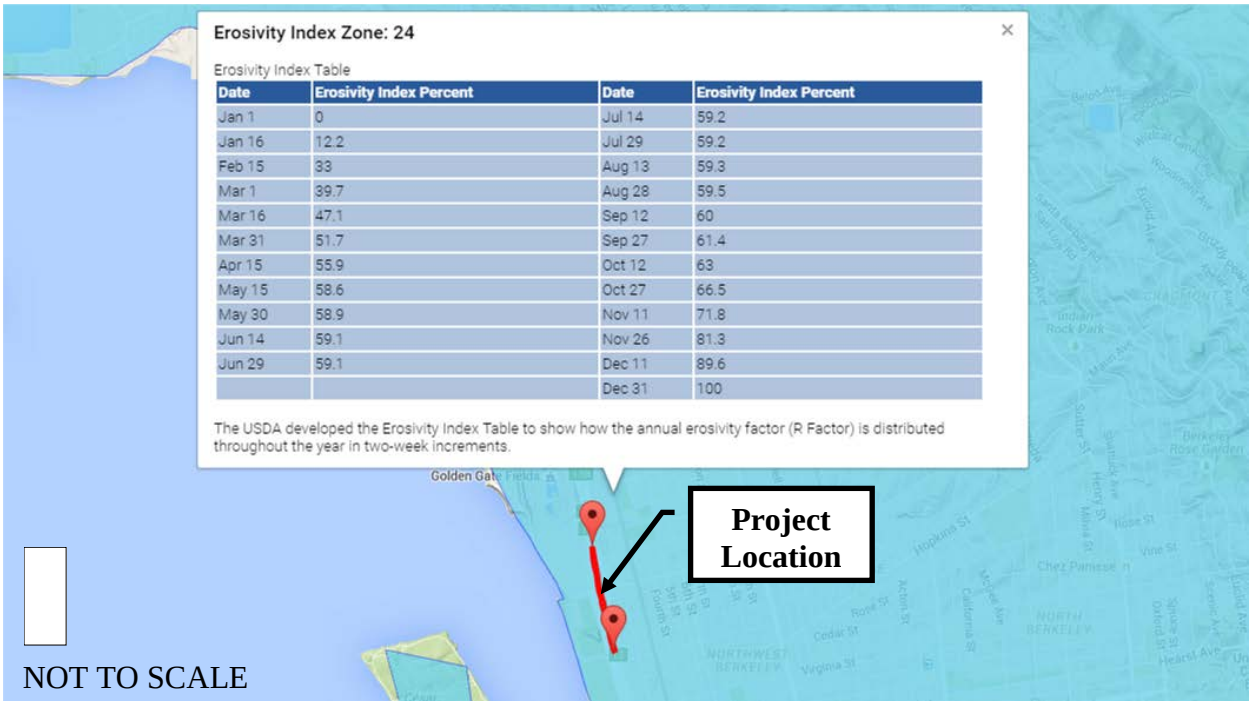
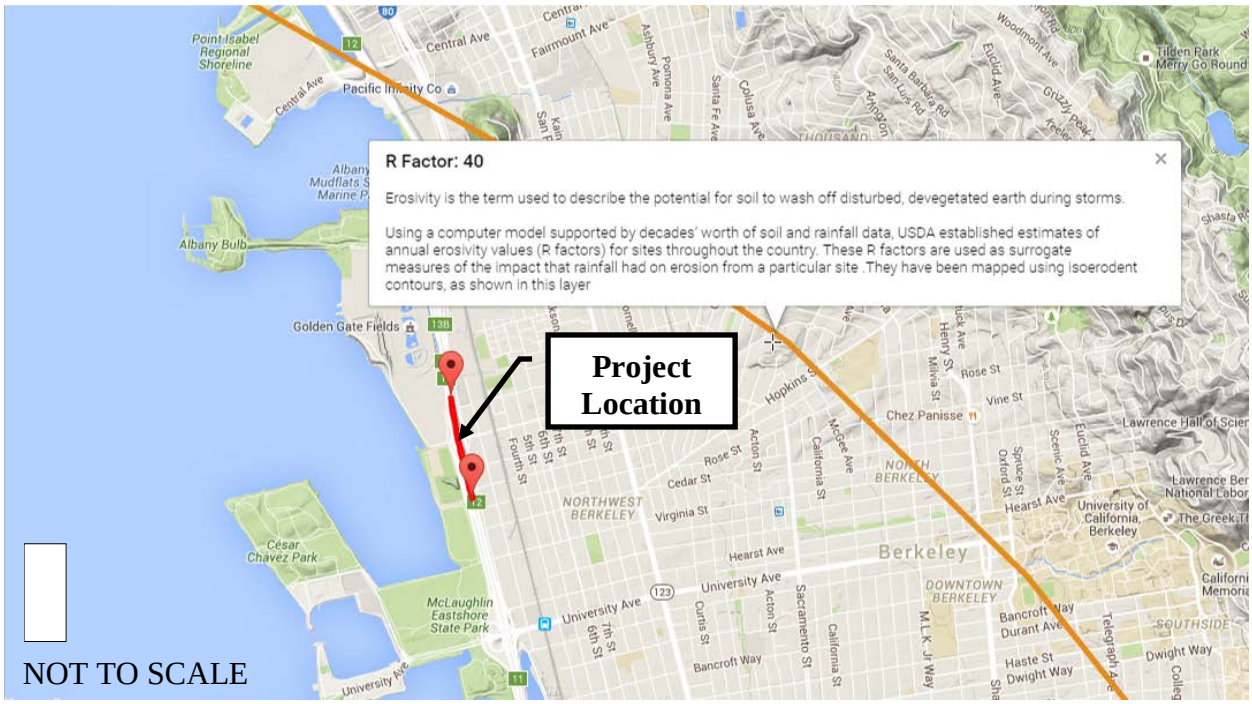
R FACTOR (R = 80)



Source: Caltrans



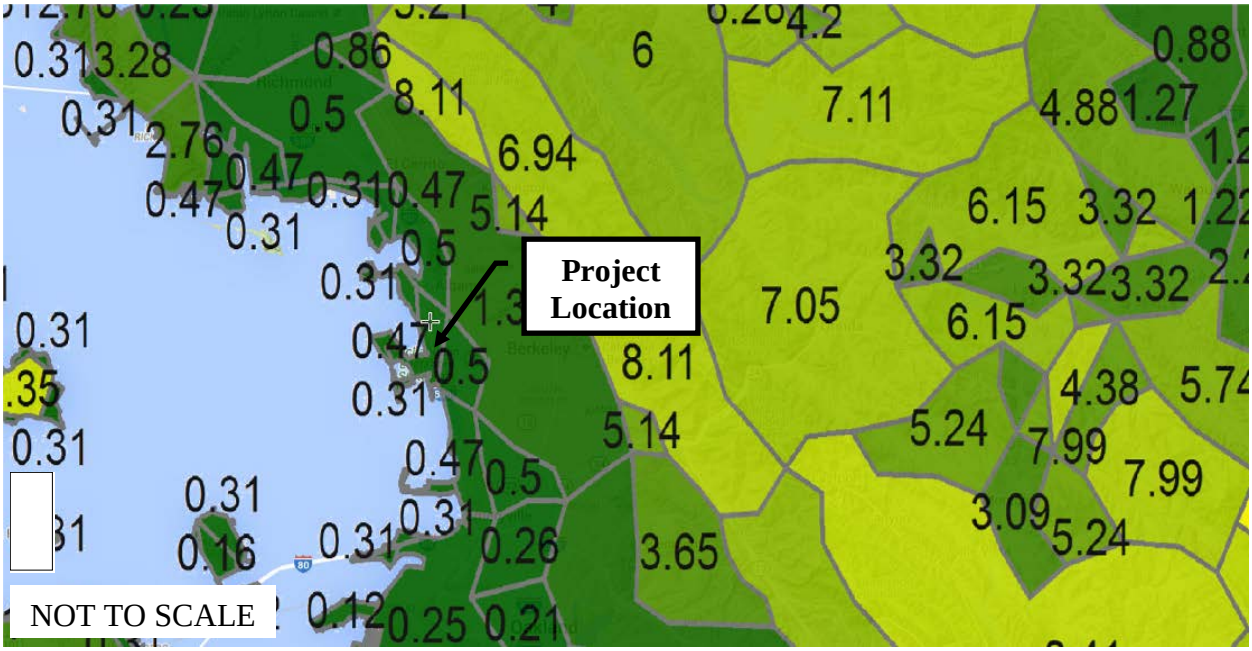
Source: Caltrans

Estimated Construction Dates: 12/31/2020 to 01/04/2023
EI Percentage: (Dec. 31, 2020 to Dec. 31, 2022): 100% X 2 = 200%
EI Percentage: (Jan. 1, 2023 to Jan. 4, 2023): 0%
Total EI Percentage = 200% + 0% = 200%
R Factor = 200% x 40 = 80

K FACTOR (K = 0.37)

Source: U.S. EPA

LS FACTOR (LS = 0.47)



Source: Caltrans

Sediment Risk Factor Worksheet	Entry
A) R Factor	
Analyses of data indicated that when factors other than rainfall are held constant, soil loss is directly proportional to a rainfall factor composed of total storm kinetic energy (E) times the maximum 30-min intensity (I30) (Wischmeier and Smith, 1958). The numerical value of R is the average annual sum of EI30 for storm events during a rainfall record of at least 22 years. "Isoerodent" maps were developed based on R values calculated for more than 1000 locations in the Western U.S. Refer to the link below to determine the R factor for the project site.	
http://cfpub.epa.gov/npdes/stormwater/LEW/lewCalculator.cfm	
R Factor Value	80
B) K Factor (weighted average, by area, for all site soils)	
The soil-erodibility factor K represents: (1) susceptibility of soil or surface material to erosion, (2) transportability of the sediment, and (3) the amount and rate of runoff given a particular rainfall input, as measured under a standard condition. Fine-textured soils that are high in clay have low K values (about 0.05 to 0.15) because the particles are resistant to detachment. Coarse-textured soils, such as sandy soils, also have low K values (about 0.05 to 0.2) because of high infiltration resulting in low runoff even though these particles are easily detached. Medium-textured soils, such as a silt loam, have moderate K values (about 0.25 to 0.45) because they are moderately susceptible to particle detachment and they produce runoff at moderate rates. Soils having a high silt content are especially susceptible to erosion and have high K values, which can exceed 0.45 and can be as large as 0.65. Silt-size particles are easily detached and tend to crust, producing high rates and large volumes of runoff. Use Site-specific data must be submitted.	
Site-specific K factor guidance	
K Factor Value	0.37
C) LS Factor (weighted average, by area, for all slopes)	
The effect of topography on erosion is accounted for by the LS factor, which combines the effects of a hillslope-length factor, L, and a hillslope-gradient factor, S. Generally speaking, as hillslope length and/or hillslope gradient increase, soil loss increases. As hillslope length increases, total soil loss and soil loss per unit area increase due to the progressive accumulation of runoff in the downslope direction. As the hillslope gradient increases, the velocity and erosivity of runoff increases. Use the LS table located in separate tab of this spreadsheet to determine LS factors. Estimate the weighted LS for the site prior to construction.	
LS Table	
LS Factor Value	0.47
Watershed Erosion Estimate (=RxKxLS) in tons/acre	14
Site Sediment Risk Factor	**Low**
Low Sediment Risk: < 15 tons/acre	
Medium Sediment Risk: >=15 and <75 tons/acre	
High Sediment Risk: >= 75 tons/acre	

Receiving Water (RW) Risk Factor Worksheet	Entry	Score
A. Watershed Characteristics	**yes/no**	
A.1. Does the disturbed area discharge (either directly or indirectly) to a **303(d)-listed waterbody impaired by sediment** (For help with impaired waterbodies please visit the link below) or has a **USEPA approved TMDL implementation plan for sediment**?: http://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2010.shtml	**yes**	**High**
OR		
A.2. Does the disturbed area discharge to a waterbody with designated beneficial uses of SPAWN & COLD & MIGRATORY? (For help please review the appropriate Regional Board Basin Plan) http://www.waterboards.ca.gov/waterboards_map.shtml		

Combined Risk Level Matrix

Receiving Water Risk	Sediment Risk: Low	Sediment Risk: Medium	Sediment Risk: High
Low	Level 1	Level 2	
High	Level 2		Level 3

Project Sediment Risk:	**Low**
Project RW Risk:	**High**
Project Combined Risk:	**Level 2**

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Appendix B Excerpts from the San Francisco Bay RWQCB Basin Plan

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Appendix B.1 Water Quality Objectives

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3.2 OBJECTIVES FOR OCEAN WATERS

The provisions of the State Board's "Water Quality Control Plan for Ocean Waters of California" (Ocean Plan) and "Water Quality Control Plan for Control of Temperature in the Coastal and Interstate Waters and Enclosed Bays and Estuaries of California" (Thermal Plan) and any revision to them will apply to ocean waters. These plans describe objectives and effluent limitations for ocean waters.

3.3 OBJECTIVES FOR SURFACE WATERS

The following objectives apply to all surface waters within the region, except the Pacific Ocean.

3.3.1 BACTERIA

Table 3-1 provides a summary of the bacterial water quality objectives and identifies the sources of those objectives. Table 3-2 summarizes U.S. EPA's water quality criteria for water contact recreation based on the frequency of use a particular area receives. These criteria will be used to differentiate between pollution sources or to supplement objectives for water contact recreation.

3.3.3.1 Implementation Provisions for Water Contact Recreation Bacteria Objectives

Water quality objectives for bacteria in Table 3-1 shall be strictly applied except when otherwise provided for in a TMDL. In the context of a TMDL, the Water Board may implement the objectives in fresh and marine waters by using a "reference system and antidegradation approach" as discussed below. Implementation of water quality objectives for bacteria using a "reference system and antidegradation approach" requires control of bacteria from all anthropogenic sources so that bacteriological water quality is consistent with that of a reference system. A reference system is defined as an area (e.g., a subwatershed or catchment) and associated monitoring point(s) that is minimally impacted by human activities that potentially affect bacteria densities in the reference receiving water body.

This approach recognizes that there are natural sources of bacteria (defined as non-anthropogenic sources) that may cause or contribute to exceedances of the objectives for indicator bacteria. It also avoids requiring treatment or diversion of water bodies or treatment of natural sources of bacteria from undeveloped areas. Such requirements, if imposed by the Water Board, could have the potential to adversely affect valuable aquatic life and wildlife beneficial uses supported by water bodies in the region.

Under the reference system approach, a certain frequency of exceedance of the single-sample objectives shall be permitted. The permitted number of exceedances shall be based on the observed exceedance frequency in a selected reference system(s) or the targeted water body, whichever is less. The "reference system and antidegradation approach" ensures that bacteriological water quality is at least as good as that of a reference system and that no degradation of existing bacteriological water quality is permitted where existing bacteriological water quality is better than that of the selected reference system(s).

The appropriateness of this approach, the specific exceedance frequencies to be permitted under it, and the permittees to whom it would apply will be evaluated within the context of TMDL development for a specific water body, and decided by the Water Board when considering

adoption of a TMDL. These implementation provisions may only be used within the context of a TMDL addressing municipal stormwater (including discharges regulated under statewide municipal NPDES waste discharge requirements), discharges from confined animal facilities, and discharges from nonpoint sources.

3.3.2 BIOACCUMULATION

Many pollutants can accumulate on particles, in sediment, or bioaccumulate in fish and other aquatic organisms. Controllable water quality factors shall not cause a detrimental increase in concentrations of toxic substances found in bottom sediments or aquatic life. Effects on aquatic organisms, wildlife, and human health will be considered.

3.3.3 BIOSTIMULATORY SUBSTANCES

Waters shall not contain biostimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses. Changes in chlorophyll a and associated phytoplankton communities follow complex dynamics that are sometimes associated with a discharge of biostimulatory substances. Irregular and extreme levels of chlorophyll a or phytoplankton blooms may indicate exceedance of this objective and require investigation.

3.3.4 COLOR

Waters shall be free of coloration that causes nuisance or adversely affects beneficial uses.

3.3.5 DISSOLVED OXYGEN

For all tidal waters, the following objectives shall apply:

In the Bay:

Downstream of Carquinez Bridge	5.0 mg/l minimum
Upstream of Carquinez Bridge	7.0 mg/l minimum

For nontidal waters, the following objectives shall apply:

Waters designated as:

Cold water habitat	7.0 mg/l minimum
Warm water habitat	5.0 mg/l minimum

The median dissolved oxygen concentration for any three consecutive months shall not be less than 80 percent of the dissolved oxygen content at saturation.

Dissolved oxygen is a general index of the state of the health of receiving waters. Although minimum concentrations of 5 mg/l and 7 mg/l are frequently used as objectives to protect fish life,

higher concentrations are generally desirable to protect sensitive aquatic forms. In areas unaffected by waste discharges, a level of about 85 percent of oxygen saturation exists. A three-month median objective of 80 percent of oxygen saturation allows for some degradation from this level, but still requires a consistently high oxygen content in the receiving water.

3.3.6 FLOATING MATERIAL

Waters shall not contain floating material, including solids, liquids, foams, and scum, in concentrations that cause nuisance or adversely affect beneficial uses.

3.3.7 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 that otherwise adversely affect beneficial uses.

3.3.8 POPULATION AND COMMUNITY ECOLOGY

All waters shall be maintained free of toxic substances in concentrations that are lethal to or that produce significant alterations in population or community ecology or receiving water biota. In addition, the health and life history characteristics of aquatic organisms in waters affected by controllable water quality factors shall not differ significantly from those for the same waters in areas unaffected by controllable water quality factors.

3.3.9 pH

The pH shall not be depressed below 6.5 nor raised above 8.5. This encompasses the pH range usually found in waters within the basin. Controllable water quality factors shall not cause changes greater than 0.5 units in normal ambient pH levels.

3.3.10 RADIOACTIVITY

Radionuclides shall not be present in concentrations 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 for use as domestic or municipal supply shall not contain concentrations of radionuclides in excess of the limits specified in Table 4 of Section 64443 (Radioactivity) of Title 22 of the California Code of Regulations (CCR), which is incorporated by reference into this Plan. This incorporation is prospective, including future changes to the incorporated provisions as the changes take effect (see Table 3-5).

3.3.11 SALINITY

Controllable water quality factors shall not increase the total dissolved solids or salinity of waters of the state so as to adversely affect beneficial uses, particularly fish migration and estuarine habitat.

3.3.12 SEDIMENT

The suspended sediment load and suspended sediment discharge rate of surface waters shall not be altered in such a manner as to cause nuisance or adversely affect beneficial uses.

Controllable water quality factors shall not cause a detrimental increase in the concentrations of toxic pollutants in sediments or aquatic life.

3.3.13 SETTLEABLE MATERIAL

Waters shall not contain substances in concentrations that result in the deposition of material that cause nuisance or adversely affect beneficial uses.

3.3.14 SUSPENDED MATERIAL

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

3.3.15 SULFIDE

All water shall be free from dissolved sulfide concentrations above natural background levels. Sulfide occurs in Bay muds as a result of bacterial action on organic matter in an anaerobic environment.

Concentrations of only a few hundredths of a milligram per liter can cause a noticeable odor or be toxic to aquatic life. Violation of the sulfide objective will reflect violation of dissolved oxygen objectives as sulfides cannot exist to a significant degree in an oxygenated environment.

3.3.16 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 products of aquatic origin, that cause nuisance, or that adversely affect beneficial uses.

3.3.17 TEMPERATURE

Temperature objectives for enclosed bays and estuaries are as specified in the "Water Quality Control Plan for Control of Temperature in the Coastal and Interstate Waters and Enclosed Bays of California," including any revisions to the plan.

In addition, the following temperature objectives apply to surface waters:

- The natural receiving water temperature of inland surface 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.
- The temperature of any cold or warm freshwater habitat shall not be increased by more than 5°F (2.8°C) above natural receiving water temperature

3.3.18 TOXICITY

All waters shall be maintained free of toxic substances in concentrations that are lethal to or that produce other detrimental responses in aquatic organisms. Detrimental responses include, but are not limited to, decreased growth rate and decreased reproductive success of resident or indicator species. There shall be no acute toxicity in ambient waters. Acute toxicity is defined as a median of less than 90 percent survival, or less than 70 percent survival, 10 percent of the time, of test organisms in a 96-hour static or continuous flow test.

There shall be no chronic toxicity in ambient waters. Chronic toxicity is a detrimental biological effect on growth rate, reproduction, fertilization success, larval development, population abundance, community composition, or any other relevant measure of the health of an organism, population, or community.

Attainment of this objective will be determined by analyses of indicator organisms, species diversity, population density, growth anomalies, or toxicity tests (including those described in Chapter 4), or other methods selected by the Water Board. The Water Board will also consider other relevant information and numeric criteria and guidelines for toxic substances developed by other agencies as appropriate.

The health and life history characteristics of aquatic organisms in waters affected by controllable water quality factors shall not differ significantly from those for the same waters in areas unaffected by controllable water quality factors.

3.3.19 TURBIDITY

Waters shall be free of changes in turbidity that cause nuisance or adversely affect beneficial uses. Increases from normal background light penetration or turbidity relatable to waste discharge shall not be greater than 10 percent in areas where natural turbidity is greater than 50 NTU.

3.3.20 UN-IONIZED AMMONIA

The discharge of wastes shall not cause receiving waters to contain concentrations of un-ionized ammonia in excess of the following limits (in mg/l as N):

Annual Median	0.025
Maximum, Central Bay (as depicted in Figure 2-5) and upstream	0.16
Maximum, Lower Bay (as depicted in Figures 2-6 and 2-7):	0.4

The intent of this objective is to protect against the chronic toxic effects of ammonia in the receiving waters. An ammonia objective is needed for the following reasons:

- Ammonia (specifically un-ionized ammonia) is a demonstrated toxicant. Ammonia is generally accepted as one of the principle toxicants in municipal waste discharges. Some industries also discharge significant quantities of ammonia.

- Exceptions to the effluent toxicity limitations in Chapter 4 of the Plan allow for the discharge of ammonia in toxic amounts. In most instances, ammonia will be diluted or degraded to a nontoxic state fairly rapidly. However, this does not occur in all cases, the South Bay being a notable example. The ammonia limit is recommended in order to preclude any build up of ammonia in the receiving water.
- A more stringent maximum objective is desirable for the northern reach of the Bay for the protection of the migratory corridor running through Central Bay, San Pablo Bay, and upstream reaches.

3.3.21 OBJECTIVES FOR SPECIFIC CHEMICAL CONSTITUENTS

Surface waters shall not contain concentrations of chemical constituents in amounts that adversely affect any designated beneficial use. Water quality objectives for selected toxic pollutants for surface waters are given in Tables 3-3, 3-3A, 3-3B, 3-3C, 3-4 and 3-4A.

The Water Board intends to work towards the derivation of site-specific objectives for the Bay-Delta estuarine system. Site-specific objectives to be considered by the Water Board shall be developed in accordance with the provisions of the federal Clean Water Act, the State Water Code, State Board water quality control plans, and this Plan. These site-specific objectives will take into consideration factors such as all available scientific information and monitoring data and the latest U.S. EPA guidance, and local environmental conditions and impacts caused by bioaccumulation. The objectives in Tables 3-3 and 3-4 apply throughout the region except as otherwise indicated in the tables or when site-specific objectives for the pollutant parameter have been adopted. Site-specific objectives have been adopted for copper in segments of San Francisco Bay (see Figure 7.2-1-01), for nickel in South San Francisco Bay (Table 3-3A), and for cyanide in all San Francisco Bay segments (Table 3-3C). Objectives for mercury that apply to San Francisco Bay are listed in Table 3-3B. Objectives for mercury that apply to Walker Creek, Soulajule Reservoir, and their tributaries, and to waters of the Guadalupe River watershed are listed in Table 3-4A.

South San Francisco Bay south of the Dumbarton Bridge is a unique, water-quality-limited, hydrodynamic and biological environment that merits continued special attention by the Water Board. Controlling urban and upland runoff sources is critical to the success of maintaining water quality in this portion of the Bay. Site-specific water quality objectives have been adopted for dissolved copper and nickel in this Bay segment. Site-specific objectives may be appropriate for other pollutants of concern, but this determination will be made on a case-by-case basis, and after it has been demonstrated that all other reasonable treatment, source control and pollution prevention measures have been exhausted. The Water Board will determine whether revised water quality objectives and/or effluent limitations are appropriate based on sound technical information and scientific studies, stakeholder input, and the need for flexibility to address priority problems in the watershed.

3.3.22 CONSTITUENTS OF CONCERN FOR MUNICIPAL AND AGRICULTURAL WATER SUPPLIES

At a minimum, surface waters designated for use as domestic or municipal supply (MUN) shall not contain concentrations of constituents in excess of the maximum (MCLs) or secondary maximum contaminant levels (SMCLs) specified in the following provisions of Title 22, which are incorporated by reference into this plan: Table 64431-A (Inorganic Chemicals) of Section 64431,

and Table 64433.2-A (Fluoride) of Section 64433.2, Table 64444-A (Organic Chemicals) of Section 64444, and Table 64449-A (SMCLs-Consumer Acceptance Limits) and 64449-B (SMCLs-Ranges) of Section 64449. This incorporation-by-reference is prospective, including future changes to the incorporated provisions as the changes take effect. Table 3-5 contains water quality objectives for municipal supply, including the MCLs contained in various sections of Title 22 as of the adoption of this plan.

At a minimum, surface waters designated for use as agricultural supply (AGR) shall not contain concentrations of constituents in excess of the levels specified in Table 3-6.

3.4 OBJECTIVES FOR GROUNDWATER

Groundwater objectives consist primarily of narrative objectives combined with a limited number of numerical objectives. Additionally, the Water Board will establish basin- and/or site-specific numerical groundwater objectives as necessary. For example, the Water Board has groundwater basin-specific objectives for the Alameda Creek watershed above Niles to include the Livermore-Amador Valley as shown in Table 3-7.

The maintenance of existing high quality of groundwater (i.e., "background") is the primary groundwater objective.

In addition, at a minimum, groundwater shall not contain concentrations of bacteria, chemical constituents, radioactivity, or substances producing taste and odor in excess of the objectives described below unless naturally occurring background concentrations are greater. Under existing law, the Water Board regulates waste discharges to land that could affect water quality, including both groundwater and surface water quality. Waste discharges that reach groundwater are regulated to protect both groundwater and any surface water in continuity with groundwater. Waste discharges that affect groundwater that is in continuity with surface water cannot cause violations of any applicable surface water standards.

3.4.1 BACTERIA

In groundwater with a beneficial use of municipal and domestic supply, the median of the most probable number of coliform organisms over any seven-day period shall be less than 1.1 most probable number per 100 milliliters (MPN/100 mL) (based on multiple tube fermentation technique; equivalent test results based on other analytical techniques as specified in the National Primary Drinking Water Regulation, 40 CFR, Part 141.21 (f), revised June 10, 1992, are acceptable).

3.4.2 ORGANIC AND INORGANIC CHEMICAL CONSTITUENTS

All groundwater shall be maintained free of organic and inorganic chemical constituents in concentrations that adversely affect beneficial uses. To evaluate compliance with water quality objectives, the Water Board will consider all relevant and scientifically valid evidence, including relevant and scientifically valid numerical criteria and guidelines developed and/or published by other agencies and organizations (e.g., U.S. Environmental Protection Agency (U.S. EPA), the State Water Board, California Department of Health Services (DHS), U.S. Food and Drug

Administration, National Academy of Sciences, California Environmental Protection Agency's (Cal/EPA) Office of Environmental Health Hazard Assessment (OEHHA), U.S. Agency for Toxic Substances and Disease Registry, Cal/EPA Department of Toxic Substances Control (DTSC), and other appropriate organizations.)

At a minimum, groundwater designated for use as domestic or municipal supply (MUN) shall not contain concentrations of constituents in excess of the maximum (MCLs) or secondary maximum contaminant levels (SMCLs) specified in the following provisions of Title 22, which are incorporated by reference into this plan: Tables 64431-A (Inorganic Chemicals) of Section 64431, Table 64433.2-A (Fluoride) of Section 64433.2, and Table 64444-A (Organic Chemicals) of Section 64444. This incorporation-by-reference is prospective, including future changes to the incorporated provisions as the changes take effect. (See Table 3-5.)

Groundwater with a beneficial use of agricultural supply shall not contain concentrations of chemical constituents in amounts that adversely affect such beneficial use. In determining compliance with this objective, the Water Board will consider as evidence relevant and scientifically valid water quality goals from sources such as the Food and Agricultural Organizations of the United Nations; University of California Cooperative Extension, Committee of Experts; and McKee and Wolf's "Water Quality Criteria," as well as other relevant and scientifically valid evidence. At a minimum, groundwater designated for use as agricultural supply (AGR) shall not contain concentrations of constituents in excess of the levels specified in Table 3-6.

Groundwater with a beneficial use of freshwater replenishment shall not contain concentrations of chemicals in amounts that will adversely affect the beneficial use of the receiving surface water.

Groundwater with a beneficial use of industrial service supply or industrial process supply shall not contain pollutant levels that impair current or potential industrial uses.

3.4.3 RADIOACTIVITY

At a minimum, groundwater designated for use as domestic or municipal supply (MUN) shall not contain concentrations of radionuclides in excess of the MCLs specified in Table 4 (Radioactivity) of Section 64443 of Title 22, which is incorporated by reference into this plan. This incorporation-by-reference is prospective, including future changes to the incorporated provisions as the changes take effect. (See Table 3-5.)

3.4.4 TASTE AND ODOR

Groundwater designated for use as domestic or municipal supply (MUN) shall not contain taste- or odor-producing substances in concentrations that cause a nuisance or adversely affect beneficial uses. At a minimum, groundwater designated for use as domestic or municipal supply shall not contain concentrations in excess of the SMCLs specified in Tables 64449-A (Secondary MCLs-Consumer Acceptance Limits) and 64449-B (Secondary MCLs-Ranges) of Section 64449 of Title 22, which is incorporated by reference into this plan. This incorporation-by-reference is

prospective, including future changes to the incorporated provisions as the changes take effect. (See Table 3-5.)

3.5 OBJECTIVES FOR THE DELTA

The objectives contained in the State Water Board's 1995 "Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary" and any revisions thereto shall apply to the waters of the Sacramento-San Joaquin Delta and adjacent waters as specified in that plan.

3.6 OBJECTIVES FOR ALAMEDA CREEK WATERSHED

The water quality objectives contained in Table 3-7 apply to the surface and groundwaters of the Alameda Creek watershed above Niles.

Wastewater discharges that cause the surface water limits in Table 3-7 to be exceeded may be allowed if they are part of an overall wastewater resource operational program developed by those agencies affected and approved by the Water Board.

TABLES

Table 3-1: Water Quality Objectives for Bacteria[a]

Beneficial Use	Fecal Coliform (MPN/100ml)	Total Coliform (MPN/100ml)	Enterococcus (MPN/100ml)[g]
Water Contact Recreation	geometric mean < 200 90th percentile < 400	median < 240 no sample > 10,000	geometric mean < 35 no sample > 104
Shellfish Harvesting[b]	median < 14 90th percentile < 43	median < 70 90th percentile < 230[c]	
Non-contact Water Recreation[d]	mean < 2000 90th percentile < 4000		
Municipal Supply: - Surface Water[e] - Groundwater	geometric mean < 20	geometric mean < 100 < 1.1[f]	

Notes:

a. Based on a minimum of five consecutive samples equally spaced over a 30-day period.

b. Source: National Shellfish Sanitation Program.

c. Based on a five-tube decimal dilution test or 300 MPN/100 ml when a three-tube decimal dilution test is used.

d. Source: Report of the Committee on Water Quality Criteria, National Technical Advisory Committee, 1968.

e. Source: California Department of Public Health recommendation.

f. Based on multiple tube fermentation technique; equivalent test results based on other analytical techniques, as specified in the National Primary Drinking Water Regulation, 40 CFR, Part 141.21(f), revised June 10, 1992, are acceptable.

g. Applicable to marine and estuarine waters only. Numeric values are based on Section 7958 of Title 17 of the California Code of Regulations, 69FR 67217 et seq., and 40 CFR Part 131.41 (effective date December 16, 2004).

Table 3-2: U.S. EPA Bacteriological Criteria for Water Contact Recreation[1,2]
(in colonies per 100 ML)

	Fresh Water		Salt Water
	Enterococci	E. Coli	Enterococci
Steady State (all areas)	33	126	35
Maximum at:			
- designated beach	61	235	104
- moderately used area	89	298	124
- lightly used area	108	406	276
- infrequently used area	151	576	500

NOTES:

1. The criteria were published in the Federal Register, Vol. 51, No. 45 / Friday, March 7, 1986 / 8012-8016. The Criteria are based on:
(a) Cabelli, V.J. 1983. Health Effects Criteria for Marine Recreational Waters. U.S. EPA, EPA 600/1-80-031, Cincinnati, Ohio, and
(b) Dufour, A.P. 1984. Health Effects Criteria for Fresh Recreational Waters. U.S. EPA, EPA 600/1-84-004, Cincinnati Ohio.

2. The U.S. EPA criteria apply to water contact recreation only. The criteria provide for a level of production based on the frequency of usage of a given water contact recreation area. The criteria may be employed in special studies within this region to differentiate between pollution sources or to supplement the current coliform objectives for water contact recreation.

Table 3-3: Marine[a] Water Quality Objectives for Toxic Pollutants for Surface Waters (all values in ug/l)

Compound	4-day Average	1-hr Average	24-hr Average
Arsenic[b, c, d]	36	69	
Cadmium[b, c, d]	9.3	42	
Chromium VI[b, c, d, e]	50	1100	
Copper[c, d, f]			
Cyanide[g]			
Lead[b, c, d]	8.1	210	
Mercury[h]	0.025	2.1	
Nickel[b, c, d]	8.2	74	
Selenium[i]			
Silver[b, c, d]		1.9	
Tributyltin[j]			
Zinc[b, c, d]	81	90	
PAHs[k]			15

NOTES:

a. Marine waters are those in which the salinity is equal to or greater than 10 parts per thousand 95% of the time, as set forth in Chapter 4 of the Basin Plan. Unless a site-specific objective has been adopted, these objectives shall apply to all marine waters except for the South Bay south of Dumbarton Bridge (where the California Toxics Rule (CTR) applies) or as specified in note h (below). For waters in which the salinity is between 1 and 10 parts per thousand, the applicable objectives are the more stringent of the freshwater (Table 3-4) or marine objectives.

b. Source: 40 CFR Part 131.38 (California Toxics Rule or CTR), May 18, 2000.

c. These objectives for metals are expressed in terms of the dissolved fraction of the metal in the water column.

d. According to the CTR, these objectives are expressed as a function of the water-effect ratio (WER), which is a measure of the toxicity of a pollutant in site water divided by the same measure of the toxicity of the same pollutant in laboratory dilution water. The 1-hr. and 4-day objectives = table value X WER. The table values assume a WER equal to one.

e. This objective may be met as total chromium.

f. Water quality objectives for copper were promulgated by the CTR and may be updated by U.S. EPA without amending the Basin Plan. Note: at the time of writing, the values are 3.1 ug/l (4-day average) and 4.8 ug/l (1-hr. average). The most recent version of the CTR should be consulted before applying these values.

g. Cyanide criteria were promulgated in the National Toxics Rule (NTR) (Note: at the time of writing, the values are 1.0 µg/l (4-day average) and 1.0 µg/l (1-hr. average)) and apply, except that site-specific

marine water quality objectives for cyanide have been adopted for San Francisco Bay as set forth in Table 3-3C.

h. Source: U.S. EPA Ambient Water Quality Criteria for Mercury (1984). The 4-day average value for mercury does not apply to San Francisco Bay; instead, the water quality objectives specified in Table 3-3B apply. The 1-hour average value continues to apply to San Francisco Bay.

i. Selenium criteria were promulgated for all San Francisco Bay/Delta waters in the National Toxics Rule (NTR). The NTR criteria specifically apply to San Francisco Bay upstream to and including Suisun Bay and Sacramento-San Joaquin Delta. Note: at the time of writing, the values are 5.0 ug/l (4-day average) and 20 ug/l (1-hr. average).

j. Tributyltin is a compound used as an antifouling ingredient in marine paints and toxic to aquatic life in low concentrations. U.S. EPA has published draft criteria for protection of aquatic life (Federal Register: December 27, 2002, Vol. 67, No. 249, Page 79090-79091). These criteria are cited for advisory purposes. The draft criteria may be revised.

k. The 24-hour average aquatic life protection objective for total PAHs is retained from the 1995 Basin Plan. Source: U.S. EPA 1980.

Table 3-3A: Water Quality Objectives for Copper and Nickel in San Francisco Bay Segments (ug/L)

Compound	4-day Average (CCC)[1]	1-hr Average (CMC)[2]	Extent of Applicability
Copper	6.9	10.8	The portion of Lower San Francisco Bay south of the line representing the Hayward Shoals shown on Figure 7.1. and South San Francisco Bay
Copper	6.0	9.4	The portion of the delta located in the San Francisco Bay Region, Suisun Bay, Carquinez Strait, San Pablo Bay, Central San Francisco Bay, and the portion of Lower San Francisco Bay north of the line representing the Hayward Shoals on Figure 7.1.
Nickel	11.9	62.4*	South San Francisco Bay

[1]Criteria Continuous Concentration

[2]Criteria Maximum Concentration

*Handbook of Water Quality Standards, 2nd ed. 1994 in Section 3.7.6 states that the CMC = Final AcuteValue/2; 62.4 is the Final Acute Value (resident species database)/2; so the site-specific CMC is lower than the California Toxics Rule value because we are using the resident species database instead of the National Species Database.

Table 3-3B: Marine[a] Water Quality Objectives for Mercury in San Francisco Bay[b]		
Protection of Human Health	0.2 mg mercury per kg fish tissue	Average wet weight concentration measured in the edible portion of trophic level 3 and trophic level 4 fish[c]
Protection of Aquatic Organisms and Wildlife	0.03 mg mercury per kg fish	Average wet weight concentration measured in whole fish 3–5 cm in length

Notes:

a. Marine waters are those in which the salinity is equal to or greater than 10 parts per thousand 95% of the time, as set forth in Chapter 4 of the Basin Plan. For waters in which the salinity is between 1 and 10 parts per thousand, the applicable objectives are the more stringent of the freshwater or marine objectives.

b. Objectives apply to all segments of San Francisco Bay, including Sacramento/San Joaquin River Delta (within San Francisco Bay region), Suisun Bay, Carquinez Strait, San Pablo Bay, Richardson Bay, Central San Francisco Bay, Lower San Francisco Bay, and South San Francisco Bay (including the Lower South Bay).

c. Compliance shall be determined by analysis of fish tissue as described in Chapter 6, Surveillance and Monitoring.

Table 3-3C: Marine [a] Water Quality Objectives for Cyanide in San Francisco Bay [b] (values in ug/l)		
Cyanide	Chronic Objective (4-day Average)	2.9
Cyanide	Acute Objective (1-hour Average)	9.4

Notes:

a. Marine waters are those in which the salinity is equal to or greater than 10 parts per thousand 95% of the time, as set forth in Chapter 4 of the Basin Plan. For waters in which the salinity is between 1 and 10 parts per thousand, the applicable objectives are the more stringent of the freshwater or marine objectives.

b. Objectives apply to all segments of San Francisco Bay, including Sacramento/San Joaquin River Delta (within San Francisco Bay region), Suisun Bay, Carquinez Strait, San Pablo Bay, Central San Francisco Bay, Lower San Francisco Bay, and South San Francisco Bay.

Appendix B.2 Description of Beneficial Uses

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CHAPTER 2: BENEFICIAL USES

State policy for water quality control in California is directed toward achieving the highest water quality consistent with maximum benefit to the people of the state. Aquatic ecosystems and underground aquifers provide many different benefits to the people of the state. The beneficial uses described in detail in this chapter define the resources, services, and qualities of these aquatic systems that are the ultimate goals of protecting and achieving high water quality. The Water Board is charged with protecting all these uses from pollution and nuisance that may occur as a result of waste discharges in the region. Beneficial uses of waters of the State presented here serve as a basis for establishing water quality objectives and discharge prohibitions to attain these goals.

Beneficial use designations for any given water body do not rule out the possibility that other beneficial uses exist or have the potential to exist. Existing beneficial uses that have not been formally designated in this Basin Plan are protected whether or not they are identified. While the tables in this Chapter list a large, representative portion of the water bodies in our region, it is not practical to list each and every water body.

2.1 DEFINITIONS OF BENEFICIAL USES

The following definitions (in italic) for beneficial uses are applicable throughout the entire state. A brief description of the most important water quality requirements for each beneficial use follows each definition (in alphabetical order by abbreviation).

2.1.1 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.

The criteria discussed under municipal and domestic water supply (MUN) also effectively protect farmstead uses. To establish water quality criteria for livestock water supply, the Water Board must consider the relationship of water to the total diet, including water freely drunk, moisture content of feed, and interactions between irrigation water quality and feed quality. The University of California Cooperative Extension has developed threshold and limiting concentrations for livestock and irrigation water. Continued irrigation often leads to one or more of four types of hazards related to water quality and the nature of soils and crops. These hazards are (1) soluble salt accumulations, (2) chemical changes in the soil, (3) toxicity to crops, and (4) potential disease transmission to humans through reclaimed water use. Irrigation water classification systems, arable soil classification systems, and public health criteria related to reuse of wastewater have been developed with consideration given to these hazards.

2.1.2 AREAS OF SPECIAL BIOLOGICAL SIGNIFICANCE (ASBS)

Areas designated by the State Water Board.

These include marine life refuges, ecological reserves, and designated areas where the preservation and enhancement of natural resources requires special protection. In these areas,

alteration of natural water quality is undesirable. The areas that have been designated as ASBS in this Region are Bird Rock, Point Reyes Headland Reserve and Extension, Double Point, Duxbury Reef Reserve and Extension, Farallon Islands, and James V. Fitzgerald Marine Reserve, depicted in Figure 2-1. The California Ocean Plan prohibits waste discharges into, and requires wastes to be discharged at a sufficient distance from, these areas to assure maintenance of natural water quality conditions. These areas have been designated as a subset of State Water Quality Protection Areas as per the Public Resources Code.

2.1.3 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.

Cold freshwater habitats generally support trout and may support anadromous salmon and steelhead fisheries as well. Cold water habitats are commonly well-oxygenated. Life within these waters is relatively intolerant to environmental stresses. Often, soft waters feed cold water habitats. These waters render fish more susceptible to toxic metals, such as copper, because of their lower buffering capacity.

2.1.4 COMMERCIAL AND SPORT FISHING (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.

To maintain fishing, the aquatic life habitats where fish reproduce and seek their food must be protected. Habitat protection is under descriptions of other beneficial uses.

2.1.5 ESTUARINE HABITAT (EST)

Uses of water that support estuarine ecosystems, including, but not limited to, preservation or enhancement of estuarine habitats, vegetation, fish, shellfish, or wildlife (e.g., estuarine mammals, waterfowl, shorebirds), and the propagation, sustenance, and migration of estuarine organisms.

Estuarine habitat provides an essential and unique habitat that serves to acclimate anadromous fishes (e.g., salmon, striped bass) migrating into fresh or marine water conditions. The protection of estuarine habitat is contingent upon (1) the maintenance of adequate Delta outflow to provide mixing and salinity control; and (2) provisions to protect wildlife habitat associated with marshlands and the Bay periphery (i.e., prevention of fill activities). Estuarine habitat is generally associated with moderate seasonal fluctuations in dissolved oxygen, pH, and temperature and with a wide range in turbidity.

2.1.6 FRESHWATER REPLENISHMENT (FRESH)

Uses of water for natural or artificial maintenance of surface water quantity or quality.

Fresh water inputs are important for maintaining salinity balance, flow, and/or water quantity for such surface water bodies as marshes, wetlands, and lakes.

2.1.7 GROUNDWATER RECHARGE (GWR)

Uses of water for natural or artificial recharge of groundwater for purposes of future extraction, maintenance of water quality, or halting saltwater intrusion into freshwater aquifers.

The requirements for groundwater recharge operations generally reflect the future use to be made of the water stored underground. In some cases, recharge operations may be conducted to prevent seawater intrusion. In these cases, the quality of recharged waters may not directly affect quality at the wellfield being protected. Recharge operations are often limited by excessive suspended sediment or turbidity that can clog the surface of recharge pits, basins, or wells.

Under the state Antidegradation Policy, the quality of some of the waters of the state is higher than established by adopted policies. It is the intent of this policy to maintain that existing higher water quality to the maximum extent possible.

Requirements for groundwater recharge, therefore, shall impose the Best Available Technology (BAT) or Best Management Practices (BMPs) for control of the discharge as necessary to assure the highest quality consistent with maximum benefit to the people of the state. Additionally, it must be recognized that groundwater recharge occurs naturally in many areas from streams and reservoirs. This recharge may have little impact on the quality of groundwaters under normal circumstances, but it may act to transport pollutants from the recharging water body to the groundwater. Therefore, groundwater recharge must be considered when requirements are established.

2.1.8 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, and oil well repressurization.

Most industrial service supplies have essentially no water quality limitations except for gross constraints, such as freedom from unusual debris.

2.1.9 MARINE HABITAT (MAR)

Uses of water that support marine ecosystems, including, but not limited to, preservation or enhancement of marine habitats, vegetation such as kelp, fish, shellfish, or wildlife (e.g., marine mammals, shorebirds).

In many cases, the protection of marine habitat will be accomplished by measures that protect wildlife habitat generally, but more stringent criteria may be necessary for waterfowl marshes and other habitats, such as those for shellfish and marine fishes. Some marine habitats, such as important intertidal zones and kelp beds, may require special protection.

2.1.10 FISH MIGRATION (MIGR)

Uses of water that support habitats necessary for migration, acclimatization between fresh water and salt water, and protection of aquatic organisms that are temporary inhabitants of waters within the region.

The water quality provisions acceptable to cold water fish generally protect anadromous fish as well. However, particular attention must be paid to maintaining zones of passage. Any barrier to migration or free movement of migratory fish is harmful. Natural tidal movement in estuaries and unimpeded river flows are necessary to sustain migratory fish and their offspring. A water quality barrier, whether thermal, physical, or chemical, can destroy the integrity of the migration route and lead to the rapid decline of dependent fisheries.

Water quality may vary through a zone of passage as a result of natural or human- induced activities. Fresh water entering estuaries may float on the surface of the denser salt water or hug one shore as a result of density differences related to water temperature, salinity, or suspended matter.

2.1.11 MUNICIPAL AND DOMESTIC SUPPLY (MUN)

Uses of water for community, military, or individual water supply systems, including, but not limited to, drinking water supply.

The principal issues involving municipal water supply quality are (1) protection of public health;

Water quality requirements differ widely for the many industrial processes in use today. So many specific industrial processes exist with differing water quality requirements that no meaningful criteria can be established generally for quality of raw water supplies. Fortunately, this is not a serious shortcoming, since current water treatment technology can create desired product waters tailored for specific uses.

2.1.14 PRESERVATION OF RARE AND ENDANGERED SPECIES (RARE)

Uses of waters that support habitats necessary for the survival and successful maintenance of plant or animal species established under state and/or federal law as rare, threatened, or endangered.

The water quality criteria to be achieved that would encourage development and protection of rare and endangered species should be the same as those for protection of fish and wildlife habitats generally. However, where rare or endangered species exist, special control requirements may be necessary to assure attainment and maintenance of particular quality criteria, which may vary slightly with the environmental needs of each particular species. Criteria for species using areas of special biological significance should likewise be derived from the general criteria for the habitat types involved, with special management diligence given where required.

2.1.15 WATER CONTACT RECREATION (REC1)

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, and uses of natural hot springs.

Water contact implies a risk of waterborne disease transmission and involves human health; accordingly, criteria required to protect this use are more stringent than those for more casual water-oriented recreation.

Excessive algal growth has reduced the value of shoreline recreation areas in some cases, particularly for swimming. Where algal growths exist in nuisance proportions, particularly bluegreen algae, all recreational water uses, including fishing, tend to suffer.

One criterion to protect the aesthetic quality of waters used for recreation from excessive algal growth is based on chlorophyll a.

Public access to drinking water reservoirs is limited or prohibited by reservoir owner/operators for purposes of protecting drinking water quality and public health. In some cases, access to reservoir tributaries is also prohibited. For these water bodies, REC-1 is designated as E*, for the purpose of protecting water quality. No right to public access is intended by this designation.

2.1.16 NONCONTACT WATER RECREATION (REC2)

Uses of water for recreational activities involving proximity to water, but not normally involving contact with water where water ingestion 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, or aesthetic enjoyment in conjunction with the above activities.

Water quality considerations relevant to noncontact water recreation, such as hiking, camping, or boating, and those activities related to tide pool or other nature studies require protection of habitats and aesthetic features. In some cases, preservation of a natural wilderness condition is justified, particularly when nature study is a major dedicated use.

One criterion to protect the aesthetic quality of waters used for recreation from excessive algal growth is based on chlorophyll a.

2.1.17 SHELLFISH HARVESTING (SHELL)

Uses of water that support habitats suitable for the collection of crustaceans and filter-feeding shellfish (e.g., clams, oysters, and mussels) for human consumption, commercial, or sport purposes.

Shellfish harvesting areas require protection and management to preserve the resource and protect public health. The potential for disease transmission and direct poisoning of humans is of considerable concern in shellfish regulation. The bacteriological criteria for the open ocean, bays, and estuarine waters where shellfish cultivation and harvesting occur should conform with the standards described in the National Shellfish Sanitation Program, Manual of Operation.

Toxic metals can accumulate in shellfish. Mercury and cadmium are two metals known to have caused extremely disabling effects in humans who consumed shellfish that concentrated these elements from industrial waste discharges. Other elements, radioactive isotopes, and certain toxins produced by particular plankton species also concentrate in shellfish tissue. Documented cases of paralytic shellfish poisoning are not uncommon in California.

2.1.18 FISH SPAWNING (SPWN)

Uses of water that support high quality aquatic habitats suitable for reproduction and early development of fish.

Dissolved oxygen levels in spawning areas should ideally approach saturation levels. Free movement of water is essential to maintain well-oxygenated conditions around eggs deposited in sediments. Water temperature, size distribution and organic content of sediments, water depth, and current velocity are also important determinants of spawning area adequacy.

2.1.19 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.

The warm freshwater habitats supporting bass, bluegill, perch, and other fish are generally lakes and reservoirs, although some minor streams will serve this purpose where stream flow is sufficient to sustain the fishery. The habitat is also important to a variety of nonfish species, such as frogs, crayfish, and insects, which provide food for fish and small mammals. This habitat is less sensitive to environmental changes, but more diverse than the cold freshwater habitat, and natural fluctuations in temperature, dissolved oxygen, pH, and turbidity are usually greater.

2.1.20 WILDLIFE HABITAT (WILD)

Uses of waters that support wildlife habitats, including, but not limited to, the preservation and enhancement of vegetation and prey species used by wildlife, such as waterfowl.

The two most important types of wildlife habitat are riparian and wetland habitats. These habitats can be threatened by development, erosion, and sedimentation, as well as by poor water quality.

The water quality requirements of wildlife pertain to the water directly ingested, the aquatic habitat itself, and the effect of water quality on the production of food materials. Waterfowl habitat is particularly sensitive to changes in water quality. Dissolved oxygen, pH, alkalinity, salinity, turbidity, settleable matter, oil, toxicants, and specific disease organisms are water quality characteristics particularly important to waterfowl habitat. Dissolved oxygen is needed in waterfowl habitats to suppress development of botulism organisms; botulism has killed millions of waterfowl. It is particularly important to maintain adequate circulation and aerobic conditions in shallow fringe areas of ponds or reservoirs where botulism has caused problems.

2.2 EXISTING AND POTENTIAL BENEFICIAL USES

2.2.1 SURFACE WATERS

Surface waters in the Region consist of non-tidal wetlands, rivers, streams, and lakes (collectively described as inland surface waters), estuarine wetlands known as baylands, estuarine waters, and coastal waters. In this Region, estuarine waters consist of the Bay system including intertidal, tidal, and subtidal habitats from the Golden Gate to the Region's boundary near Pittsburg and the lower portions of streams that are affected by tidal hydrology, such as the Napa and Petaluma rivers in the north and Coyote and San Francisquito creeks in the south.

Inland surface waters support or could support most of the beneficial uses described above. The specific beneficial uses for inland streams include municipal and domestic supply (MUN), agricultural supply (AGR), commercial and sport fishing (COMM), freshwater replenishment (FRESH), industrial process supply (PRO), groundwater recharge (GWR), preservation of rare and endangered species (RARE), water contact recreation (REC1), noncontact water recreation (REC2), wildlife habitat (WILD), cold freshwater habitat (COLD), warm freshwater habitat (WARM), fish migration (MIGR), and fish spawning (SPWN).

The San Francisco Bay Estuary supports estuarine habitat (EST), industrial service supply (IND), and navigation (NAV) in addition to COMM, RARE, REC1, REC2, WILD, MIGR, and SPWN.

Coastal waters' beneficial uses include water contact recreation (REC1); noncontact water recreation (REC2); industrial service supply (IND); navigation (NAV); marine habitat (MAR); shellfish harvesting (SHELL); commercial and sport fishing (COMM); wildlife habitat (WILD), fish migration (MIGR), fish spawning (SPWN), and preservation of rare and endangered species (RARE). In addition, the California coastline within the Region is endowed with exceptional scenic beauty.

The beneficial uses of any specifically identified water body generally apply to all its tributaries. In some cases a beneficial use may not be applicable to the entire body of water, such as navigation in Richardson Bay or shellfish harvesting in the Pacific Ocean. In these cases, the Water Board's judgment regarding water quality control measures necessary to protect beneficial uses will be applied.

Beneficial uses of streams that have intermittent flows, as is typical of many streams in the region, must be protected throughout the year and are designated as "existing."

Beneficial uses of each significant water body have been identified and are organized according to the seven major Hydrologic Planning Areas within the Region (Figure 2-2). The maps locating each water body (Figures 2-3 through 2-9b) were produced using a geographical information system (GIS) at the Water Board. The maps use the hydrologic basin information compiled by the California Interagency Watershed map, with supplemental information from the Oakland Museum of California Creek and Watershed Map series, the Contra Costa County Watershed Atlas, and the San Francisco Estuary Institute EcoAtlas. More detailed representations of each location can be created using this GIS version.

Table 2-1 contains the beneficial uses for many surface water bodies in the Region, organized geographically by the Region's seven Hydrologic Planning Areas. Within each Hydrologic Planning Area, water bodies are listed geographically, with tributaries indented below their receiving water body. In cases where a water body shares the same name with another water body (e.g., Redwood Creek), the location of the water body (county and/or other identifier) is given in parentheses. An alternative name for a water body, where known, is also shown in parentheses. In Table 2-1, beneficial uses are indicated as follows:

E – indicates the beneficial use exists in the water body.

E* – indicates public access to the water body is limited or prohibited for purposes of protecting drinking water quality and public health. REC-1 is designated as E* for the purpose of protecting water quality. No right to public access is intended by this designation.

P – indicates the water body could potentially support the beneficial use.

2.2.2 GROUNDWATER

Groundwater is defined as subsurface water that occurs beneath the water table in soils and geologic formations that are fully saturated. Where groundwater occurs in a saturated geologic unit that contains sufficient permeable thickness to yield significant quantities of water to wells and springs, it can be defined as an aquifer. A groundwater basin is defined as a hydrogeologic unit containing one large aquifer or several connected and interrelated aquifers.

Water-bearing geologic units occur within groundwater basins in the Region that do not meet the definition of an aquifer. For instance, there are shallow, low permeability zones throughout the Region that have extremely low water yields. Groundwater may also occur outside of currently identified basins. Therefore, for basin planning purposes, the term "groundwater" includes all

subsurface waters, whether or not these waters meet the classic definition of an aquifer or occur within identified groundwater basins.

The California Department of Water Resources (DWR) evaluated the characteristics of groundwater basins in the Region and throughout the state and summarized the results in California's Groundwater, Bulletin 118 (2003). Of special importance to the Region are the 28 groundwater basins and seven sub-basins classified by DWR that produce, or potentially could produce, significant amounts of groundwater (Figures 2-10 and 2-10A-D). The Water Board maintains a GIS for all water bodies in the Region and has the capacity to present information on each basin at a much higher level of resolution than is depicted in Figures 2-10A-D.

Existing and potential beneficial uses applicable to groundwater in the Region include municipal and domestic water supply (MUN), industrial water supply (IND), industrial process supply (PRO), agricultural water supply (AGR), groundwater recharge (GWR), and freshwater replenishment to surface waters (FRESH). Table 2-2 lists the 28 identified groundwater basins and seven sub-basins located in the Region and their existing and potential beneficial uses.

Unless otherwise designated by the Water Board, all groundwater is considered suitable, or potentially suitable, for municipal or domestic water supply (MUN). In making any exceptions, the Water Board will consider the criteria referenced in State Water Board Resolution No. 88-63 and Water Board Resolution No. 89-39, "Sources of Drinking Water," where:

- The total dissolved solids exceed 3,000 milligrams per liter (mg/L) (5,000 microSiemens per centimeter, μS/cm, electrical conductivity), and it is not reasonably expected by the Water Board that the groundwater could supply a public water system; or
- There is contamination, either by natural processes or by human activity (unrelated to a specific pollution incident), that cannot reasonably be treated for domestic use using either Best Management Practices (BMPs) or best economically achievable treatment practices; or
- The water source does not provide sufficient water to supply a single well capable of producing an average, sustained yield of 200 gallons per day; or
- The aquifer is regulated as a geothermal energy-producing source or has been exempted administratively pursuant to 40 Code of Federal Regulations (CFR) Part 146.4 for the purpose of underground injection of fluids associated with the production of hydrocarbon or geothermal energy, provided that these fluids do not constitute a hazardous waste under 40 CFR Part 261.3.

2.2.3 WETLANDS

Federal administrative law (e.g., 40 CFR Part 122.2, revised December 22, 1993) defines wetlands as waters of the United States. National waters include waters of the State of California, defined by the Porter-Cologne Act as "any water, surface or underground, including saline waters, within the boundaries of the State" (California Water Code §13050[e]). Wetland water quality control is therefore clearly within the jurisdiction of the State Water Board and Regional Water Boards.

Wetlands are further defined in 40 CFR 122.2 as "those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal

circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas."

The Water Board recognizes that wetlands frequently include areas commonly referred to as saltwater marshes, freshwater marshes, open or closed brackish water marshes, mudflats, sandflats, unvegetated seasonally ponded areas, vegetated shallows, sloughs, wet meadows, playa lakes, natural ponds, vernal pools, diked baylands, seasonal wetlands, floodplains, and riparian woodlands.

Mudflats make up one of the largest and most important habitat types in the Estuary. Snails, clams, worms, and other animals convert the rich organic matter in the mud bottom to food for fish, crabs, and birds.

Mudflats generally support a variety of edible shellfish, and many species of fish rely heavily on the mudflats during at least a part of their life cycle. Additionally, San Francisco Bay mudflats are one of the most important habitats on the coast of California for millions of migrating shorebirds.

Another important characteristic of the Estuary is the fresh, brackish, and salt water marshes around the Bay's margins. These highly complex communities are recognized as vital components of the Bay system's ecology. Most marshes around the Bay have been destroyed through filling and development. The protection, preservation, and restoration of the remaining marsh communities are essential for maintaining the ecological integrity of the Estuary.

Identifying wetlands may be complicated by such factors as the seasonality of rainfall in the Region. Therefore, in identifying wetlands considered waters of the United States, the Water Board will consider such indicators as hydrology, hydrophytic plants, and/or hydric soils for the purpose of mapping and inventorying wetlands. The Water Board will, in general, rely on the federal manual for wetland delineation in the Region when issuing Clean Water Act Section 401 water quality certifications (U.S. Army Corps of Engineers (Corps) Wetlands Delineation Manual, 1987). In the rare cases where the U.S. EPA and Corps guidelines disagree on the boundaries for federal jurisdictional wetlands, the Water Board will rely on the wetlands delineation made by the U.S. EPA or the California Department of Fish and Game (CDFG). For the purpose of mapping and inventorying wetlands, the Water Board will rely on the protocols and naming conventions of the National Wetlands Inventory (NWI) prepared by the U.S. Fish and Wildlife Service (USFWS).

Many individual wetlands provide multiple benefits depending on the wetland type and location. There are many potential beneficial uses of wetlands, including Wildlife Habitat (WILD); Preservation of Rare and Endangered Species (RARE); Shellfish Harvesting (SHELL); Water Contact Recreation (REC1); Noncontact Water Recreation (REC2); Commercial, and Sport Fishing (COMM); Marine Habitat (MAR); Fish Migration (MIGR); Fish Spawning (SPAWN); and Estuarine Habitat (EST). Some of these general beneficial uses can be further described in terms of their component wetland function. For example, many wetlands that provide groundwater recharge (GWR) also provide flood control, pollution control, erosion control, and stream baseflow.

Table 2-3 shows how beneficial uses are associated with different wetland types. Table 2-4 lists and specifies beneficial uses for 34 significant wetland areas within the Region; generalized locations of these wetlands are shown in Figure 2-11. It should be noted that most of the wetlands listed in Table 2-4 are saltwater marshes, and that the list is not comprehensive.

The Water Board has participated in completing the Baylands Ecosystem Habitat Goals Report (1999) and the Baylands Ecosystem Species and Community Profiles (2000), which were written by scientists and managers in the Region in order to recommend sound wetland restoration strategies. Other efforts around the Bay to locate wetland sites include San Francisco Estuary Institute's (SFEI) EcoAtlas Baylands Maps (Baylands Maps) and Bay Area Wetlands Project Tracker (Wetlands Tracker), and the Wetland Tracker managed by the San Francisco Bay Joint Venture. Because of the large number of small and non-contiguous wetlands, it is not practical to delineate and specify beneficial uses of every wetland area. Therefore, beneficial uses may be determined site specifically, as needed. Chapter 4 of this Plan contains additional information on the process used to determine beneficial uses for specific wetland sites.

FIGURES

Figure 2-1: Areas of Special Biological Significance

Figure 2-2: Hydrologic Planning Areas

Legend for Figures 2-3 through 2-9b

Figures 2-3 through 2-3b: Marin Coastal Basin

Figures 2-4 through 2-4b: San Mateo Coastal Basin

Figure 2-5: Central Basin

Figures 2-6 through 2-6b: South Bay Basin

Figures 2-7 through 2-7b: Santa Clara Basin

Figures 2-8 through 2-8b: San Pablo Basin

Figures 2-9 through 2-9b: Suisun Basin

Figure 2-10: Significant Groundwater Basins

Figure 2-10A: Groundwater Basins: Marin / Sonoma / Napa

Figure 2-10B: Groundwater Basins: Napa / Solano

Figure 2-10C: Groundwater Basins: San Francisco

Figure 2-10D: Groundwater Basins: East and South Bay

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Appendix C Hydromodification Susceptibility Map

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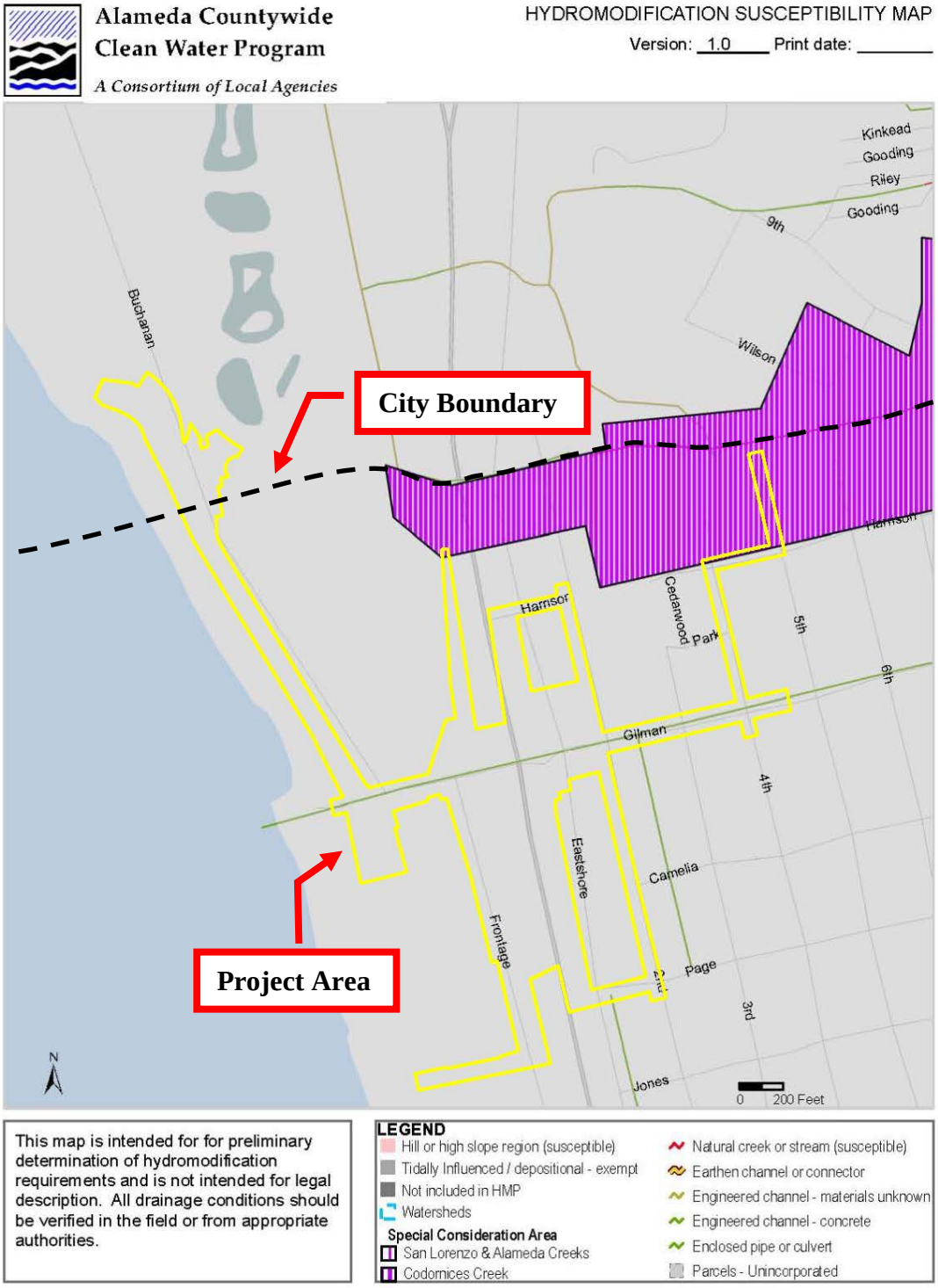
Alameda Countywide
Clean Water Program
A Consortium of Local Agencies
HYDROMODIFICATION SUSCEPTIBILITY MAP
Version: 1.0 Print date:
Kinkead
Gooding
Riley
Gooding
9th
Buchanan
Wilson
City Boundary
Harrison
Cedarwood
Park
5th
6th
Gilman
4th
Eastshore
Camelia
Frontage
Page
3rd
Jones
Project Area
N
0 200 Feet
This map is intended for for preliminary determination of hydromodification requirements and is not intended for legal description. All drainage conditions should be verified in the field or from appropriate authorities.
LEGEND
Hill or high slope region (susceptible)
Tidally Influenced / depositional - exempt
Not included in HMP
Watersheds
Special Consideration Area
San Lorenzo & Alameda Creeks
Codornices Creek
Natural creek or stream (susceptible)
Earthen channel or connector
Engineered channel - materials unknown
Engineered channel - concrete
Enclosed pipe or culvert
Parcels - Unincorporated

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