8.12 Water Resources

This section describes the water resources features in the immediate Project area and evaluates the effect of the Chevron Richmond Refinery Power Plant Replacement Project (PPRP, or the Project) on water resources. Potential impacts to water resources are evaluated specifically with respect to significance thresholds established in the California Environmental Quality Act (CEQA) checklist.

8.12.1 Introduction

Chevron is proposing the PPRP to add an additional 60 megawatts (MW) net generation to its existing refinery electrical generation located within Chevron's Richmond Refinery in the City of Richmond (see Figure 1.2-1) in Contra Costa County, California. The proposed PPRP will be integrated into Chevron's plans to meet its growing refinery electrical load, and produce steam to replace an existing boiler plant that is approaching its end of life. The PPRP is a subset of the larger Richmond Refinery Renewal Project that is concurrently undergoing CEQA review by the City of Richmond. The California Energy Commission (CEC) has jurisdiction for only the PPRP portion of the Renewal Project that is the subject of this application.

The PPRP will consist of the following components:

- A nominal 43-MW net, natural gas- or liquid petroleum gas (butane)-fired cogeneration train consisting of one combustion turbine generator (CTG), a refinery fuel gas-fired heat recovery steam generator, 13.8-kV switchgear and ancillary equipment.
- Shutdown of the existing No. 1 power plant refinery steam boilers currently providing steam to the Refinery.
- A 17-MW net extraction, condensing steam turbine generator (STG), an associated cooling tower, and 12-kV switchgear installed as part of the new hydrogen production facility (the remainder of the hydrogen plant is under CEQA review as part of the Renewal Project). The new hydrogen plant will be a net generator of steam for both the STG and the Refinery steam system.
- Reconductoring of approximately 4,000 feet of existing onsite double-circuit overhead 115-kV transmission line to upgrade its ampacity. The reconductoring will reuse existing transmission line structures.
- Adjacent onsite service connections for fuel, reclaimed water, water, wastewater, steam, and electricity to existing piperacks, with the exception of the reconductoring noted above.

The Cogen 3000 portion of the PPRP will occupy approximately 0.5 acre within an existing 5.2-acre cogeneration facility, and the STG and associated equipment (H_2-STG) will occupy approximately 0.5 acre within a new 7.9-acre hydrogen plant that will be built as part of the Richmond Refinery Renewal Project. The PPRP will be located well within the heart of the existing 2,900-acre Richmond Refinery. Temporary construction laydown and parking for the PPRP will be provided in various existing laydown areas within the Refinery that are

currently used for ongoing maintenance and project laydown. A complete description of the PPRP is provided in Section 2.0.

8.12.2 Laws, Ordinances, Regulations, and Standards

Federal, state, county, and local laws, ordinances, regulations, and standards (LORS) applicable to water resources are discussed in this section and summarized in Table 8.12-1.

TABLE 8.12-1
Applicable Laws, Ordinances, Regulations, and Standards

LORS	Applicability	Conformance and Timing
Federal		
Clean Water Act/Water Pollution Control Act. P.L. 92-500, 1972; amended by Water Quality Act of 1987, P.L. 100-4 (33 USC 466 et seq.); National Pollutant Discharge Elimination System (NPDES) (CWA, Section 402).	Prohibits discharge of pollutants to receiving waters unless the discharge is in compliance with an NPDES permit. Applies to all point-source discharges, including industrial wastewater and stormwater runoff, during both construction and operation.	Compliance with NPDES permit requirements from the San Francisco Bay Water Board (see below under State) and local agencies (see below under Local).
State		
Porter-Cologne Water Quality Control Act	Specifies the responsibilities of the state with respect to protection of surface waters.	• Refinery process wastewater and stormwater is collected and managed in the existing wastewater treatment system that is regulated by the San Francisco Bay Regional Water Quality Control Board (RWQCB) under NPDES Permit CA0005134, Order No. R2-2006-0035. See Section 8.12.3.3 (Plant Wastewater). • Sanitary wastewater streams are conveyed to the Richmond Sewer District for treatment and disposal; discharges are regulated under NPDES Permit CA0038539, Order No. 94-014. See Section 8.12.3.3 (Plant Wastewater). • Stormwater discharges are regulated under an existing NPDES permit for municipal stormwater NPDES Permit CA0005134, Order No. R2-2006-0035)). See Section 8.12.4.2 (Municipal Stormwater). • Stormwater discharges during operation of power plants requires compliance with statewide program for industrial uses (NPDES Permit, Order No. 97-03-DWQ). See Section 8.12.4.2 (Industrial Stormwater). • Construction stormwater discharges on sites greater than 1 acre require compliance with statewide construction discharge permit (NPDES Permit CAS000002, Order No. 99-08-DWQ). See Section 8.12.4.2 (Construction Stormwater).

TABLE 8.12-1
Applicable Laws, Ordinances, Regulations, and Standards

LORS	Applicability	Conformance and Timing
California Water Code §461 and §13550, and SWRCB Resolution 75-58.	Encourages the conservation of water resources and the maximum reuse of wastewater.	The PPRP proposes to use potable water for process and cooling water. However, if sufficient recycled water becomes available, the project will use recycled water, and is therefore in conformance with these code sections and Resolution No. 75.58. See Section 8.12.3.2 (Water Supply and Use).
Bay Conservation and Development Commission	The Bay Conservation and Development Commission was created in response to broad public concern over the future of San Francisco Bay.	• Regulates new development within the first 100 feet inland from the Bay to ensure that maximum feasible public access to the Bay is provided. • Pursues an active planning program to study Bay issues so that Commission plans and policies are based upon the best available current information. • Administers the federal Coastal Zone Management Act within the San Francisco Bay segment of the California coastal zone to ensure that federal activities reflect Commission policies. • Participates in California's oil spill prevention and response planning program.
Local		
Contra Costa County General Plan	Contra Costa County General Plan provides policies and goals to protect water resources.	*Goal 8-T:* To conserve, enhance, and manage water resources, protect their quality, and assure an adequate long-term supply of water for domestic, fishing, industrial, and agricultural use. *Policy 8-74:* Preserve watersheds and groundwater recharge areas by avoiding the placement of potential pollution sources in areas with high percolation rates. *Policy 8-75:* Preserve and enhance the quality of surface and groundwater resources. *Policy 8-87:* On-site water control shall be required of major new developments so that no increase in peak flows occurs relative to the site's pre-development condition, unless the Planning Agency determines that off-site measures can be employed which are equally effective in preventing adverse downstream impacts. *Policy 8-91:* Grading, filling, and construction activity near watercourses shall be conducted in such a manner as to minimize impacts from increased runoff, erosion, sedimentation, biochemical degradation, or thermal pollution. *Policy 8-dd:* Require groundwater monitoring programs for all large-scale commercial and industrial facilities using wells.

TABLE 8.12-1
Applicable Laws, Ordinances, Regulations, and Standards

LORS	Applicability	Conformance and Timing
		Policy 10-38: Flood-proofing of structures shall be required in any area subject to flooding; this shall occur both adjacent to watercourses as well as in San Pablo Bay or along the waterfront. *Policy 10-60:* Structures for human occupancy, and particularly critical structures, and potentially dangerous commercial or industrial facilities (e.g., plants for the manufacture or storage of hazardous materials) shall be protected against tsunami hazard.
City of Richmond General Plan	The City of Richmond General Plan (1994) lists the following goals and policies to protect hydrology and water quality.	OSC-J.1: Greatly expand reclamation of wastewater. Such water would be utilized by all appropriate users, in particular by industry (e.g., Chevron Refinery and Richmond Rod and Gun Club). OSC-M.2: Protect the City's waterways and the Bay from run-off containing high concentrations of pesticides and fertilizers, industrial wastes, or other contaminants. *Goal CF-H:* Provide and maintain a level of public infrastructure facilities that adequately serves the present and future needs of the community. *Policy CF-H.1:* Coordinate with East Bay Municipal Utility District (EBMUD) to ensure an adequate water system for existing and future residents and to maintain adequate water reserves. *Policy CF-H.3:* Encourage effective water conservation practices by residents and businesses including household water conservation and use of drought resistant landscaping and reclaimed wastewater. *Goal CF-H:* Provide and maintain a level of public infrastructure facilities that adequately serves the present and future needs of the community. *Policy CF-H.4:* Continue to operate and maintain the Municipal Sewer District at high levels of efficiency, and upgrade the city's waste water system to provide sufficient capacity and water pollution control facilities to meet current and future project needs, including backup capacity to cover periods of maintenance and heavy stormwater runoff. *Policy CF-H.5:* Coordinate closely with planning, operation, and upgrading of the Richmond Municipal Sewer District facilities with the West Contra Costa and Stege Sanitary Districts and with East Bay Municipal Utility District.

8.12.2.1 Federal

The Clean Water Act authorizes the U.S. Environmental Protection Agency (USEPA) to regulate discharges of wastewater and stormwater into surface waters by issuing National Pollutant Discharge Elimination System (NPDES) permits and setting pretreatment standards. In California, the Regional Water Quality Control Boards implement these permits at the state level, but USEPA may exercise it jurisdiction at its discretion. Relevant NPDES permits are discussed below under state LORS.

8.12.2.2 State

Municipal Stormwater NPDES Permit

The Contra Costa Clean Water Program was established as the local entity responsible for implementing compliance with the federal Clean Water Act to control stormwater pollution. The Clean Water Program includes all of Contra Costa County, 16 incorporated cities, and the Contra Costa County Flood Control and Water Conservation District. The program is being conducted in compliance with the municipal NPDES Permit No. CAS0029912 issued by the San Francisco Bay Regional Water Quality Control Board (RWQCB). The permit contains a comprehensive plan to reduce the discharge of pollutants to the "maximum extent practicable" and mandated that participating municipalities implement an approved stormwater management plan by September 1, 1993. The program incorporated Best Management Practices (BMPs) that include construction controls (such as a model grading ordinance), legal and regulatory approaches (such as stormwater ordinances), public education and industrial outreach (to encourage the reduction of pollutants at various sources), inspection activities, wet weather monitoring, and special studies.

Industrial Stormwater NPDES Permit

The State Water Resources Control Board (SWRCB) implements regulations under the federal Clean Water Act requiring that point source discharges of stormwater (which is a flow of rainfall runoff in some kind of discrete conveyance such as a pipe, ditch, channel, or swale) associated with industrial activity that discharge either directly to surface waters or indirectly through municipal separate storm sewers must be regulated by an NPDES permit (RWQCB, 2006). The SWRCB has issued a statewide General Permit and Waste Discharge Requirements (WDRs) to dischargers of stormwater associated with industrial activities (such as the proposed Project), excluding construction activities (NPDES General Permit CAS000001, SWRCB Order 97-03-DWQ). The Stormwater Pollution Prevention Plans (SWPPPs) are required to specify management measures necessary to meet WDRs to ensure receiving water quality is protected. The SWRCB requires a Notice of Intent to be filed prior to any stormwater discharge from industrial activities, and that the SWPPP be prepared, implemented, and maintained at the facility. This statewide General NPDES Permit is currently undergoing a re-issuance process with the SWRCB; the Project will comply with the current General Permit and with any revisions to the General Permit.

Construction Stormwater NPDES Permit

The federal Clean Water Act effectively prohibits discharges of stormwater from most construction sites unless the discharge is in compliance with an NPDES permit. The SWRCB is the permitting authority in California and has adopted a statewide General Permit for Stormwater Discharges Associated with Construction Activity (NPDES Permit CAS000002, Order No. 99-08-DWQ) that applies to projects resulting in one or more acres of soil

disturbance. In accordance with the statewide General Permit, new development and redevelopment projects are required to incorporate treatment measures and other appropriate source control and site design features to reduce the pollutant load in stormwater discharges and manage runoff flows, consistent with implementing agencies' requirements.

California Water Code Sections 461 and 13550, and SWRCB Resolution No. 75-58

Water Code Section 461 states that the primary interest of the people of the state in the conservation of all available water resources required the maximum reuse of recycled water in the satisfaction of requirements for beneficial uses of water. In addition, Water Code section 13550 specifically encourages the conservation of potable water resources and the maximum reuse of wastewater for industrial uses (such as the PPRP) and other uses in areas where recycled water of adequate quality is available at reasonable cost. The PPRP is consistent with these sections of the Water Code because as sufficient recycled water becomes available, the Project will use recycled wastewater for cooling and process needs.

SWRCB Resolution No. 75-58 adopted the "Water Quality Control Policy on the Use and Disposal of Inland Waters Used for Powerplant Cooling," which provides statewide water quality principles regarding power plants that depend upon inland waters for cooling. Resolution No. 75.58 included several guiding principles for cases where the SWRCB or any of the Regional Boards have permit authority over a power plant project, and specifically encouraged the use of wastewater for power plant cooling. The PPRP is consistent with Resolution No. 75.58 because it will use recycled wastewater for cooling when sufficient supplies become available.

Bay Conservation and Development Commission (BCDC)

The 27-member San Francisco Bay Conservation and Development Commission was created by the California Legislature in 1965 in response to broad public concern over the future of San Francisco Bay. The BCDC is made up of appointees from local governments and state/federal agencies. The BCDC, among other responsibilities, is charged with:

- Regulating new development within the first 100 feet inland from the Bay to ensure that maximum feasible public access to the Bay is provided.
- Pursuing an active planning program to study Bay issues so that BCDC plans and policies are based upon the best available current information.
- Administering the federal Coastal Zone Management Act within the San Francisco Bay segment of the California coastal zone to ensure that federal activities reflect BCDC policies.
- Participating in California's oil spill prevention and response planning program.

8.12.2.3 Local

City of Richmond General Plan

The City of Richmond General Plan (City of Richmond, 1994) lists the following goals and policies applicable to hydrology and water quality for the proposed Project.

Hydrology and Water Quality Goals

- *Goal OSC-J.1*: Greatly expand reclamation of wastewater. Such water would be utilized by all appropriate users, in particular by industry (e.g., Chevron Refinery and Richmond Rod and Gun Club).
- *Goal OSC-M.2*: Protect the City's waterways and the Bay from run-off containing high concentrations of pesticides and fertilizers, industrial wastes, or other contaminants.

Water Use Conservation and Demand

- *Goal CF-H:* Provide and maintain a level of public infrastructure facilities that adequately serves the present and future needs of the community.
- *Policy CF-H.1:* Coordinate with East Bay Municipal Utility District (EBMUD) to ensure an adequate water system for existing and future residents and to maintain adequate water reserves.
- *Policy CF-H.3:* Encourage effective water conservation practices by residents and businesses including household water conservation and use of drought resistant landscaping and reclaimed wastewater.

Wastewater

- *Goal CF-H:* Provide and maintain a level of public infrastructure facilities that adequately serves the present and future needs of the community.
- *Policy CF-H.4:* Continue to operate and maintain the Municipal Sewer District at high levels of efficiency, and upgrade the city's waste water system to provide sufficient capacity and water pollution control facilities to meet current and future project needs, including backup capacity to cover periods of maintenance and heavy stormwater runoff.
- *Policy CF-H.5:* Coordinate closely with planning, operation, and upgrading of the Richmond Municipal Sewer District facilities with the West Contra Costa and Stege Sanitary Districts and with East Bay Municipal Utility District.

County of Contra Costa General Plan

Contra Costa County policies to which the Project would be required to conform include those of the Contra Costa County General Plan (County of Contra Costa, 2005). Applicable goals and policies of the County General Plan include:

Water Resources Goals

- *Goal 8-T:* To conserve, enhance, and manage water resources, protect their quality, and assure an adequate long-term supply of water for domestic, fishing, industrial, and agricultural use.

General Water Resources Policies

- *Policy 8-74:* Preserve watersheds and groundwater recharge areas by avoiding the placement of potential pollution sources in areas with high percolation rates.
- *Policy 8-75:* Preserve and enhance the quality of surface and groundwater resources.

Policies for New Development Along Natural Watercourses

- *Policy 8-87:* On-site water control shall be required of major new developments so that no increase in peak flows occurs relative to the site's pre-development condition, unless the Planning Agency determines that off-site measures can be employed which are equally effective in preventing adverse downstream impacts.
- *Policy 8-91:* Grading, filling, and construction activity near watercourses shall be conducted in such a manner as to minimize impacts from increased runoff, erosion, sedimentation, biochemical degradation, or thermal pollution.

Water Resources Implementation Measures

- *Policy 8-dd:* Require groundwater monitoring programs for all large-scale commercial and industrial facilities using wells.

Floodplain Development

- *Policy 10-38:* Flood-proofing of structures shall be required in any area subject to flooding; this shall occur both adjacent to watercourses as well as in San Pablo Bay or along the waterfront.
- *Policy 10-60:* Structures for human occupancy, and particularly critical structures, and potentially dangerous commercial or industrial facilities (e.g., plants for the manufacture or storage of hazardous materials) shall be protected against tsunami hazard.

8.12.3 Setting

8.12.3.1 Hydrologic Setting

Climate and Precipitation

The Project area is characterized as Mediterranean with cool, wet winters and relatively warmer, dry summers. Most of the precipitation falls between November and March. Monthly average rainfall in the City of Richmond is presented in Table 8.12-2. Total annual average rainfall is approximately 23 inches. Total annual average rainfall at the San Pablo/Potrero Hills is approximately 16 inches (Rantz, 1971).

TABLE 8.12-2
Average Monthly Rainfall Near Proposed Project Site (1950 to 2005)

Precipitation	Sum	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average	23.23	4.84	3.83	3.21	1.56	0.53	0.19	0.04	0.08	0.22	1.23	3.00	4.50
Maximum	-	11.68	16.40	12.24	4.98	3.74	1.46	1.41	1.10	1.65	4.57	10.55	9.71
Minimum	-	0.30	0.17	0.01	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.12	0.00

Notes:
All measurements in inches.
Source: Western Regional Climate Center (WRCC), 2005.

Surface Water

The site is part of the Wildcat Creek drainage area that drains to San Pablo Bay. San Pablo Bay is part of the San Francisco Bay Estuary. Freshwater strongly influences environmental conditions in the San Francisco Bay Estuary. Over 90 percent of the estuary's fresh water

originates from the Sacramento-San Joaquin drainage basin and enters the northern reach. The southern reach, like the northern reach, has the physiographic characteristics of an estuary but lacks the fresh water inflow to drive a strong estuarine circulation. As a result, circulation in the southern reach is influenced predominantly by tides, evaporation, and wastewater discharges. Figure 8.12-1 shows the surface water features near the project site.

The major source of freshwater to San Pablo Bay is inflow from Sacramento-San Joaquin Delta, followed by surface water flow, surface stormwater runoff, and groundwater. The physical characteristics (i.e., salinity, temperature, and suspended solids) of San Pablo Bay vary greatly on a given day due to its location between the less salty Suisun Bay and the saltier San Francisco Bay. The interaction between the fresh and saline water has a major influence on the circulation of water in the San Pablo Bay itself. When freshwater and saltwater meet, the denser saltwater tends to flow under the freshwater until the waters are mixed by stronger tidal currents and winds.

The RWQCB has identified impaired water bodies due to elevated levels of contaminants (RWQCB, 1995). Identified impaired water bodies for the San Francisco Bay Region include central San Francisco Bay, San Pablo Bay, and Wildcat Creek. The pollutants of concern in these impaired water bodies include chlordane, pesticides, dioxins, furans, mercury, PCBs, selenium, nickel, and diazinon. The sources of these pollutants include non-point sources from urban development, atmospheric deposition, ballast water (from ships), industrial and municipal point sources, agriculture, and natural sources. Other water quality stressors include introduction of exotic plant/animal species. Surface water bodies are used primarily for commercial and sport fishing, estuarine habitat, fish and wildlife habitat, recreation, rare species habitat, and industrial water supply.

Groundwater

The Chevron Richmond Refinery lies within the San Francisco Bay Area Hydrologic Region. The PPRP is located within the East Bay Plain Subbasin of the Santa Clara Valley Groundwater Basin (Figure 8.12-2) (California Department of Water Resources [DWR], 2003). The East Bay Plain Subbasin is bounded by San Pablo Bay to the north, contact with the Franciscan bedrock to the east and Niles Cone Subbasin to the South. To the West, the subbasin extends beneath San Francisco Bay. Flows from this subbasin are generally toward the west towards San Francisco or San Pablo Bay. The water-bearing formations of this region include alluvial fan deposits (Santa Clara Formation), mud and alluvial deposits associated with an estuarine environment (Alameda Formation), alluvial silts, clays and gravels (Temescal Formation), and artificial fill found mostly along the bay front (DWR, 2003). These unconsolidated sediments can range up to 1,000 feet thick.

Flooding Potential

As shown on Figure 8.12-3, the Project is not located within a potential flood zone as mapped by the Federal Emergency Management Agency (FEMA). Although the property boundary includes areas that are within the 100-year floodplain, the majority of Chevron Richmond Refinery operations and the PPRP site are outside the 100-year floodplain (ESRI-FEMA, 2001).

8.12.3.2 Water Supply and Use

General Information

Potable water is supplied to the Chevron Richmond Refinery by EBMUD. EBMUD water supply and distribution system consist of six water treatment plants, which have a combined treatment capacity of over 375 million gallons per day (mgd). The Orinda Water Treatment Plant, which supplies potable water to the Richmond area and the Refinery, has a treatment capacity of 200 mgd and is currently operating at approximately 70 percent capacity (EBMUD, 2007).

In addition to supplying potable water, EBMUD has been supplying recycled water to the Refinery since September 1995. Recycled water is suitable for most industrial uses such as cooling. Recycled water also can be used for boiler feedwater, process water, and for washdown. Other uses of recycled water include dust control and soil compaction during construction, as well as landscape irrigation. Currently, a 16-inch recycled water pipeline takes processed effluent from the EBMUD's North Richmond Water Reclamation Plant and provides it to Chevron for use in one of its cooling towers. This has resulted in a 3.5 mgd reduction in Chevron's use of potable water.

The Chevron Richmond Refinery is proposing to increase its use of recycled water in cooperation with EBMUD, which is proposing to construct and operate the Richmond Advanced Recycled Expansion (RARE) water project near the southern boundary of the Chevron Richmond Refinery. The RARE project will treat effluent to recycled water standards and deliver it to the Refinery using an existing potable water supply pipeline to the Refinery's existing water treatment facilities (reverse osmosis [RO] plant). If the RARE project is constructed, all uses currently served by potable water from the RO plant would be served by recycled water, reducing potable water use at the Refinery by approximately 3 to 5 mgd. The public comment period for the RARE project's Environmental Impact Report has been completed and an Agency Scoping meeting was held on May 18, 2007. The on-stream date for the RARE project is not yet known, as the project's EIR was approved on May 8, 2007. Therefore, this water resources analysis assumes that the Project will use existing potable water supplies from EBMUD.

Project Information

Water will be used for the Cogen 3000 project, the H_2-STG project, and for potable use. On hot days (85°F), Cogen 3000 will require up to 8 gallons per minute (gpm) of water for the turbine inlet air evaporative cooling system makeup. Under average annual ambient conditions (60°F), Cogen 3000 will require approximately 3 gpm for the inlet air evaporative cooling system make-up. In addition, Cogen 3000 will require 532 gpm of RO water for steam cycle make-up. All of the water required for the Cogen 3000 facility will be provided by the existing RO plant (currently supplied by the EBMUD potable water system).

The H_2-STG will use up to 300 gpm of recycled water for cooling tower make-up. Total recycled water use by the cooling tower would be approximately 484 acre-feet per year. The recycled water will be delivered to the H_2-STG through an existing recycled water pipeline from the EBMUD North Richmond Water Reclamation Plant. The H_2-STG also will use a small amount (approximately 15 gpm) of cycle makeup water for gland seal leakage, which will be provided by the existing RO plant (currently supplied by the potable water system but may be supplied by the RARE project if constructed).

Potable water for drinking, safety shower, fire protection, and service water uses will be served from the existing EBMUD potable water system, using existing lines.

Figures 2.1-16 and 2.1-17 illustrate the expected water balance for Cogen 3000 at an average ambient temperature of 60°F and at maximum ambient temperature of 85°F. Average water balance for the STG is illustrated in Figure 2.1-18. Average daily and maximum water uses are presented in Table 2.2-1.

8.12.3.3 Wastewater Collection, Treatment, and Disposal

General Information

Numerous sources of discharge water emanate from the Refinery including treated process wastewater, stormwater, steam condensate, firewater, and groundwater. All of the effluent water is ultimately discharged into the San Pablo or San Francisco Bays.

The Refinery has its own wastewater treatment system. The system's capacity is approximately 20 mgd, compared to an average May 2003-September 2004 dry-weather wastewater discharge of 5.48 mgd. During periods of dry weather such as the summer months, almost all wastewater comes from existing cooling tower blowdown, condensed steam, plant wash-up water, and various other sources. During the winter months, in addition to the average 5.48 mgd process wastewater, large amounts of rainfall also enter the wastewater treatment system. The 2004 daily wastewater flow varied from a low of 0.0 mgd in June to a high of 24.75 mgd in January. This increase in wastewater flow was due principally to the influx of rainfall into the system. Implementation by Chevron of a system that separates stormwater from wastewater has resulted in only the wastewater flow being treated by the wastewater treatment system. The wastewater treating system was originally sized to handle the full flow of wastewater and stormwater, and as a result of the flow separation project, the wastewater treatment system now has excess capacity for treating wastewater.

The discharge of treated wastewater and stormwater from the Refinery is regulated and permitted by the RWQCB. The wastewater treatment system is segregated into three collection areas, the north yard, the central yard, and the south yard. Each of these collection system areas accepts flow from the process units in its respective area and routes the wastewater to one of three separate oil/water separators, then to a 165 million gallon biological treatment unit called a Bioreactor. The Bioreactor effluent can either be routed directly to the deepwater outfall sump for discharge to San Pablo Bay after passing through a granular activated carbon unit, or a portion may be routed through constructed wetlands for tertiary polishing and selenium removal. Effluent from the wetlands rejoins the main wastewater stream at the deepwater outfall sump, and these commingled streams are discharged via the granular activated carbon unit to a 36-inch diffuser outfall at an average depth of 30 to 50 feet in to the San Pablo Bay (approximately 2,000 feet offshore to the north of Point San Pablo).

Treatment of sanitary (domestic) wastewater from the Refinery is provided by the Richmond Sewer District. The Richmond Sewer District treatment plant has a wet weather design capacity of 40 mgd and a dry weather design capacity of 16 mgd. Operation of the treatment plant has shown that it has adequate capacity to meet secondary treatment for discharge flows up to 18 mgd.

Project Information

The wastewater collection system will collect process wastewater from all of the PPRP plant equipment, including the Heat Recovery Steam Generator (HRSG), cooling towers, and water treatment equipment. The water balance diagrams, presented in Section 2.0, show the expected wastewater streams and flow rates for the PPRP (also see Table 2.2-1). Waste streams include the following:

- Circulating water system blowdown from cooling towers will be discharged to the Refinery wastewater treatment system.
- General plant drains will collect containment area washdown, sample drains, and drainage from facility equipment drains. Water from these areas will be collected in a system of floor drains, hub drains, sumps, and piping and routed to the wastewater collection system. Drains that potentially could contain oil or grease will first be routed through an existing oil/water separator.
- Distillate from the existing Refinery RO system will be used as the feed water for the boiler cycle makeup treatment system.
- HRSG blowdown will ultimately be to flash tanks where the flash steam is sent to lower pressure Refinery steam systems and the condensate is cooled by cooling water in a heat exchanger. The cooled condensate will then be forwarded to one of the other Refinery process units for reuse in that process.

8.12.3.4 Stormwater Discharges

General Information

Stormwater from across the Refinery is either directly discharged through the various outfalls or is commingled with steam condensate, groundwater seepage and/or water from fire protection system. Most of the Refinery stormwater runoff is collected and managed in the existing stormwater system that is regulated by the RWQCB.

Project Information

The PPRP will be designed to minimize the need to remove existing soil during construction. Excavated soils will be managed in conformance with the Refinery's RWQCB-approved Soil Management Program.

Drainage systems required for the PPRP will be integrated into the Refinery's existing stormwater and process wastewater conveyance and treatment systems, regulated under an existing NPDES permit.

8.12.4 Impacts

Project impacts are evaluated with respect to the potential effect on surface and groundwater supplies, potential for erosion, water quality degradation, flooding, and consistency with existing LORS.

8.12.4.1 Environmental Checklist

Table 8.12-3 provides the CEQA Checklist questions that were used to assess the significance of potential impacts and to summarize the possible impacts to water resources from the PPRP.

TABLE 8.12-3
CEQA Checklist for Water Resources

	Potentially Significant Impact	Less than Significant w/Mitigation	Less than Significant	No Impact
Water Resources — Would the Project:				
a) Violate any water quality standards or waste discharge requirements?			X	
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?			X	
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation onsite or offsite?			X	
d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding onsite or offsite?				X
e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?			X	
f) Otherwise substantially degrade water quality?				X
g) Place housing within a 100-year flood hazard area as mapped on a Federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?				X
h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?				X
i) Expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam?				X
j) Inundation by seiche, tsunami, or mudflow?				X
k) Substantially deplete or degrade local or regional surface water supplies, particularly fresh water, or fail to implement reasonable alternatives for water conservation?				X

8.12.4.2 Discussion of Impacts

Water Supply

For cooling tower make-up and other uses, the Project will use potable water provided by EBMUD. EBMUD is making a significant investment to make recycled water available to users, which will help offset its dependence on surface water. The PPRP provides an important market for the use of recycled water and will use recycled water when sufficient supplies are available.

Potable water use for drinking, safety shower, fire protection, and plant services is very small and will be served from the existing EBMUD potable water system that currently serves the Refinery. If the EBMUD RARE project is approved and constructed, the PPRP's only uses of potable water will be limited to drinking, safety showers, and fire protection. Approximately 800 gpm (1,290 acre-feet per year) of potable water is currently used by the existing steam boilers at the Refinery. These facilities will be shut down after the PPRP is online. The proposed Project's maximum annual total water use is expected to be 1,486 acre-feet per year, resulting in a net increase of approximately 200 acre-feet per year. This increase is not expected to result in significant impacts to EBMUD's water supply system.

Wastewater

The anticipated wastewater discharge is well within the total capacity of the Refinery's wastewater treatment system. The wastewater stream separation system implemented recently by Chevron has resulted in only the process wastewater flow being treated by the system. As a result, the current system has excess capacity for treating wastewater; therefore, wastewater impacts for the PPRP will be less than significant. The increased volume of sanitary wastewater resulting from the PPRP would be considered a *de minimis* increase in demand on the sewer system and well within the capacity of the district.

Groundwater Use

The PPRP will use potable water (and if available recycled), which does not originate from groundwater sources; therefore, the Project will not cause significant impacts to potable groundwater supplies or uses.

Stormwater Runoff

Rainwater runoff from stockpiles of contaminated soils excavated during site preparation of the building sites for the H_2-STG could introduce additional contaminant loading into the waste stream. However, these stockpiled soils would be managed under the Refinery's RWQCB-approved Soil Management Program, which would mitigate the potential impact to less-than-significant levels.

The proposed Project would comply with the BMP conditions of a Construction Activity Stormwater permit and would have no offsite discharges from stormwater.

Addition of impervious surfaces could adversely affect runoff, erosion or flooding. However, for the proposed Project, the major components would be constructed in parts of the Refinery where stormwater runoff is controlled by the existing wastewater treatment system. Potential water quality impacts associated with erosion and runoff during construction would also be managed by the existing wastewater treatment systems as well as standard construction methods and applicable regulations.

Cumulative Impacts

The PPRP will not cause or contribute to cumulative impacts on water resources. Good engineering practices and BMPs will be used in the Project design and operation. Stormwater discharge will adhere to a SWPPP and to state and local agency water quality standards. The Basin Plan is a regional program which documents approaches to implementing state and federal policies in the context of actual waste quality conditions. The PPRP's compliance with the Basin Plan constitutes compliance with a regional water quality program, further ensuring that cumulative impacts to local waterways are avoided. No significant impacts to surface water or groundwater quality are expected during construction or operation of the Project. In the future, if sufficient recycled water becomes available, the Project will contribute to water conservation by making use of recycled water for power plant and other process uses.

8.12.5 Mitigation Measures

Implementation of the PPRP as designed will have less-than-significant impacts. Mitigation is not required. As described in Section 8.12.2, rainwater runoff from stockpiles of contaminated soils excavated during site preparation of the building sites for the H_2-STG could introduce additional contaminant loading into the waste stream. However, these stockpiled soils would be managed under the Refinery's RWQCB-approved Soil Management Program, which would mitigate the potential impact to less-than-significant levels.

8.12.6 Permits Required

The RWQCB is responsible for administering water quality permitting for the Project. A tabular summary of required permits and involved agencies is provided in Table 8.12-4.

TABLE 8.12-4
Permitting Agencies for Water Resources Permits

Permit	Agency
Construction Activity Stormwater Permit	San Francisco Bay RWQCB Dale Bowyer Program Coordinator (510) 622-2323

8.12.7 Involved Agencies and Agency Contacts

Agency contacts are provided in Table 8.12-4.

8.12.8 References

California Department of Water Resources (DWR). 2003. *California's Groundwater, San Francisco Bay Hydrologic Region.* Bulletin 118.

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East Bay Municipal Utility District (EBMUD). 2007. *RARE Water Project Environmental Impact Report*. January 2007.

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San Francisco Bay Regional Water Quality Control Board (RWQCB). 1995. *Water Quality Control Plan (Basin Plan)*. June 21, 1995; approved July 20, 1995.

_____. 2006. *National Pollutant Discharge Eliminations System Permit No. CA0005134, Order no. R2-2006-0035*.

Western Regional Climate Center (WRCC). 2005. http://www.wrcc.dri.edu/cgibin/cliMAIN.pl?carchm+sfo, accessed July 27.

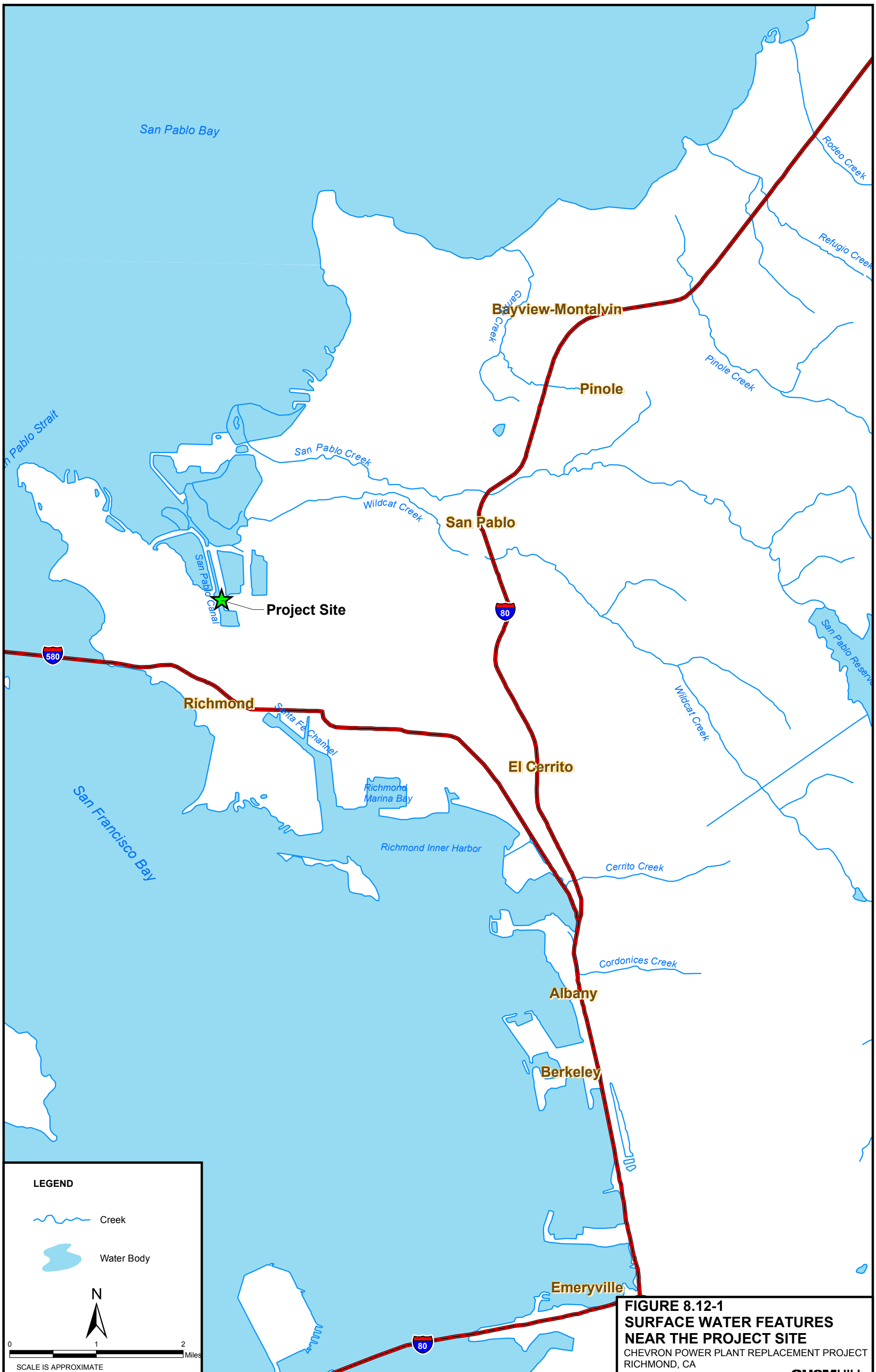

FIGURE 8.12-1
SURFACE WATER FEATURES NEAR THE PROJECT SITE
CHEVRON POWER PLANT REPLACEMENT PROJECT
RICHMOND, CA

CH2MHILL

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FIGURE 8.12-2
GROUNDWATER BASINS IN THE PROJECT AREA
CHEVRON POWER PLANT REPLACEMENT PROJECT
RICHMOND, CA

CH2MHILL

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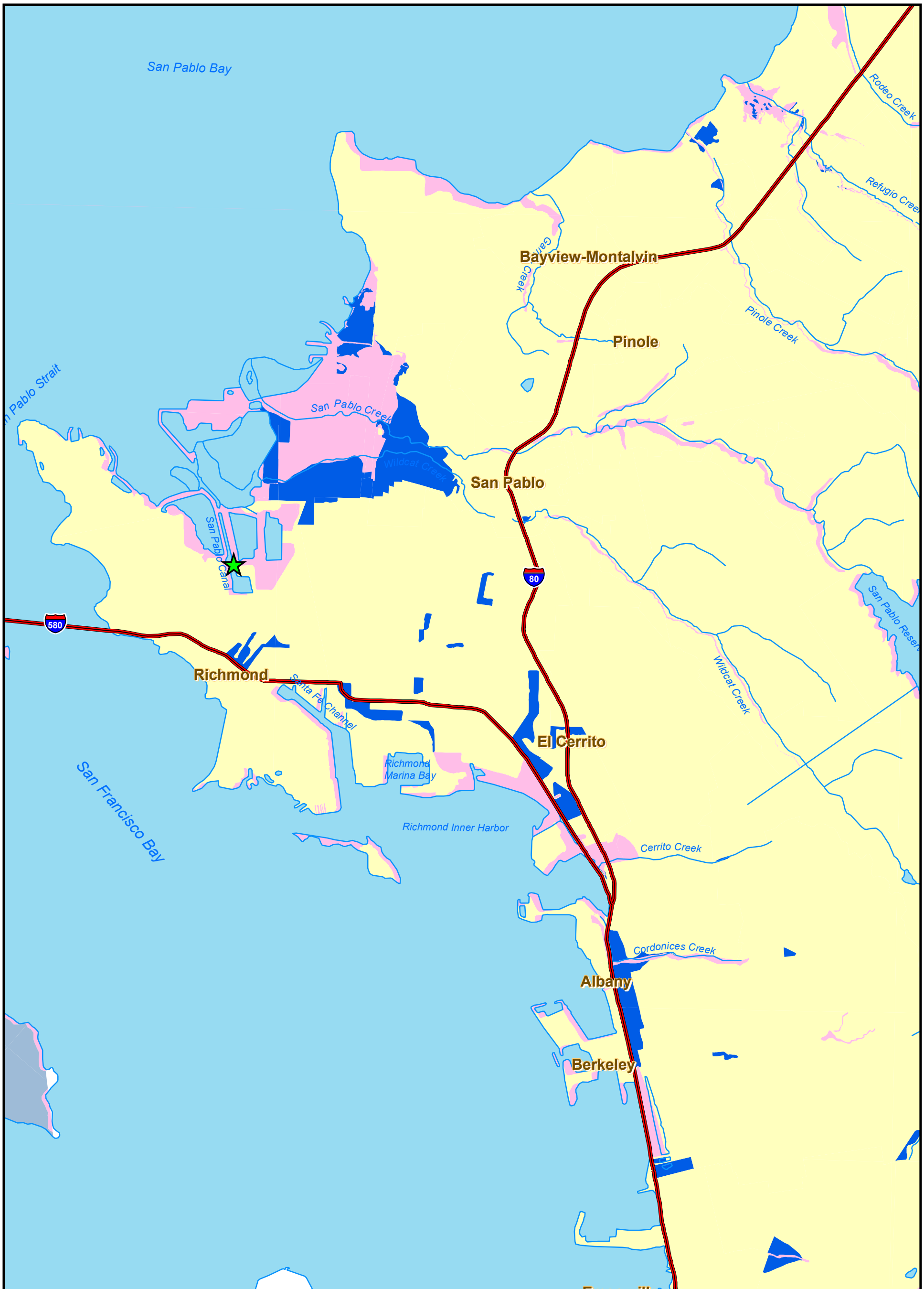

LEGEND

- Site Location
- An area inundated by 100-year flooding, for which no Base Flood Elevations have been determined.
- An area that is determined to be outside the 100- and 500-year floodplains
- An area inundated by 500-year flooding; an area inundated by 100-year flooding with average depths of less than 1 foot or with drainage areas less than 1 square mile; or an area protected by levees from the 100-year flooding.
- An area of undetermined but possible flood hazards
- Area Not Included
- Undescribed

0 1 2 Miles

SCALE IS APPROXIMATE

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FIGURE 8.12-3
FEMA FLOOD PLAIN MAP
CHEVRON POWER PLANT REPLACEMENT PROJECT
RICHMOND, CA

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