Draft
Environmental Impact Report

Pinole-Hercules Water Pollution Control Plant Improvement Project

Prepared for:

City of Pinole
2131 Pear Street
Pinole, CA 94564

AECOM

March 15, 2010

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Prepared for:

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2131 Pear Street
Pinole, CA 94564

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March 15, 2010

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NOTICE OF AVAILABILITY OF THE DRAFT ENVIRONMENTAL IMPACT REPORT AND PUBLIC MEETING ON THE PINOLE-HERCULES WATER POLLUTION CONTROL PLANT IMPROVEMENT PROJECT

The City of Pinole has prepared a draft environmental impact report (EIR) for the Pinole-Hercules Water Pollution Control Plant (WPCP) Improvement Project in compliance with the California Environmental Quality Act (CEQA) (Public Resources Code Section 21000 et seq.) and the State CEQA Guidelines (14 California Code of Regulations Section 15000 et seq.). The WPCP treats water from the Cities of Pinole and Hercules. The overall project purpose is to bring the WPCP into compliance with the National Pollutant Discharge Elimination System (NPDES) permit issued by the Regional Water Quality Control Board.

Description of the Project: The Pinole-Hercules WPCP Improvement Project involves two options: (1) construction of upgrades at the existing plant, relocation of the City of Pinole corporation yard, and construction of a new parallel force main to the Rodeo Sanitary District (RSD); or (2) treatment of City of Pinole flows only at the existing plant and upgrades to the WPCP facility. The project would include an increase in the Pinole-Hercules WPCP's permitted wet-weather treatment capacity, but there would be no increase in the permitted dry-weather treatment capacity.

Project Location: The WPCP is located along the shoreline of San Pablo Bay, at 11 Tennent Avenue, Pinole, California, within Contra Costa County. The proposed force main under Option 1 would exit the WPCP from Tennent Avenue and cross Pinole Creek; it would then parallel the creek for approximately 1,100 feet to the intersection with San Pablo Avenue. The force main would remain within San Pablo Avenue until entering the unincorporated community of Rodeo, where it would turn north onto Parker Avenue, east onto 2nd Avenue, north onto Railroad Avenue, and then east to return to San Pablo Avenue before entering the RSD. Project elements associated with Option 2 would occur entirely within the existing WPCP facility.

Significant Environmental Impacts of the Project: Analysis of environmental impacts associated with the WPCP identified potentially significant impacts in the following issue areas: air quality and odors, climate change, cultural resources, fisheries and aquatic resources, geology and soils, hydrology and water quality, noise, and terrestrial biology. All impacts would be mitigated to a less-than-significant level except for cumulative construction- and operation-related air emissions, which is considered a significant and unavoidable impact of the project.

Public Review Period: The draft EIR is available for review during a 45-day comment period that begins on March 15, 2010 and ends on April 28, 2010. A public hearing on the draft EIR will be held on April 7, 2010 at 6 pm at the Pinole City Hall. Copies of the draft EIR can be reviewed at the following locations:

Pinole City Hall	Hercules Library	Pinole Library
2131 Pear Street	109 Civic Drive	2935 Pinole Valley Road
Pinole, CA 94564	Hercules, CA 94547	Pinole, CA 94564

Written comments must be postmarked no later than April 28, 2010 and should be sent to the following address:

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Pinole, CA 94564 (Email: DAllison@ci.pinole.ca.us)

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EXECUTIVE SUMMARY

ES.1 INTRODUCTION

This executive summary highlights the major areas of importance in the environmental impact report (EIR) for the proposed, Pinole Hercules Water Pollution Control Plant (WPCP) Improvement Project as required by Section 15123 of the California Environmental Quality Act (CEQA) Guidelines (State CEQA Guidelines). As stated in Section 15123(a) of the State CEQA Guidelines, "[a]n EIR shall contain a brief summary of the proposed action and its consequences. The language of the summary should be as clear and simple as reasonably practical." As required by the State CEQA Guidelines, this executive summary includes (1) a summary description of the project, (2) a synopsis of environmental impacts and recommended mitigation measures (Table ES-1), (3) identification of the alternatives evaluated, and (4) a discussion of the areas of controversy associated with the project. For additional detail regarding specific issues, please consult Chapter 2, "Project Description"; Chapter 3, "Affected Environment, Environmental Consequences, and Mitigation Measures"; Chapter 4, "Other Statutory Requirements"; and Chapter 5, "Alternatives."

ES.2 PROJECT CHARACTERISTICS

ES.2.1 PROJECT LOCATION

The Pinole-Hercules WPCP is located along the shoreline of San Pablo Bay, at 11 Tennent Avenue, Pinole, California, within Contra Costa County (see Exhibit 2-1 in Chapter 2, "Project Description"). The WPCP is bordered by the Union Pacific Railroad tracks to the south; Pinole Creek to the northeast; Bayfront Park to the southwest; and San Pablo Bay to the west (see Exhibit 2-2 in Chapter 2, "Project Description"). Land east and south of the project site, across the railroad tracks, consists of residential housing and a storage facility.

Regional access to the WPCP is provided from Interstate-80 (I-80) via San Pablo Avenue. Local access to the plant is provided by Tennent Avenue, adjacent to a parking lot associated with Bayfront Park.

ES.2.2 ELEMENTS OF THE PROJECT

The Cities of Pinole and Hercules are requesting a permit that would increase their maximum daily wet-weather flow capacity from 10.3 million gallons per day (mgd) to 14.59 mgd and a maximum wet-weather flow capacity of 20 mgd. The dry-weather treatment capacity would remain the same at 4.06 mgd.

OPTION 1: NEW LARGER EFFLUENT PIPE TO RODEO

The Pinole-Hercules WPCP would undergo various on-site facility improvements, but would remain a secondary treatment plant. Proposed facility improvements include new secondary clarifiers, influent and effluent pump stations, aeration tanks, and other equipment. The permitted Pinole-Hercules WPCP maximum daily wet-weather flow capacity would increase from 10.3 mgd to 14.59 mgd, and the permit would also allow for a peak instantaneous wet-weather flow capacity of 20 mgd. The dry-weather treatment capacity would remain the same at 4.06 mgd.

A new larger capacity pipeline would be installed from the Pinole-Hercules WPCP to the permitted Outfall 001 at the Rodeo Sanitary District (RSD) wastewater treatment plant. Shallow water Outfall 002 would no longer be used. All treated, disinfected wastewater would be discharged to the existing permitted deepwater outfall (Outfall 001) at the RSD. The diffuser on the exiting outfall would undergo maintenance to provide the appropriate dilution in San Pablo Bay. Finally, the existing city of Pinole corporation yard at the WPCP would be relocated to Pinole Shores Drive, between the Union Pacific Railroad tracks and San Pablo Avenue.

OPTION 2: PINOLE-ONLY FLOWS AT EXISTING PLANT

There is a potential that in the future, the City of Hercules could decide to send its wastewater flows to the West County Wastewater District (WCWD) water pollution control facility. If this occurred, the wastewater flows generated by the City of Pinole would continue to be treated at the Pinole-Hercules WPCP. Under Option 2, to address the high influent flows that occur during large rain events, a 450,000-gallon concrete storage tank and associated accessories would be installed. The storage tank would be mostly buried, with the base located approximately 28 feet below the ground surface. Construction of the storage tanks would allow any flows above 10.3 mgd to be stored and then returned to the treatment process when flows drop below 10.3 mgd. The storage tank would be empty except during severe storm events. During the peak storm event, the storage tank would be filled and emptied within a 24-hour period. Option 2 would not include relocation of the corporation yard.

ES.3 SUMMARY OF SIGNIFICANT IMPACTS AND MITIGATION MEASURES

Table ES-1 displays a summary of impacts and proposed mitigation measures that would avoid or minimize potential impacts. In the table, the level of significance of the impact following implementation of each mitigation measures is identified. For detailed descriptions of project impacts and mitigation measures, please see Sections 3.1 through 3.9.

ES.4 ALTERNATIVES

The State CEQA Guidelines Section 15126.6 requires that an EIR describe a range of reasonable alternatives to the project that could feasibly attain the basic objectives of the project and avoid and/or lessen one or more of the significant environmental effects of the project. Chapter 5of this draft EIR (DEIR) provides a comparative analysis between the project and the following alternatives: Full Tertiary Facilities, Small Tertiary or Hybrid Solution, All Flows to West County Wastewater, and City of Hercules Only Flows to West County Facility. As required under CEQA, the No-Project Alternative is also evaluated in Chapter 6.

ES.4.1 NO-PROJECT ALTERNATIVE

Under the No-Project Alternative, no facility upgrades would be constructed. The Pinole-Hercules WPCP would continue to treat flows from the cities of Pinole and Hercules and would continue to be permitted to treat and discharge 4.06 mgd average dry-weather flow and 10.3 mgd average wet-weather flow. Treated effluent from the WPCP would continue to be conveyed northeast through the existing pipeline to the RSD, where flows from the two treatment facilities are combined and discharged into San Pablo Bay through permitted deep water Outfall 001.

The WPCP would continue to occasionally utilize the shallow water discharge outfall (Outfall 002), located at the west side of the WPCP property boundary, when the plant’s treatment capacity is exceeded during winter storm events that produce influent levels above the plant’s 10.3 mgd permitted wet-weather capacity. During these high influent flow periods, the excess influent would continue to be treated to a primary level, blended with secondary treated wastewater, disinfected, and then dechlorinated prior to release into San Pablo Bay from the shallow water outfall, which would be in violation of Oder R2-2007-0024. The Pinole-Hercules WPCP Joint Powers Authority would continue to consult with the regional water quality control board and take actions to resolve issues related to peak wet-weather flow and the current inadequate processing and discharge facilities.

ES.4.2 FULL TERTIARY FACILITIES

The Full Tertiary Facilities Alternative would involve upgrading the entire Pinole-Hercules WPCP from secondary to tertiary treatment. The current effluent discharge pipeline to the RSD would no longer be used and

RSD Outfall 001 would no longer be used. Instead, a new permitted outfall would be constructed in Pinole Creek for discharge of tertiary-treated effluent into the creek..

The Pinole-Hercules WPCP upgrade to treat all wastewater flows to tertiary recycled water standards would involve the use of tertiary filters or a membrane bioreactor. The plant's peak wet-weather capacity would be increased from 10.3 mgd to 14.59 mgd. Ultraviolet (UV) disinfection would be implemented. All treated, disinfected wastewater would be discharged to Pinole Creek approximately 3,000 feet upstream of San Pablo Bay. Implemenation of this alternative would increase the discharge flowrate, and thereby increase the stream flow in Pinole Creek, at least during the wet season.

ES.4.3 SMALL TERTIARY OR HYBRID SOLUTION

The Small Tertiary or Hybrid Solution Alternative would involve the addition of a small tertiary facility to handle the increased wet-weather flows at the Pinole-Hercules WPCP. The existing pipeline to RSD Outfall 001 would be upgraded and would continue to be used. The secondary treated effluent would be discharged through the existing RSD Deepwater Outfall 001. The existing effluent pump station and gravity pipe to RSD would be upgraded to handle 14.59 mgd.

Similar to the proposed Option 1, the treatment plant upgrades specified for this alternative would be implemented to treat 14.59 mgd maximum day wet-weather flows and instantaneous peak wet-weather flows of 20 mgd. Flows up to 10.3 mgd would be treated with the existing equipment. Tertiary filters or a membrane bioreactor would be installed to treat flows in excess of 10.3 mgd to tertiary recycled water standards. Flows from the new small tertiary or hybrid plant would be conveyed to a new pipeline and new outfall in Pinole Creek approximately 1,800 feet upstream of San Pablo Bay. UV disinfection would be utilized for all tertiary flows to Pinole Creek.

ES.4.4 ALL FLOWS TO WEST COUNTY WASTEWATER DISTRICT FACILITIES

The All Flows to West County Wastewater District Facilities Alternative would involve decommissioning the existing Pinole-Hercules WPCP and diverting all existing wastewater flows generated by the Cities of Pinole and Hercules, via a new pipeline, to the West County Wastewater District (WCWD) facilities. The existing effluent pipeline to RSD Outfall 001 would no longer be used by Pinole or Hercules and the Pinole-Hercules WPCP would be shut down and dismantled. The majority of the new pipeline route to the West County Water Pollution Control Plant would follow San Pablo Avenue (a multilane parkway) and secondary roads; however, the pipeline would cross three streams: Garrity, Rheem, and San Pablo Creeks. Wastewater from the cities would be combined with wastewater from the West County service area and undergo secondary treatment. The WCWD facilities would have to be expanded from the existing 12.5 mgd (average dry-weather flow) and 21 mgd (peak wet-weather flow) to 14 mgd (average dry-weather flow) and 110 mgd (peak wet-weather flow). Combined flows would be discharged through a deepwater outfall currently used by WCWD and the City of Richmond and operated by the West County Agency. The outfall is located off Port Richmond in the Central San Francisco Bay. The volume of treated wastewater discharged through the West County Agency outfall would increase under this Alternative, but the quality of wastewater in the commingled flows is unclear at this time.

ES.4.5 CITY OF HERCULES ONLY TO WEST COUNTY WASTEWATER DISTRICT

The City of Hercules Only to West County Wastewater District Facilities Alternative would involve constructing a new pipeline to transport the wastewater generated by the City of Hercules to the WCWD wastewater treatment plant. Wastewater flows generated by the City of Pinole would continue to be treated at the Pinole-Hercules WPCP, which would undergo only minor facility upgrades and be operated solely to treat wastewater generated by the City of Pinole. (The environmental impacts associated with treatment of Pinole-only flows are evaluated in this EIR under Option 2.) It is expected that wastewater flows from the City of Hercules would be approximately 2.25 mgd (average dry-weather flow) and up to approximately 10-11 mgd (peak wet-weather flow). Wastewater from Hercules would be combined with wastewater from the WCWD service area and undergo secondary treatment by WCWD. The current dry-weather capacity of the WCWD facilities is sufficient to handle the combined flow. The current permitted wet-weather capacity of the WCWD facilities (21 mgd, peak wet-weather flow) would be expanded to handle up to 96 mgd. The commingled flows would be discharged through a deepwater outfall currently used by WCWD and the City of Richmond and operated by the West County Agency. The outfall is located off Port Richmond in the Central San Francisco Bay. The volume of treated wastewater discharged through the West County outfall would increase under this alternative. The quality of wastewater produced by the commingled flows is unclear at this time.

ES 4.6 FLOW EQUALIZATION AT THE EXITING PLANT

The Flow Equalization at the Existing Plant Alternative has similar elements to both Option 1 (New Larger Effluent Pipe to Rodeo) and Option 2 (Pinole-Only Flows at Existing Plant), described in detail in Chapter 2, "Project Description," of this DEIR. However, this alternative differs in location and sizes of facility upgrades. This alternative would involve minor improvements to the Pinole-Hercules WPCP, the plant would continue to provide secondary treatment, and a flow equalization tank would be installed. However, under this alternative, the tank would be 4 million gallons in size in order to handle influent flows from both cities. The tank would be constructed underground in one of three locations: (1) underneath the parking lot at Bayfront Park immediately southeast of the WPCP, (2) on a portion of the privately owned storage facility immediately east of the WPCP, or (3) along the existing road right-of-way next to the UPRR tracks immediately northeast of the WPCP. Under this alternative, the Pinole-Hercules WPCP would continue to treat flows generated by both the City of Hercules and the City of Pinole. Therefore, this alternative would include upgrading the peak wet-weather capacity of the Pinole-Hercules WPCP to 14.59 mgd. Inflows greater than 14.59 mgd would receive primary treatment before delivery to the flow equalization tank.

ES.4.7 ENVIRONMENTALLY SUPERIOR ALTERNATIVE

The State CEQA Guidelines require identification of an environmentally superior alternative from among the proposed project and the alternatives evaluated. If the No-Project Alternative is environmentally superior, CEQA requires identification of the "environmentally superior alternative" other than the No-Project Alternative from among the proposed project and the alternatives evaluated.

As shown Chapter 5, "Alternatives," Table 5-1 of this DEIR, all of the alternatives would have greater impacts than the project Options 1 or 2. The No Project Alternative would be the environmentally superior alternative under CEQA. Although the No Project Alternative would have four lesser impacts than proposed Option 1, it would not meet the project objectives and would result in two greater impacts: fisheries and aquatic resources and hydrology and water quality. The Full Tertiary Facilities and the Small Tertiary or Hybrid Solution Alternatives would meet the project objectives but would result in three greater impacts: fisheries and aquatic resources, hydrology and water quality, and terrestrial biology. The All Flows to West County Wastewater District Facilities and the City of Hercules Only to West County Wastewater District Facilities Alternative would also meet project objectives but would result in four greater impacts: fisheries and aquatic resources, geology and soils, hydrology and water quality, and terrestrial biology. The Flow Equalization at the Existing Plant would meet project objectives but would result in one greater impact related to land use. Thus, among the five alternatives other than No Project that were evaluated in this section of the DEIR, Flow Equalization at the Existing Plant would be the environmentally superior alternative for CEQA purposes.

ES.5 KNOWN AREAS OF CONTROVERSY

Section 15123 of the State CEQA Guidelines requires that a summary of an EIR identify areas of controversy known to the lead agency, including issues raised by agencies and the public. During the public comment period for the notice of preparation, various comment letters were received regarding the project. Appendix B of the DEIR includes copies of the comments received in writing and at the public meeting held on September 24, 2009.

In general, areas of potential controversy known to the City of Pinole include biological resources, traffic (which was evaluated in the initial study circulated with the notice of preparation), water quality, and flooding hazards. The comments also included suggestions related to potential alternatives. These issues were considered in the preparation of this DEIR and, where appropriate, are addressed in the environmental impact analyses presented in Chapter 3 and Chapter 5.

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Table ES-1
Summary of Project Impacts and Mitigation Measures

Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
3.1 Air Quality and Odors			
3.1-1: Generation of Short-term Construction-Related Emissions of Criteria Air Pollutants and Precursors. Construction activities associated with project implementation would generate intermittent emissions of criteria air pollutants and precursors. Construction-generated fugitive dust emissions, including PM_{10} and $PM_{2.5}$, could violate or contribute substantially to an existing or projected air quality violation, expose sensitive receptors to substantial pollutant concentrations, and/or conflict with implementation of regional air quality plans.	Options 1 and 2: S	3.1-1: Implement BAAQMD Dust Control Measures Applies to: Options 1 and 2 The City shall require its contractors to implement all applicable control measures for minimizing fugitive PM dust emissions that are recommended by BAAQMD at the time construction is performed. Requirements to implement these measures shall be included in the contracts the City establishes with the contractor(s) it selects to work on the project. These measures may include but are not limited to the following: ▸ Water all active construction areas at least twice daily. ▸ Cover all trucks hauling soil, sand, and other loose materials or require all trucks to maintain at least 2 feet of freeboard. ▸ Pave, apply water three times daily, or apply (nontoxic) soil stabilizers on all unpaved access roads, parking areas, and staging areas at construction sites. ▸ Sweep daily (with water sweepers) all paved access roads, parking areas, and staging areas at construction sites. ▸ Sweep streets daily (with water sweepers) if visible soil material is carried into adjacent public streets. ▸ Hydroseed or apply (nontoxic) soil stabilizers to inactive construction areas (previously graded areas inactive for 10 days or more). ▸ Enclose, cover, water twice daily or apply (nontoxic) soil binders to exposed stockpiles (e.g., dirt, sand). ▸ Limit traffic speeds on unpaved roads to 15 mph. ▸ Install sandbags or other erosion control measures to prevent silt runoff to public roadways. ▸ Replant vegetation in disturbed areas as quickly as possible. ▸ Install wheel washers for all exiting trucks, or wash off the tires or tracks of all trucks and equipment leaving unpaved areas of the WPCP site and unpaved areas of new corporation yard. ▸ Install wind breaks (if they do not already exist), or plant trees/vegetative wind breaks at windward sides of construction areas at the WPCP site and the site of the new corporation yard.	LTS

B = Beneficial NI = No Impact LTS = Less than Significant S = Significant PS = Potentially Significant SU = Significant and Unavoidable

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		▸ Suspend all excavation and grading activity when wind speeds (as instantaneous gusts measured by an on-site anemometer) exceed 25 mph and dust has the potential to adversely affect adjacent residential properties. Wind speeds shall be measured with an anemometer on site a minimum of one time per day. Additional hourly anemometer measurements shall be conducted if wind conditions noticeably increase or are forecast to be greater than 15 mph. ▸ Limit the area subject to excavation, grading, and other construction activity at any one time. Implementation of Mitigation Measure 3.1-1 would reduce fugitive PM dust emissions levels by approximately 75% through implementation of BAAQMD-recommended fugitive PM dust control measures. BAAQMD considers implementation of all feasible dust control measures, such as those listed above, to reduce construction-related emissions of fugitive PM_{10} dust (including fugitive $PM_{2.5}$ dust) to a **less-than-significant** level (BAAQMD 1999).	
3.1-2: Generation of Long-Term Operational Emissions of Criteria Air Pollutants and Precursors. The net project increase in operational emissions of criteria air pollutants and ozone precursors would not exceed BAAQMD's currently adopted thresholds of significance. Therefore, operational emissions would not result in or substantially contribute to emissions concentrations that exceed the NAAQS or CAAQS and would not conflict with air quality planning efforts in the SFBAAB.	Options 1 and 2: LTS	No mitigation is required.	
3.1-3: Generation of Local, Mobile-Source CO Emissions. Project implementation would not generate additional vehicle trips on the local roadway network; therefore, the project would not substantially contribute to the degradation of nearby intersections or local CO concentrations that exceed the 1-hour or 8-hour CO NAAQS or CAAQS.	Options 1 and 2: LTS	No mitigation is required.	

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Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
3.1-4: Exposure of Sensitive Receptors to Short- and Long-Term Emissions of Toxic Air Contaminants. Project implementation would not result in a substantial increase in the exposure of receptors to emissions of TACs from construction activities, on-site stationary, and/or increased motor vehicle trips generated by the project.	Options 1 and 2: LTS	No mitigation is required.	
3.1-5: Possible Exposure of a Substantial Number of People to Objectionable Odors. Temporary, short-term construction and long-term operation of the project would not result in an increase in the frequency with which sensitive receptors would be exposed to objectionable odorous emissions.	Options 1 and 2: LTS	No mitigation is required.	
3.1-6: Generation of Criteria Air Pollutants for which the SFBAAB is Nonattainment with Respect to the NAAQS. Construction and operational activities associated with the project would not generate emissions of criteria air pollutants or precursors, for which the SFBAAB is designated as nonattainment, that exceed the de minimis thresholds for applicability to general conformity. As a result, the project would not conflict or obstruct with implementation of the SIP.	Options 1 and 2: LTS	No mitigation is required.	
3.2 Cultural Resources			
3.2-1: Damage to or Destruction of Documented CRHR/NRHP–Eligible Cultural Resources. Three prehistoric cultural resources have been documented adjacent to or in the immediate vicinity of the proposed effluent pipeline route and corporation yard site. Previously undocumented portions of these resources could be encountered and disturbed during project-related ground-disturbing activities.	Option 1: PS Option 2: NI	3.2-1: Provide Construction Personnel Training in the Recognition of Cultural Materials, Stop Work If Materials are Encountered, and Implement Procedures Necessary for Resource Protection and Treatment. Applies to: Option 1 (Pipeline Alignment and Corporation Yard Only) Before the start of project-related ground-disturbing activities at the corporation yard or within 500 feet of site P-07-459 near the pipeline alignment, a qualified professional archaeologist shall provide a brief training session to all construction personnel. This training will provide basic information on recognizing the kinds of cultural resources that could be encountered as a result of project ground-disturbing activities; briefly review applicable cultural resources regulations; and outline procedures that must be followed upon the discovery of cultural materials or possible	LTS

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Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
		human remains. If traces of prehistoric occupation (e.g., midden soils, unusual amounts of shell, artifacts, bone) or historic-era remains (e.g., building or structure traces, concentrations of early-historic-era refuse) are encountered, ground-disturbing activities in the vicinity of the find shall cease until the archaeologist can determine the nature and potential significance of the find and recommend a treatment plan. The treatment plan could include but is not necessarily limited to avoidance through construction rerouting or revisions, additional archival research, and subsurface excavations for archaeological testing and/or data recovery. Implementation of Mitigation Measure 3.2-1 would reduce potentially significant impacts on documented cultural resources to a **less-than-significant** level because construction worker personnel training would be provided, work would be halted should a cultural resources be discovered, and a qualified archaeologist would prepare a treatment plan.	
3.2-2: Damage to or Destruction of Undocumented Cultural Resources. Subsurface disturbances could potentially destroy or damage as-yet-undiscovered prehistoric or historic-era cultural resources.	Options 1 and 2: S	3.2-2: Monitor Ground-Disturbing Activities in Areas Determined to Be Highly Sensitive for Containing Prehistoric and/or Historic-Era Cultural Materials and Human Remains. Applies to: Options 1 and 2 A qualified professional archaeologist shall monitor all ground-disturbing activities at the Pinole-Hercules WPCP, effluent pipeline trenching on the south bank of present-day Pinole Creek and along San Pablo Avenue as noted above, and initial grading and utility trenching at the site of the proposed corporation yard. If traces of prehistoric occupation (e.g., midden soils, unusual amounts of shell, artifacts, bone) or historic-era remains (e.g., building or structure traces, concentrations of early-historic-era refuse) are encountered, ground-disturbing activities in the vicinity of the find shall cease until the archaeologist can determine the nature and potential significance of the find and recommend a treatment plan. The treatment plan could include but is not necessarily limited to avoidance through construction rerouting or revisions, additional archival research, and subsurface excavations for archaeological testing and/or data recovery.	LTS

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Table ES-1
Summary of Project Impacts and Mitigation Measures

Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
		Implementation of Mitigation Measure 3.2-2 would reduce potentially significant impacts resulting from inadvertent damage or destruction of unknown cultural resources during construction to a **less-than-significant** level through the recovery of potentially important scientific data and/or the preservation in place of CRHR/NRHP–eligible cultural resources.	
		Implement Mitigation Measure 3.2-1. Applies to: Options 1 and 2 Implementation of Mitigation Measures 3.2-1 and 3.2-2 would reduce potentially significant impacts resulting from inadvertent damage or destruction of unknown cultural resources during construction to a **less-than-significant** level because a professional archaeological monitor would be present during ground-disturbing activities in sensitive areas, and if any resources were discovered, potentially important scientific data would be recovered and/or CRHR/NRHP–eligible cultural resources would be preserved in place.	
3.2-3: Damage to or Destruction of Undocumented Human Remains. Subsurface disturbances could potentially uncover unmarked historic-era or prehistoric burials.	Options 1 and 2: PS	3.2-3: If Human Remains are Uncovered During Ground-Disturbing Activities, Halt Potentially Damaging Excavation in the Area of the Burial and Contact the Contra Costa County Coroner and a Professional Archaeologist to Determine the Nature and Extent of the Remains. Applies to: Options 1 and 2 The coroner is required to examine all discoveries of human remains within 48 hours of receiving notice of a discovery on private or state lands (California Health and Safety Code, Section 7050.5[b]). If the coroner determines that the remains are those of a Native American, he or she must contact the Native American Heritage Commission by phone within 24 hours of making that determination (Health and Safety Code, Section 7050[c]). Following the coroner's findings, the property owner, the City of Pinole or its construction contractor, an archaeologist, and the NAHC-designated most likely descendant (MLD) shall determine the ultimate treatment and disposition of the remains and take appropriate steps to ensure that additional human interments are not disturbed. The responsibilities for acting upon notification of a discovery of Native American human remains	LTS

Table ES-1
Summary of Project Impacts and Mitigation Measures

Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
		are identified in Section 5097.9 of the California Public Resources Code. The landowner shall ensure that the immediate vicinity (according to generally accepted cultural or archaeological standards and practices) is not damaged or disturbed by further development activity until consultation with the MLD has taken place. The MLD shall have 48 hours to complete a site inspection and make recommendations after being granted access to the site. A range of possible treatments for the remains, including nondestructive removal and analysis, preservation in place, relinquishment of the remains and associated items to the descendants, or other culturally appropriate treatment may be discussed. Assembly Bill (AB) 2641 (Chapter 863, Statutes of 2006), which amended Section 5097.98 of the California Public Resources Code, suggests that the concerned parties may extend discussions beyond the initial 48 hours to allow for the discovery of additional remains. AB 2641(e) (i.e., Public Resources Code, Section 5097.98[e]) includes a list of site protection measures and states that the landowner shall do one or more of the following: ▸ Record the site with the NAHC or the appropriate Information Center. ▸ Utilize an open-space or conservation zoning designation or easement. ▸ Record a document with the county in which the property is located. The landowner or an authorized representative must rebury the Native American human remains and associated grave goods with appropriate dignity on the property in a location not subject to further subsurface disturbance if the NAHC is unable to identify a MLD or if the MLD fails to make a recommendation within 48 hours after being granted access to the site. The landowner or authorized representative may also reinter the remains in a location not subject to further disturbance if they reject the recommendation of the MLD, and mediation by the NAHC fails to provide measures acceptable to the landowner. Implementation of Mitigation Measure 3.2-4 would reduce potential impacts on human remains to a **less-than-significant** level by immediately suspending work in the vicinity of the discovery and complying with state laws requiring contact with the applicable county coroner and a professional archaeologist to determine the nature of the find, and subsequent contact with the NAHC and appropriate treatment if the remains are determined to be those of a Native American.	

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Summary of Project Impacts and Mitigation Measures

Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
3.3 Climate Change			
3.3-1: Generation of Temporary, Short-Term Construction-Related GHG Emissions. Construction activities associated with the project would generate temporary GHG emissions. Construction-related GHG emissions would cease following completion of the project and would not be considered a cumulatively considerable contribution of GHG emissions when compared with other relevant regulatory-established levels of substantial GHG emissions. In addition, construction-generated GHG emissions would not conflict with the goals of the AB 32 Scoping Plan.	Options 1 and 2: LTS	No mitigation is required.	
3.3-2: Generation of Long-Term Operational GHG Emissions. Project implementation would change the amount of electricity and natural gas consumed by operation of the Pinole-Hercules WPCP and the associated level of GHG emissions; however the project would not result in an increase in operational GHG emissions that would exceed the BAAQMD's proposed threshold of significance of 1,100 MT CO2e/yr.	Options 1 and 2: LTS	No mitigation is required.	
3.3-3: Effects of Climate Change on the Project. The future effects of climate change, including sea level rise, increased intensity of storm surges, and increased variability in precipitation patterns, could adversely affect the Pinole-Hercules WPCP.	Options 1 and 2: Too speculative to reach an impact conclusion	Since a significance determination cannot be reached, no mitigation measures are appropriate.	
3.4 Fisheries and Aquatic Resources			
3.4-1: Potential for Construction-Related Water Quality Impacts on Fish and Benthic Macroinvertebrate Communities Resulting from Construction of the Proposed Force Main. The new pipeline would cross several creeks supporting fish and benthic macroinvertebrate communities. Construction-related activities associated with placement of the pipeline could introduce pollutants and/or sediments into these creeks.	Option 1: PS Option 2: NI	3.4-1a. Prepare and Implement a Spill Prevention Plan Applies to: Option 1 A spill prevention plan shall be prepared outlining measures to be taken to immediately clean up and properly dispose of any fluid spills. Staging and storage areas shall be established away from the in-water construction areas to store, service, and maintain construction equipment and supplies and thereby minimize the potential for leaks or spills of oil, diesel fuel, gasoline,	LTS

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Summary of Project Impacts and Mitigation Measures

Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
		or related chemicals to enter the water, further contributing to degradation of water quality in the creeks.	
		3.4-1b. Develop and Implement a Frac-Out Plan for Jack and Bore Drilling. Applies to: Option 1 A qualified engineer shall develop a frac-out plan for jack and bore drilling at any of the creek crossings. The frac-out plan shall include, at a minimum, frac-out prevention, monitoring, and response measures and all provisions of this plan shall be implemented during construction operations. The plan shall be submitted to the City of Pinole for review and approval prior to the start of any jack and bore operations.	LTS
		Implement Mitigation Measures 3.6-3a and 3.6-3b. Applies to: Option 1	LTS
		Implement Mitigation Measure 3.9-1. Applies to**:** Option 1 Implementation of Mitigation Measures 3.4-1a, 3.4-1b, 3.6-3a, 3.6-3b, and 3.9-1 would reduce the potentially significant impacts related to construction-related water quality effects on salmonids to a **less-than-significant** level because the potential for pollutants and/or sediments associated with construction-related activities to enter the creeks would be minimized through preparation and implementation of a spill prevention plan, SWPPP, and BMPs; a biological monitor would be onsite during construction activities adjacent to the creeks; and a frac-out plan would be prepared to address sediment generated by jack and bore drilling.	LTS
3.4-2: Potential for Construction-related Impacts Associated with the Proposed force main to Alter Aquatic and Riparian Habitat. The new pipeline would cross several creeks supporting fish and benthic macroinvertebrate communities. However, because the pipeline would be attached to bridge crossings or routed underneath the creek channels, no in-channel work is anticipated, and the extent of disturbance is expected to be confined to an area immediately surrounding the exit and entrance of the force main on the banks of the channel. Furthermore, no large	Option 1: LTS Option 2: NI	No mitigation is required.	

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Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
trees or other shade-providing physical components of the riparian zone are expected to be removed and the channel would be returned to its preproject condition following construction.			
3.4-3: Potential for Construction-Related Impacts on Aquatic Habitat Associated with Modification of the Diffuser. The existing diffuser at Outfall 001 would be modified to achieve the full capacity of the diffuser under Option 1. Construction-related activities may resuspend benthic sediments immediately surrounding the diffuser; however, any impacts would be temporary and confined to a small area.	Option 1: LTS Option 2: NI	No mitigation is required.	
3.4-4: Impacts of Project Discharges on Ammonia, Copper, and Cyanide in Receiving Water to Adversely Affect Fish or Macroinvertebrates. Ammonia, copper, and cyanide concentrations in the undiluted effluent may exceed applicable regulatory water quality criteria that have been established for the protection of aquatic life--the beneficial use most sensitive to these constituents. In considering the appropriate averaging periods that result in exposure to organisms, the maximum concentration of undiluted effluent may exceed the lowest acute criteria, or the average effluent concentration may exceed the chronic criteria, or both criteria may be exceeded, depending on the individual constituent. Under Option 1, the project would incrementally increase the size of the initial zone of effluent mixing during the wet-weather discharge periods, although the potential acute and chronic exposure impacts to fish and other aquatic organisms would be limited to a smaller area within this zone close to the diffuser. Under Option 2, the quality of the effluent discharge to the deepwater outfall may change compared to existing conditions as a result the City of Hercules effluent contribution being eliminated. However, under both options, the discharge would not cause lethal exposure or	Options 1 and 2: LTS and B	No mitigation is required.	

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Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
adverse long-term population or community level impacts on any aquatic species. Thus, the project-related discharges of these constituents to San Pablo Bay would not adversely affect beneficial uses related to aquatic life.			
3.4-5: Potential for Decreased Dissolved Oxygen Concentrations Downstream of the Diffuser. Dissolved oxygen concentration in the undiluted effluent may be less than minimum Basin Plan objectives and EPA recommended criteria that have been established for the protection of aquatic life-- the beneficial use most sensitive to dissolved oxygen. Under Option 1, the project would incrementally increase the size of the initial zone of effluent mixing during the wet-weather discharge periods, although the potential acute and chronic exposure impacts to fish and other aquatic organisms would be limited to a smaller area within this zone close to the diffuser. Under Option 2, the quality of the effluent discharge to the deepwater outfall may change compared to existing conditions as a result the City of Hercules effluent contribution being eliminated. However, under both options, the discharge is not expected to cause lethal exposure or adverse long-term population or community level impacts on any aquatic species. Thus, the project-related discharges of oxygen-demanding substances and DO levels to San Pablo Bay would not adversely affect beneficial uses related to aquatic life.	Options 1 and 2: LTS and B	No mitigation is required.	
3.4-6: Potential for Thermal Impacts on Aquatic Organisms from Exposure to Elevated Water Temperatures in the Vicinity of the Diffuser. Elevated temperatures can have adverse impacts on fish and BMI passing or residing within the vicinity of the diffuser. Under Option 1, the project would incrementally increase the size of the initial zone of effluent mixing during the wet-weather discharge periods, resulting in a small incremental alteration of temperature gradients within the plume. Far-field conditions would not	Options 1 and 2: LTS and B	No mitigation is required.	

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Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
be measurably changed. Under Option 2, the temperature of the effluent at the RSD outfall is not expected to measurably change compared to existing conditions as a result the City of Hercules effluent contribution being eliminated and, therefore, would not measurably change the thermal conditions in the existing plume. Given the small incremental increase in the size of the plume, the large zones of passage around and over the plume, and the low likelihood of exposure durations to temperature conditions that could cause acute or chronic thermal impacts, project-related discharges to San Pablo Bay would not have adverse thermal impacts on fish or benthic macroinvertebrates moving past or residing near the diffuser.			
3.4-7: Potential for the Thermal Plume Downstream of the Diffuser to Block or Substantially Delay the Upstream Spawning Migrations of Fish. Elevated temperatures combined with depressed DO levels can create a barrier to fish migration. Under Option 1, the project would incrementally increase the size of the initial zone of effluent mixing during the wet-weather discharge periods, resulting in a small incremental increase in temperature and DO contours within the plume. Under Option 2, the quality of the effluent discharge to the deepwater outfall may change compared to existing conditions as a result the City of Hercules effluent contribution being eliminated. However, under both options, the discharge would not reach sufficient temperature or DO thresholds to create a barrier to fish migration and substantial zones of passage, unaffected or minimally affected by the discharge, would occur on either side and above the diffuser. Thus, the project-related discharges of these constituents to San Pablo Bay would not adversely affect migrations of fish past the diffuser.	Options 1 and 2: LTS and B	No mitigation is required.	

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3.5 Geology and Soils			
3.5-1: Possible Risks to People and Structures Caused by Surface Fault Rupture. Proposed facilities would not be located within or adjacent to a fault zoned under the Alquist-Priolo Earthquake Fault Zone Act, and the Pinole Creek Fault is not considered to be active by California Geological Survey (CGS).	Options 1 and 2: LTS		
3.5-2: Possible Risks to People and Structures Caused by Strong Seismic Ground Shaking. Proposed facilities would be constructed in a seismically active area, and project implementation would expose people and structures to risks caused by strong seismic ground shaking.	Options 1 and 2: PS	3.5-1a: Prepare Site-Specific Geotechnical Report per CBC Requirements and Implement Appropriate Recommendations. Applies to: Options 1 and 2 Before building permits are issued and construction activities begin any project development phase, the City of Pinole shall hire a licensed geotechnical engineer to prepare a final geotechnical subsurface investigation report for the proposed facilities, which shall be submitted for review and approval to the City of Pinole Planning Department. The final geotechnical engineering report shall address and make recommendations on the following: ▸ site preparation; ▸ soil bearing capacity; ▸ appropriate sources and types of fill; ▸ potential need for soil amendments; ▸ structural foundations, including retaining-wall design; ▸ grading practices; ▸ soil corrosion of concrete and steel; ▸ erosion/winterization; ▸ seismic ground shaking; ▸ liquefaction; ▸ subsidence; and ▸ expansive/unstable soils. In addition to the recommendations for the conditions listed above, the geotechnical investigation shall include subsurface testing of soil and groundwater conditions, and shall determine appropriate foundation designs that are consistent with the version of the CBC that is applicable at the time building and grading permits are applied for. All recommendations	LTS

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		contained in the final geotechnical engineering report shall be implemented by the City of Pinole. Special recommendations contained in the geotechnical engineering report shall be noted on the grading plans and implemented as appropriate before construction begins. Design and construction of all new project development shall be in accordance with the CBC.	
		3.5-1b: Monitor Earthwork during Ground-Disturbing Activities. Applies to: Options 1 and 2 All earthwork shall be monitored by a qualified geotechnical or soils engineer retained by the City of Pinole. The geotechnical or soils engineer shall provide oversight during all excavation, placement of fill, and disposal of materials removed from and deposited on both on- and off-site construction areas. Implementation of Mitigation Measures 3.5-1a and 3.5-1b would reduce the potentially significant impact of possible damage to people and structures from strong seismic ground shaking under both Options 1 and 2 to a less-than-significant level by requiring that the design recommendations of a geotechnical engineer to reduce damage from seismic events be incorporated into buildings, structures, and infrastructure as required by the CBC, and that a geotechnical or soils engineer provide on-site monitoring to make sure that earthwork is being performed as specified in the plans.	LTS
3.5-3: Construction-Related Erosion. Construction activities during project implementation would involve grading and movement of earth in soils subject to wind and water erosion hazard.	Option 1: PS Option 2: LTS	3.5-3: Prepare and Implement a Grading and Erosion Control Plan. Applies to: Option 1 Before grading permits are issued, the City of Pinole shall retain a California Registered Civil Engineer to prepare a grading and erosion control plan. The plan shall be consistent with the City's Grading Ordinance and the state's NPDES permit, and shall include the site-specific grading associated with development for all project components. The plan referenced above shall include the location, implementation schedule, and maintenance schedule of all erosion and sediment control measures, and a description of the location and methods of storage and disposal of construction materials. Erosion and sediment control measures could include the use of detention basins, berms, swales, wattles, and silt fencing, and covering or watering of stockpiled soils to reduce wind	LTS

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		erosion. Stabilization on slopes could include construction of retaining walls and reseeding with vegetation after construction. Stabilization of construction entrances to minimize trackout (control dust) is commonly achieved by installing filter fabric and crushed rock to a depth of approximately 1 foot. The City of Pinole shall ensure that the construction contractor is responsible for securing a source of transportation and deposition of excavated materials. Implementation of Mitigation Measure 3.6-3a (discussed in Section 3.6, “Hydrology and Water Quality”) would also help reduce erosion-related impacts. Implementation of Mitigation Measure 3.5-4 along with Mitigation Measure 3.6-3a (discussed in Section 3.6, “Hydrology and Water Quality”), would reduce potentially significant construction-related erosion impacts under Option 1 to a **less-than-significant** level because a grading and erosion control plan with specific erosion and sediment control measures such as those suggested above or listed in Mitigation Measure 3.6-3a would be prepared, approved by the City of Pinole Planning Department, and implemented.	
3.5-4: Potential Geologic Hazards Related to Liquefaction, Subsidence, and Unstable Soil. Construction of project components could be subject to hazards from liquefaction, subsidence, and construction in potentially unstable soils.	Options 1 and 2: PS	Implement Mitigation Measure 3.5-1a and 3.5-1b. Applies to: Options 1 and 2 Implementation of Mitigation Measures 3.5-1a and 3.5-1b would reduce potential geologic hazards from construction related to liquefaction and subsidence to a **less-than-significant** level because a licensed geotechnical engineer would performed a site-specific geotechnical investigation that would include a determination of liquefaction potential as required by the California Building Standards Code, as well as evaluation of subsidence potential and soil bearing strength, and all recommendations made by the engineer regarding building and foundation design would be implemented. Furthermore, all earthwork would be monitored by a soils or geotechnical engineer to make sure that project plans and specifications are complied with.	LTS

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3.5-5: Potential Damage to Structures and Infrastructure from Construction in Expansive Soils. Portions of the project site are underlain by soils that have a moderate to high potential for expansion when wet and may result damage to structures.	Options 1 and 2: PS	Implement Mitigation Measures 3.5-1a and 3.5-1b. Applies to: Options 1 and 2 Implementation of Mitigation Measures 3.5-1a and 3.5-1b would reduce the potentially significant impact of damage to people and structures from construction in expansive soils under both Options 1 and 2 to a **less-than-significant** level by requiring that the design recommendations of a geotechnical engineer to reduce damage from expansive soils be incorporated into buildings, structures, and infrastructure as required by the CBC, and that a geotechnical or soils engineer provide on-site monitoring to make sure that earthwork is being performed as specified in the plans.	LTS
3.5-6: Potential Geologic Hazard from Construction in Corrosive Soils. Most of the soils within which the project components would be constructed are moderately to highly corrosive of concrete and steel, which could subject project facilities to a shorter useful lifespan.	Options 1 and 2: PS	Implement Mitigation Measure 3.5-1a. Applies to: Options 1 and 2 Implementation of Mitigation Measure 3.5-1a would reduce the potentially significant impact of damage to structures from construction in corrosive soils under both Options 1 and 2 to a **less-than-significant** level by requiring that a licensed geotechnical engineer perform a site-specific corrosivity evaluation, and requiring that the design recommendations of a geotechnical engineer to reduce damage from corrosive soils be incorporated into project-related buildings, structures, and infrastructure.	LTS
3.5-7: Potential Risks to People or Structures from Seiche or Tsunami. Construction of proposed improvements at the Pinole-Hercules WPCP would not change the susceptibility of the plant to damage from tsunamis, and would not result in any new employees whose safety could be jeopardized by a tsunami.	Options 1 and 2: LTS	No mitigation measures are required.	
3.5-8: Potential Damage of or Destruction to of Previously Unknown Unique Paleontological Resources during Construction-Related Activities. The proposed pipeline alignment is underlain by paleontologically sensitive rock formations. Therefore, construction activities along the alignment could damage or destroy previously unknown, unique paleontological resources at the project site.	Option 1: PS Option 2: NI	3.5-8: Conduct Construction Personnel Education, Monitor Earthwork, Stop Work if Paleontological Resources are Discovered, Assess the Significance of the Find, and Prepare and Implement a Recovery Plan as Required. Applies to: Option 1 (Pipeline Alignment Only) To minimize potential adverse impacts on previously unknown potentially unique, scientifically important paleontological resources during earthmoving activities along the proposed pipeline alignment, the City of Pinole shall do the following:	LTS

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Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
		▸ Before the start of any earthmoving activities along the proposed pipeline alignment, the City of Pinole shall retain a qualified paleontologist or archaeologist to train all construction personnel involved with earthmoving activities, including the project superintendent, regarding the possibility of encountering fossils, the appearance and types of fossils likely to be seen during construction, and proper notification procedures should fossils be encountered. ▸ The City of Pinole shall hire a qualified paleontologist to provide monitoring during all earthmoving activities along the proposed pipeline alignment, except in those areas underlain by Holocene alluvial fan deposits and artificial fill as shown in Exhibit 3.5-1. ▸ If paleontological resources are discovered during earthmoving activities, the construction crew shall immediately cease work in the vicinity of the find and notify the on-site paleontologist and the City of Pinole. The paleontologist shall evaluate the resource and prepare a recovery plan in accordance with Society of Vertebrate Paleontology guidelines (1996). The recovery plan may include, but is not limited to, an intensive field survey in the vicinity of the find, sampling and data recovery, museum storage coordination for any specimen recovered, and a report of findings. All feasible recommendations contained in the recovery plan shall be implemented before construction activities can resume at the site where the paleontological resources were discovered. Implementation of Mitigation Measure 3.5-8 would reduce potentially significant impacts related to damage or destruction of unique paleontological resources to a **less-than-significant** level under Option 1 because construction workers would be alerted to the possibility of encountering paleontological resources, and in the event that resources were encountered, fossil specimens would be recovered and recorded and would undergo appropriate curation.	

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3.6 Hydrology and Water Quality			
3.6-1: Long-Term Operational Impacts on Hydrology and Drainage. Option 1 includes the relocation and construction of a new corporation yard, which would create new paved impervious surfaces that would increase the amount of stormwater runoff within the city of Pinole. Additional stormwater runoff may contribute to localized drainage-related problems such as erosion, damage to stormwater drainage facilities or ditches and natural swales from increased runoff rates, or localized inundation of property and structures from increased drainage volumes.	Option 1: PS Option 2: LTS	3.6-1a: Prepare Site Drainage Plans Applies to: Option 1 (Corporation Yard Only) The City shall develop plans for stormwater drainage at the site of the new corporation yard that are consistent with site design and drainage system guidelines provided by CCCWP and associated implementation of the San Francisco Bay RWQCB new MRP adopted in October 2009. The plans shall establish drainage performance criteria for off-site drainage, in consultation with City engineering staff, such that project-related drainage is consistent with City-determined facility designs, discharge rates, erosion protection, and routing to drainage channels, which could be accomplished by, but is not limited to, the following techniques: ► minimizing directly connected impervious areas; ► maximizing permeability of the site; ► stormwater quality controls such as infiltration, detention/retention, and/or biofilters; and ► basins, swales, and pipes in the system design. The storm drain system at the corporation yard shall be designed to manage both quality and volume of runoff. The plans shall be developed in accordance with the "Standard Plans for Drainage" provided by the County (Contra Costa County 2008).	LTS
		3.6-1b: Prepare and Implement a Stormwater Control Plan A stormwater control plan shall be prepared to comply with CCCWP's Stormwater Management Plan and C.3 Stormwater Guidebook. The stormwater control plan shall detail permanent stormwater management facilities. Storm drain facilities shall be designed in accordance with the site design and drainage system guidelines provided by CCCWP, which include, but are not limited to, the following: ► minimizing directly connected impervious areas; ► maximizing permeability of the site; ► stormwater quality controls such as infiltration, detention/retention, and/or biofilters; and	LTS

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Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
		▸ basins, swales, and pipes in the system design. The storm drain system shall be designed to manage both quality and volume of runoff. The stormwater control plan shall be submitted to CCCWP for review and approval consistent with the requirements of the NPDES permit. Implementation of Mitigation Measures 3.6-1a and 3.6-1b would reduce potentially significant drainage and water quality impacts from relocation of the corporation yard under Option 1 to a **less-than-significant** level, because it would require that stormwater runoff from the construction activities and impervious surfaces be appropriately controlled, treated, and any offsite drainage would be appropriately routed to existing or created drainage features such that off-site properties would not be adversely affected.. Furthermore, a stormwater control plan would be prepared such that facilities would be designed in compliance with CCCWP guidelines, which would minimize the project-related volume and quality of runoff.	
3.6-2: Long-Term Operational Impacts from Flooding and Related Hazards. Option 1 includes the relocation and construction of a new corporation yard, which would create new paved impervious surfaces that would increase the amount of stormwater runoff within the city of Pinole. Additional stormwater runoff of approximately 0.06 cfs may contribute to localized inland flooding during periods of peak runoff. Under Option 1, suspension of the force main on the existing bridge over Pinole Creek, if constructed such that it encroaches below the creeks' normal high-water surface elevation, could create additional impediments to peak channel flows, causing or contributing to flood hazards or inland flooding. Under both Option 1 and Option 2, additional wastewater treatment facilities would be constructed at the existing plant, inland of the Pinole Creek levee, which is potentially subject to flooding from overtopping of levees at a frequency greater than 1% per year, thereby contributing to exposure of facilities to flood hazards.	Options 1 and 2: PS	Implement Mitigation Measure 3.6-1. Avoid Encroachment of Pipelines onto Peak Channel Flows and Minimize Exposure of Facilities to Flooding Applies to: Option 1 Further, the City shall design and construct new treatment facilities at the Pinole-Hercules WPCP to provide appropriate flood protection such that plant operations are not adversely affected by inland flooding and inundation. The City shall consult with CCCFCWCD on the design of stream crossings for the new pipeline such that the minimum elevation of the pipeline would be above the predicted surface-water elevation of the 100-year peak flow. Applies to: Option 2 The City shall require construction contractors to design and construct new treatment facilities at the Pinole-Hercules WPCP to provide appropriate flood protection measures to ensure that plant operations are not adversely affected by inland flooding and inundation. The plans shall be developed in accordance with the "Standard Plans for Drainage" provided by the County (Contra Costa County 2008). Implementation of Mitigation Measures 3.6-1 and 3.6-2 would reduce	LTS

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		potentially significant drainage and flooding impacts from construction of project facilities under Option 1 and Option 2 to a **less-than-significant** level, because it would require that facilities would be designed to minimize exposure of property to flooding and flood hazards or creation of such hazards and would reduce and control off-site runoff from impervious areas.	
3.6-3: Short-Term Stormwater Quality Impacts from Project Construction Activities and Operations. Project-related construction activities under Options 1 and 2 have the potential to result in temporary soil erosion, discharges of construction-related contaminants, and off-site discharge of contaminants in stormwater runoff. Under Option 1, long-term operation of the new corporation yard also has the potential to cause discharge of contaminants in stormwater runoff.	Options 1 and 2: PS	3.6-3a: Obtain an NPDES Permit and Develop and Implement a SWPPP with BMPs Applies to: Options 1 and 2 The project's construction area is expected to be larger than 1 acre and therefore would require appropriate stormwater construction permits. To avoid or minimize the potential for adverse construction-related effects on water quality, the City shall develop a SWPPP and obtain authorization under the City's municipal stormwater authority or the statewide NPDES stormwater permit for general construction activity before beginning work. To comply with the NPDES regulations, the City shall identify and implement construction-related BMPs to avoid and minimize erosion and contaminant runoff. Such BMPs may include, but are not limited to, the following: ► keeping construction grade below lot curb at 2 inches to prevent runoff, ► covering small areas with rolled material during rain, ► covering large areas with erosion control blankets and/or mulch, ► distributing rock bags in the gutter before an inlet to slow flow and filter sediment, ► protecting inlets with straw wattles and rock bags, ► putting stucco and concrete supplies and materials in one place with pH sampling equipment and covering with plastic, ► using large river rock to stabilize entrance and exit areas and prevent tracking to streets, ► minimizing construction work near or in drainage channels, and ► locating staging areas as far as practicable from surface waters. Other preventive good housekeeping practices could include, but are not limited to, road sweeping, sediment tracking and hauling, and dust control; and diversion measures such as berms to prevent clear runoff from contacting disturbed areas, and contaminated runoff from entering surface	LTS

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		waters. Erosion and sedimentation control measures can also include soil stabilization, mulching, silt fencing, or temporary desilting basins. The NPDES permit and SWPPP shall also be applied to construction activities involving pipe crossings at Pinole, Ohlone, Refugio, and Rodeo Creeks. Streamflow shall be maintained downstream of the stream crossing sites at all times during construction, and not otherwise restrict flow in any manner that would restrict passage of fish around the sites.	
		3.6-3b: Divert Discharge from Construction Dewatering to Pinole-Hercules WPCP Headworks Applies to: Options 1 and 2 To avoid the potential for adverse effects on water quality of adjacent surface water bodies, any groundwater that is dewatered as a result of construction activities at the Pinole-Hercules WPCP shall be sent to the Pinole-Hercules WPCP headworks for treatment with the wastewater stream. (This mitigation measure does not require a separate NPDES permit.) Implementation of Mitigation Measures 3.6-3a and 3.6-3b would reduce potentially significant impacts on stormwater quality from construction activities under Options 1 and 2 to a **less-than-significant** level because it would require the implementation of a SWPPP and BMPs, which would minimize the effect of runoff on stormwater quality and volume. Furthermore, groundwater encountered during construction dewatering would be diverted to the headworks of the Pinole-Hercules WPCP and therefore adverse water quality impacts from dewatering would be avoided.	
3.6-4: Impacts of Project Discharges on Ammonia, Copper, and Cyanide in San Pablo Bay. Ammonia, copper, and cyanide concentrations in the project-related discharges may cause exceedance of applicable regulatory water quality criteria in the initial zone of mixing and a 0–1% increase in these constituent concentrations in the far field of San Pablo Bay. However, the project-related discharges would not increase levels of these constituents enough to cause federal or state numeric or narrative water quality criteria to be exceeded by a frequency, magnitude, and	Options 1 and 2: LTS	No mitigation measures are required	

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geographic extent that would result in adverse effects on one or more beneficial uses of San Pablo Bay. The discharges also would not result in substantial, permanent degradation of existing water quality that would cause adverse impacts on one or more beneficial uses of San Pablo Bay.			
3.6-5: Impacts of Project Discharges on Biochemical Oxygen Demand, Oil and Grease, Total Coliform, and Total Suspended Solids in San Pablo Bay. The upgraded Pinole-Hercules WPCP would be designed and operated to comply with the NPDES permit limitations for biochemical oxygen demand, oil and grease, and total suspended solids either at the end of the discharge pipe or within the diffuser's initial zone of mixing. The NPDES permit limitations are based on applicable Basin Plan water quality objectives that have been determined to be protective of beneficial uses. Project discharges would not measurably change background concentrations of these constituents in San Pablo Bay. The project-related discharges would not increase levels of these constituents sufficiently to cause federal or state water quality criteria/objectives to be exceeded by a frequency, magnitude, and geographic extent that would result in adverse effects on one or more beneficial uses of San Pablo Bay. The discharges also would not result in substantial, permanent degradation of existing water quality that would cause adverse impacts on one or more beneficial uses of San Pablo Bay.	Options 1 and 2: LTS	No mitigation measures are required	
3.6-6: Impacts of Project Discharges on Dioxin, Mercury, and Selenium in San Pablo Bay. Dioxin, mercury, and selenium concentrations in project-related discharges would meet applicable regulatory criteria at end-of-pipe and would not measurably change background constituent concentrations in San Pablo Bay relative to existing conditions. Furthermore, the project-related discharges would result in no net increase in dioxin, mercury, and	Options 1 and 2: LTS	No mitigation measures are required	

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Table ES-1
Summary of Project Impacts and Mitigation Measures

Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
selenium loading to San Pablo Bay, and thus would not increase levels or loadings of these water quality parameters enough to cause federal or state numeric or narrative water quality criteria to be exceeded with a frequency, magnitude, and geographic extent that would result in adverse effects on one or more beneficial uses of San Pablo Bay. The discharges also would not result in substantial, permanent degradation of existing water quality that would cause adverse effects on one or more beneficial uses of San Pablo Bay.			
3.6-7: Impact of Project Discharges on Nutrients in San Pablo Bay. Concentrations of nutrients in project-related effluent discharges (e.g., nitrogen and phosphorus compounds) that can cause biostimulation of aquatic algae and plant growth would not measurably change background concentrations of nutrients in San Pablo Bay. Furthermore, the project-related discharges would result in no net increase in nutrient loading, and thereby would not increase biostimulation conditions in San Pablo Bay. As such, narrative Basin Plan objectives would not be exceeded by a frequency, magnitude, and geographic extent that would result in adverse impacts on one or more beneficial uses. Additionally, the project discharges would not result in substantial, permanent degradation of existing water quality that would cause adverse impacts on one or more beneficial uses of San Pablo Bay.	Options 1 and 2: LTS	No mitigation measures are required	
3.6-8: Impacts of Project Discharges on Endocrine-Disrupting Compounds in San Pablo Bay. Project-related discharges could contain endocrine-disrupting compounds (EDCs). However, there are no applicable regulatory criteria for these compounds, and it may be many years before the scientific understanding of their effects is sufficient for the San Francisco Bay RWQCB to establish permit limitations for treated wastewater discharges. Because San Pablo Bay is not used for or designated as a	Options 1 and 2: LTS	No mitigation measures are required	

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Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
drinking water supply, the potential for these compounds, if present, to affect human health would be unlikely. Aquatic organisms are not expected to be exposed to substantially different or higher levels of EDCs (if present in the effluent) under either Option 1 or Option 2, relative to existing conditions. The potential for exposure to EDCs by aquatic life or humans would not be expected to change under the project.			
3.7 Land Use			
3.7-1: Compatibility with Land Use Plans Adopted to Avoid or Mitigate Environmental Effects. Implementation of the project would be consistent with applicable land use plans.	Options 1 and 2: NI	No mitigation measures are required	
3.7-2: Potential for Division of an Established Community. Implementation of the project would occur within the city of Pinole, the city of Hercules, and the community of Rodeo, but would not divide an established community.	Options 1 and 2: NI	No mitigation measures are required	
3.8 Noise			
3.8-1: Short-Term Increases in Construction Source Noise Levels. If construction activities were to occur during the more noise-sensitive hours or if construction equipment were not properly equipped with noise-control devices or shielded, construction-generated noise could result in the exposure of persons to or generation of noise levels in excess of applicable standards and/or, annoyance and/or sleep disruption to occupants of any existing noise-sensitive land uses in the project vicinity, and/or create a substantial temporary increase in ambient noise levels.	Options 1 and 2: PS	3.8-1: Reduce Short-Term Increases in Noise Levels from Construction Sources. Applies to: Option 1 (WPCP and Pipeline Alignment Only) and Option 2 To reduce impacts associated with noise generated during project-related construction activities at the WPCP and along the proposed pipeline route, the City of Pinole and its primary construction contractors shall ensure that the following requirements are implemented at each work site in any year of project construction to avoid and minimize construction noise effects on sensitive receptors. Measures that shall be used to limit noise shall include the items listed below: 1. To the maximum extent feasible, construction activities (except for the use of the drilling machine required for HDD associated with jack-and-bore operations and the pipeline connections to existing equipment at the WPCP) shall be limited to the hours of 7 a.m. to 5 p.m. Monday through Friday, and from 9 a.m. to 6 p.m. on Saturday in commercial zones only.	SU

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Summary of Project Impacts and Mitigation Measures

Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
		2. Construction equipment shall be properly maintained and equipped with noise control, such as mufflers, in accordance with manufacturers' specifications. Impact tools shall be shielded per manufacturer's specifications. 3. Temporary barriers shall be erected for the stationary construction noise sources at the sites of HDD activity and along the eastern side of the Pinole-Hercules WPCP, in accordance with all of the following specifications: ► The barrier shall be placed as close to stationary noise sources as possible and shall break the line of sight between the source and receptor. ► The barrier shall be constructed of ¾-inch Medium Density Overlay plywood sheeting, or other acceptable material having a surface weight of 2 lb/sq. ft. or greater, and a demonstrated Sound Transmission Class (STC) rating of 25 or greater as defined by the American Society for Testing and Materials (ASTM) Test Method E90. ► For a temporary acoustical curtain, the material shall be weather and abuse resistant, and exhibit superior hanging and tear strength during construction and with a surface weight of at least 1 lb/sq. ft. The material shall have a minimum breaking strength of 120 pounds per inch (lb/in) per Federal Test Method Standard 191 A-M5102 and minimum tear strength of 30 lb/in per ASTM D117. Based on the same test procedures, the absorptive material facing shall have a minimum breaking strength of 100 lb/in and minimum tear strength of 7 lb/in. The material shall have a STC rating of 25 or greater, based on certified sound transmission loss data taken according to ASTM Test Method E90. It shall also have a Noise Reduction Coefficient rating of 0.70 or greater, based on certified sound absorption coefficient data according to ASTM Test Method C423. ► When barrier units are joined together, the mating surfaces of the barrier sides shall be flush with each other. Gaps between barrier units, and between the bottom edge of the barrier panels and the ground, shall be closed with material that will completely close the gaps, and be dense enough to attenuate noise. 4. The City of Pinole shall provide notice to all property owners and tenants	

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Summary of Project Impacts and Mitigation Measures

Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
		within 500 feet of the edge of the construction right-of-way at the WPCP and along the pipeline route at least 2 weeks in advance of construction. 5. The City of Pinole shall designate a disturbance coordinator to whom concerned residents may address their construction-related noise complaints. The name and phone number of the coordinator shall be conspicuously posted at construction areas and on all advanced notifications required in (4) above. The coordinator shall respond to all complaints. With implementation of Mitigation Measure 3.8-1, construction activities would generally be limited, except for the drilling machine required for HDD and pipeline connections to existing WPCP equipment, to the less-sensitive daytime hours. In addition, temporary noise barriers would be erected to provide noise reduction, construction equipment would be provided with appropriate shielding, advance notice to nearby residents would be provided, and a disturbance coordinator would be designated to respond to complaints. However, construction-generated noise levels would still exceed the applicable standards at nearby sensitive receptors for all project components (with the exception of the corporation yard). Thus, this impact would remain **significant and unavoidable**.	
3.8-2: Short-Term Exposure of Sensitive Receptors to Increased Traffic Noise Levels from Project Construction. Implementation of Option 1 and Option 2 would result in temporary increases in off-site roadway traffic noise associated with project construction. Construction-generated traffic would not expose sensitive receptors to noise levels along off-site roadways that exceed the applicable noise standards and/or result in a substantial increase in ambient noise levels.	Options 1 and 2: LTS	No mitigation measures are required.	
3.8-3: Compatibility of Proposed Land Uses with the Ambient Noise Environment. Project implementation would not result in the development of any noise-sensitive land uses or the exposure of any sensitive receptors proposed as part of the project to noise levels that exceed applicable City or County standards.	Options 1 and 2: LTS	No mitigation measures are required.	

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Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
3.8-4: Long-Term Increases in Stationary- and Area-Source Noise Levels. Long-term on-site stationary- and area-source noise would not result in the exposure of persons to or generation of noise levels in excess of applicable standards or create a substantial permanent increase in ambient noise levels in the project vicinity. Area sources of noise (e.g., landscape maintenance equipment) would not be anticipated to differ substantially from existing noise equipment levels.	Options 1 and 2: LTS	No mitigation measures are required.	
3.8-5: Groundborne Noise and Vibration Levels. Construction-generated vibration levels would not exceed Caltrans' recommended standards with respect to the prevention of structural building damage (0.2 and 0.08 in/sec PPV for normal and historical buildings) or FTA's maximum-acceptable-vibration standard with respect to human response (80 VdB for residential uses) at nearby existing vibration-sensitive land uses. Long-term operation of the project would not include any major sources of vibration. Thus, project implementation would not result in the exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels.	Options 1 and 2: LTS	No mitigation measures are required.	
3.9 Terrestrial Biology			
3.9-1: Impacts on Sensitive Habitats. Under Option 1, sensitive habitats within the 100-foot disturbance area defined for the proposed pipeline alignment include coastal salt marsh, riparian habitat, and freshwater marsh. Construction activity could affect small areas of the salt marsh habitat on Pinole Creek and the riparian and freshwater wetland habitats on Ohlone Creek, Refugio Creek, and the small tributary that drains into the upstream end of Pinole Creek if habitats are not properly marked and avoided. Construction under Option 2 would be limited to the footprint of the existing Pinole-Hercules WPCP, which does not contain any sensitive habitats; as a result, this	Option 1: PS Option 2: NI	3.9-1: Implement Measures to Minimize Potential Impacts on Sensitive Habitats Along the Proposed Pipeline Alignment Applies to: Option 1 The following measures to avoid potential loss or degradation of coastal salt marsh, riparian, and freshwater marsh habitat resulting from construction activities within the 100-foot potential disturbance area shall be implemented along the proposed pipeline alignment: (1) Whenever ground-disturbing activity is expected to occur within 100 feet of any sensitive habitat, including wetlands or potentially jurisdictional waters as shown on Exhibits 3.9-1 through 3.9-4, a qualified biologist shall be present to monitor these activities to make	

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Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
option would not have any adverse effects on sensitive habitats.		sure that no loss or degradation of habitat occurs and to provide guidance on establishing and maintaining adequate setbacks from sensitive habitats. (2) Ground-disturbing activities shall not occur within 25 feet of the sensitive habitats shown on Exhibits 3.9-1 through 3.9-4 unless those activities are entirely limited to roadways and other unvegetated surfaces. (3) No vehicles shall be used outside of the defined disturbance area. (4) Temporary soil and debris stockpiles shall be carefully located away from sensitive habitats, so the material will not enter or run off into waterways. (5) Temporary soil and debris stockpiles shall be covered to prevent erosion and runoff into creeks. (6) All staging areas, parking areas, equipment, and storage areas for fuel, lubricants, and solvents shall be located in areas away from sensitive habitats and adjacent creeks, drainages, and waterways. (7) Construction best management practices (BMPs) shall be implemented. Specifically, silt fencing shall be installed between the construction area and sensitive habitats that could support special-status species and nesting migratory birds; fueling and vehicle/equipment maintenance areas shall be demarcated with construction fencing or lathes and colored flagging; and staging areas adjacent to sensitive habitats or water bodies shall be demarcated with construction fencing or lathes and colored flagging. Silt fencing shall be installed in all areas where construction occurs within 25 feet of sensitive habitat or actively flowing water.	LTS
		Implement Mitigation Measure 3.4-1b. Applies to: Option 1 Implementation of Mitigation Measures 3.9-1 and 3.4-1b would reduce potentially significant impacts on coastal salt marsh, riparian, and freshwater wetland habitats along the proposed pipeline alignment under Option 1 to a **less-than-significant** level by requiring that trained biological monitors clearly identify and flag sensitive habitats; by limiting all construction activity to areas set back from sensitive habitats; by employing	

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Summary of Project Impacts and Mitigation Measures

Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
		BMPs, including fencing, so that sensitive habitats are avoided during construction activities; and by preparing a frac-out plan with slurry containment measures.	
3.9-2: Potential Disturbance of Special-Status Wildlife and Nesting Raptors. Under Option 1, special-status wildlife and nesting raptor species have the potential to occur within the100-foot disturbance area defined for the proposed pipeline alignment. Disturbance of special-status species and nesting raptors could occur if these species are present during construction activities. Option 2 would be limited to the footprint of the existing Pinole-Hercules WPCP, which does not contain habitat to support special-status species or nesting raptors; as a result, this option would not have any adverse effects on these species.	Option 1: PS Option 2: NI	Implement Mitigation Measure 3.9-1. Applies to: Option 1 3.9-2: Conduct Surveys for Nesting Raptors and, If Nesting Raptors are Discovered, Cease Construction and Consult with DFG to Prevent Nest Failure Applies to: Option 1 To reduce impacts on raptors, the City of Pinole shall retain a qualified biologist to conduct preconstruction surveys and to identify active nests within 500 feet of the proposed pipeline alignment. Preconstruction surveys for raptor species shall be conducted during the nesting season (March 15 to August 15) no more than 14 days and no fewer than 7 days before any construction activity begins. Any construction activity that occurs between August 16 and March 14 shall not require preconstruction surveys for raptors. Should nesting raptors be discovered within the survey area, a qualified biologist shall notify DFG. No new disturbance shall occur within one-half mile of the nest until the nest is no longer active or appropriate avoidance measures are developed in consultation with DFG to ensure that the nest is adequately protected. Potential avoidance measures can include visual screening, timing restrictions for construction activity, and monitoring of active nests. Should an active raptor nest be found, monitoring (funded by the City of Pinole) of active nests by a qualified biologist shall be performed to make sure that project construction does not disturb raptors at the nest site. Implementation of Mitigation Measure 3.9-1 would reduce potentially significant impacts on special-status wildlife species along the proposed pipeline alignment under Option 1 to a **less-than-significant** level by using trained biological monitors to clearly identify and flag habitat that could support special-status wildlife; by limiting all construction activity to areas outside of habitats that could support special-status wildlife; and by employing BMPs to avoid habitats that could support special-status wildlife. Implementation of Mitigation Measure 3.9-2 would reduce the project's impact on nesting raptor species to a **less-than-significant** level by requiring that project activities do not impede the use of raptor nesting sites.	LTS

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Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
3.9-3: Potential Effects on Waters of the United States, Including Wetlands, and Waters of the State. The proposed pipeline alignment would be located near protected waters in some locations. The project has been designed to avoid filling waters of the United States, including wetlands subject to USACE jurisdiction under the federal CWA or wetland habitats protected under state and local regulations, and therefore adverse impacts would be unlikely; however, without mitigation, complete avoidance of impacts on these waters cannot be assured. Construction activity under Option 2 would not result in the placement of fill material into any waters because none are present within the Pinole-Hercules WPCP.	Option 1: PS Option 2: NI	Implement Mitigation Measures 3.9-1, 3.4-1b, 3.6-3a, and 3.6-3b. Applies to: Option 1 Implementation of Mitigation Measures 3.9-1, 3.4-1b, 3.6-3a, and 3.6-3b would reduce potentially significant impacts on wetlands and potentially jurisdictional waters along the proposed pipeline alignment under Option 1 to a **less-than-significant** level by requiring that trained biological monitors clearly identify and flag waters; by limiting all construction activity to areas setback from waters; by employing BMPs including fencing so that waters are physically avoided and sediment and contaminant discharge during construction activities is avoided; and by preparing a frac-out plan that would contain any slurry spills.	LTS
3.9-4: Potential Effect on the Movement of any Native Resident or Migratory Wildlife Species, Migratory Corridors, or Native Wildlife Nursery Sites. Under Option 1, the native habitat that supports native species would generally be avoided because construction activity would be temporary and would occur primarily in areas already developed. Construction under Option 2 would be limited to the footprint of the existing Pinole-Hercules WPCP, which does not contain habitat that would support the movement of native resident or migratory wildlife species. Consequently, Options 1 and 2 would have no adverse impacts on wildlife or their habitats, movement, and nurseries.	Option 1: LTS Option 2: NI	No mitigation measures are required.	
3.9-5: Potential Conflicts with Local Policies or Ordinances for Protecting Biological Resources or with Provisions of an Adopted Habitat Conservation Plan. Construction of the proposed facilities under Option 1 and Option 2 would not conflict with local policies or ordinances intended to protect terrestrial biological resources or with provisions of an adopted habitat conservation plan.	Options 1 and 2: NI	No mitigation measures are required.	

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1 INTRODUCTION

1.1 PURPOSE OF THE EIR

The City of Pinole has prepared this draft environmental impact report (DEIR) to provide responsible and trustee agencies and the public with information about the potential environmental effects of the Pinole-Hercules Water Pollution Control Plant Improvement Project. This DEIR was prepared in compliance with the California Environmental Quality Act (CEQA) (as amended through Public Resources Code Section 21000 et seq.) and the State CEQA Guidelines (California Code of Regulations Section 15000 et seq.). An EIR is a public information document in which the significant environmental impacts of a project are evaluated, feasible measures to mitigate significant impacts are identified, and alternatives to the project that can reduce or avoid significant environmental impacts are identified.

The purpose of this DEIR is not to recommend either approval or denial of the project, but to provide information that will be used in the planning and decision-making process by the lead agency and responsible and trustee agencies. The lead agency is the public agency with primary responsibility over the project. For this project, the lead agency is the City of Pinole.

CEQA requires decision makers to balance the benefits of a proposed action against its unavoidable environmental effects in deciding whether to carry out a project. If environmental impacts are identified in the EIR as significant and unavoidable, the lead agency may still approve the project if it determines that social, economic, or other benefits outweigh the unavoidable impacts. The lead agency would then be required to prepare a "Statement of Overriding Considerations" that discusses the specific reasons for approving the project, based on information contained in the EIR and other information in the record.

1.2 PROJECT REQUIRING ENVIRONMENTAL ANALYSIS

The Pinole-Hercules Water Pollution Control Plant (WPCP) is jointly owned and operated by the city of Pinole and the city of Hercules. The WPCP is permitted by the Regional Water Quality Control Board to treat 4.06 million gallons per day (mgd) dry-weather flow and 10.3 mgd wet-weather flow. Issuance of the most recent National Pollutant Discharge Elimination System (NPDES) permit included the stipulation that alternatives must be examined and implemented to eliminate the use of the shallow water Outfall 002. The Cities of Pinole and Hercules have decided to also implement a solution that would prevent the need for blending of primary and secondary treated wastewater prior to discharge through Outfall 002, and are therefore requesting a permit that would increase their maximum daily wet-weather flow capacity to 14.59 mgd and a peak instantaneous wet-weather flow capacity of 20 mgd. The dry-weather treatment capacity would not change. Two options have been selected for detailed analysis in this DEIR. Option 1 would entail a suite of improvements at the existing WPCP, construction of a new treated effluent force main to the Rodeo Sanitary District parallel to the existing force main, and relocation of the existing City of Pinole corporation yard to a site approximately one-half mile south on Pinole Shores Drive. There is a possibility that in the future, the City of Hercules could decide to construct a new pipeline to the West County Water Pollution Control District (WCWD) and send its wastewater to WCWD for treatment. If that were to occur, the City of Hercules would be responsible for preparing a separate environmental analysis to evaluate the impacts associated with that conveyance and treatment at WCWD. Option 2 of this EIR evaluates the potential environmental impacts that could occur if the WPCP were to treat only wastewater that is generated by the city of Pinole.

1.3 JOINT POWERS AUTHORITY

The Pinole-Hercules WPCP is owned by both the City of Pinole and the City of Hercules under a joint powers agreement. The Joint Exercise of Powers Act (California Government Code Section 6500) permits two or more public authorities to operate collectively as a Joint Powers Authority (JPA). The Pinole-Hercules WPCP is administered under a JPA. The JPA recognizes that both cities have authority and power for upgrades to the plant and operations at the plant (i.e., collection, transmission, treatment, and disposal) to meet the requirements of the NPDES permit within the boundaries of the respective cities. The City of Pinole is responsible for the management and operation at the plant. The joint powers agreement provides the maximum quantities of wastewater allowed from each city and the allocation of costs, including necessary renewals, replacements, and capital improvements to the WPCP. The members of the JPA meet regularly to discuss wastewater treatment plant operations and recommendations for actions that could be taken. The JPA body itself does not have regulatory authority to implement recommendations; instead, the JPA members report back to each respective city council with recommendations. The authority to implement the JPA's recommendations rests with the council members of both cities.

1.4 SCOPE OF THE EIR

1.4.1 PROJECT LEVEL EIR

This DEIR includes a detailed, project-level analysis that is specific to the site of the facilities and improvements proposed under both Options 1 and 2. The City of Pinole's intention in evaluating the Option 1 and Option 2 facilities at a project level of detail is that no further EIRs or negative declarations would be required for additional regulatory approvals following adoption of either option, barring the occurrence of any of the circumstances described in Public Resources Code Section 21166. (As stated above, if the City of Hercules decided to construct a new pipeline to the WCWD and send its wastewater to WCWD for treatment, the City of Hercules would be responsible for preparing a separate environmental analysis to evaluate the impacts associated with that conveyance pipeline and treatment at WCWD.)

1.4.2 SCOPE OF ANALYSIS

Pursuant to Section 15143 of the State CEQA Guidelines, a lead agency may limit an EIR's discussion of environmental impacts to specific issue areas where significant impacts on the environment may occur. The City of Pinole used a variety of information to determine which issue areas would result in significant or potentially significant impacts on the environment. This information included field surveys of the project site; literature and database searches; professional judgment; review of project characteristics; and comments on the notice of preparation (NOP) received from members of the public and from agencies. The NOP along with an Initial Study Checklist were circulated to public agencies and the public on September 9, 2009 (See Appendix A of this DEIR). Review of the NOP comments and preliminary analysis performed in the initial study indicated that the project could result in significant adverse impacts on the environment in the following issue areas: air quality and odors, cultural resources, climate change, fisheries and aquatic resources, geology and soils, hydrology and water quality, land use, noise, and terrestrial biology. Therefore, the scope of this DEIR focuses on these nine issue areas.

Based on the analysis performed for the initial study (contained in Appendix A) and public comments on the NOP, the City of Pinole determined that the project would have less-than-significant impacts in some environmental issue areas. These issue areas, and the reasons why they are not addressed further in this EIR, are outlined briefly below.

- **Aesthetics (visual resources)—**all proposed facilities would be constructed within developed urban or industrial land uses, except for approximately 2,000 feet of pipeline that would be constructed along Pinole Creek. Because the pipeline would be installed underground and the appearance aboveground would be returned to preproject conditions upon completion of the project, the temporary, short-term visual impacts associated with pipeline construction along Pinole Creek were considered to be less than significant.

- **Agricultural Resources—**the project site is not under a Williamson Act contract, and project implementation would not convert agricultural land to nonagricultural uses.

- **Hazards and Hazardous Materials—**the handling and storage of hazardous materials associated with construction and operational activities would be minimal, would be strictly controlled by applicable state and local regulations, would not generate hazardous wastes, and would not result in any substantial risk of hazardous waste exposure to people or the environment. There are no sites within the WPCP boundary or proposed corporation yard included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5. There is one leaking underground storage tank adjacent to the pipeline route; however, the proposed pipeline would be installed within the existing road right-of-way in vicinity of this site, and the site does not extend into the roadway. Therefore, the project would not create a significant hazard to the public or the environment from exposure to a toxic substance listed pursuant to Government Code Section 65962.5.The project would not be located within 2 miles of an airport, adjacent to wildlands, nor interfere with adopted emergency response or evacuation plans.

- **Mineral Resources—**most of the project facilities would be located on land classified by the California Division of Mines and Geology as areas where “no significant mineral deposits are present.” Although a portion of the pipeline to the Rodeo Sanitary District would be installed within land classified as “areas containing mineral deposits, the significance of which cannot be evaluated from available data,” this land along the pipeline alignment consists of paved roadways where potential mineral resources have already been made unavailable, and installation of the pipeline would not change the current unavailability of mineral resources, if any are present.

- **Population and Housing—**the project does not include construction of housing. Potential growth-inducing aspects of the project are evaluated in Chapter 5, “Other CEQA-Mandated Sections,” of this DEIR.

- **Public Services—**the project would not result in the need for any expanded fire or police protection services, nor would it require the construction of any school facilities. Potential growth-inducing aspects of the project are evaluated in Chapter 5, “Other CEQA-Mandated Sections,” of this DEIR.

- **Recreation—**the project would not increase the use of recreational facilities, would not include construction of new recreational facilities, or require the construction or expansion of existing recreational facilities.

- **Transportation/Traffic—**the limited nature of project construction activities would generate only a small amount of short-term traffic, which would not be expected to substantially degrade the current level of service designations on local roadways. Project improvements would not generate a need for additional employees, and thus project operation would not result in generation of additional traffic that could adversely affect surrounding roadways.

- **Utilities and Service Systems—**the project is itself a utilities project, and potentially significant impacts associated with construction of this utility project are evaluated throughout this EIR. No other utilities or service systems would be affected by project construction or implementation.

1.6 LEAD, RESPONSIBLE, AND TRUSTEE AGENCIES

1.6.1 LEAD AGENCY

As defined in State CEQA Guidelines Section 15367, the “Lead Agency” is the public agency that has the principal responsibility for carrying out or approving the project. The City of Pinole is the designated Lead Agency for this project. Additional agencies (listed below) with potential permit or approval authority over the project, or elements thereof, will have the opportunity to review this document during the public review period, and will use this information in consideration and issuance of any permits required for the project.

1.6.2 RESPONSIBLE AND TRUSTEE AGENCIES

Other state or local public agencies that may or will use the EIR to carry out their discretionary approval power over the project are "Responsible Agencies," as defined by Public Resources Code Section 21069 and State CEQA Guidelines Section 15381. "Trustee Agencies," as defined by Public Resources Code Section 21070, are state agencies that have jurisdiction by law over resources affected by a project that are held in trust for the people of the State of California. Agencies that may have discretionary approval or may have jurisdiction over resources affected by the project are listed below:

LOCAL RESPONSIBLE AGENCIES

- **Bay Area Air Quality Management District:** Authority to Construct and Permit to Operate.
- **City of Hercules:** Authority to Construct, Permit to Operate, and traffic management control plans.
- **Contra Costa County:** Authority to Construct, Permit to Operate, and traffic management control plans.
- **Rodeo Sanitary District:** Authority to Construct, Permit to Operate.
- **San Francisco Bay Conservation and Development Commission:** Permit to Construct (on land within 100 feet of the shoreline).

STATE RESPONSIBLE AGENCIES

- **San Francisco Bay Regional Water Quality Control Board (RWQCB):** NPDES permit—Waste Discharge Requirements for effluent discharge, NPDES stormwater permits for runoff.
- **State Water Resources Control Board (SWRCB):** Section 401 Water Quality Certification.
- **California Department of Fish and Game (DFG):** Section 1602 Streambed Alternative Agreement (if necessary).

FEDERAL AGENCIES

- **U.S. Army Corps of Engineers:** Clean Water Act Section 404 permit (if necessary).

1.7 EIR PUBLIC REVIEW PROCESS

The public review process required by CEQA begins with a NOP on the EIR. The NOP requests comments from affected agencies and the public regarding the scope and content of the EIR. The City of Pinole circulated an NOP for this project on September 9, 2009. This DEIR focuses on the issues that were found to be potentially significant in the NOP. After the NOP was circulated, the City of Pinole held a public scoping meeting, consistent with the requirements of the State CEQA Guidelines, to provide public agencies and interested persons the opportunity to comment on the environmental information to be included in the DEIR. That hearing was held on September 24, 2009. Comments submitted at the hearing and those received during the NOP comment period are included in Appendix B.

The purpose of public review of the DEIR is to receive comments from interested parties on environmental issues that should be considered as part of the Pinole-Hercules WPCP Improvement Project, as well as input on potential alternatives that should be considered. Following the close of the DEIR public review period, a second document containing the comments received on the DEIR and responses to those comments, along with any necessary text changes to the DEIR, will be prepared and published. Together, the DEIR and the responses to comments/text changes will constitute the final EIR. The City of Pinole is responsible for certifying that the EIR has been adequately prepared in compliance with CEQA. After certification, responsible agencies may use the EIR in making their determination whether to approve any discretionary actions for which they have jurisdiction.

This DEIR is being circulated to local, state, and federal agencies, and to interested organizations and individuals who may wish to review and comment on the report. This DEIR is being circulated for a 45-day public review period, during which time written comments may be submitted to the City of Pinole at the following address:

City of Pinole
2131 Pear Street
Pinole, CA 94564-1774
Attention: Dean Allison
Email: DAllison@ci.pinole.ca.us

Copies of the DEIR are available for review at the following addresses:

(1) Pinole City Hall
2131 Pear Street
Pinole, CA 94564

(2) Pinole Library
2935 Pinole Valley Road
Pinole, CA 94564

(3) Hercules Public Library
109 Civic Drive
Hercules, CA 94547

1.7.1 PUBLIC HEARING

A public hearing on this DEIR will also be held at the Pinole City Hall (2131 Pear Street, Pinole, CA) on April 7, 2010, at 6 p.m., during the review period, to receive oral and written comments on the document. A public notice of availability of the DEIR, which also includes the date, time, and specific location for the public hearing, has been published in local newspapers and forwarded to interested parties who requested information about this project or who provided comments on the NOP or at the hearing on the NOP.

1.8 TERMINOLOGY USED IN THE EIR

This DEIR includes the following terminology to denote the significance of environmental impacts of the project:

- **No impact** indicates that the construction, operation, and maintenance of the project would not have any direct or indirect effects on the environment. It means no change from existing conditions. This impact level does not need mitigation.

- **Less-than-Significant Impact:** A less-than-significant impact is one that would not result in a substantial or potentially substantial adverse change in the environment. This impact level does not require mitigation measures.

- **Significant impact:** A significant impact is defined by Public Resources Code Section 21068 as one that would cause "a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project." Mitigation measures or alternatives to the project must be provided, where feasible, to reduce the magnitude of significant impacts.

- **Potentially Significant Impact:** A potentially significant impact is one that, if it were to occur, would be considered a significant impact as described above; however, the occurrence of the impact cannot be immediately determined. For CEQA purposes, a potentially significant impact is treated (i.e., mitigated) as if it were a significant impact.

- **Significant and Unavoidable Impact:** A significant and unavoidable impact is one that would result in a substantial or potentially substantial adverse impact on the environmental that cannot be mitigated to a less-than-significant level even with any feasible mitigation. Under CEQA, a project with significant and unavoidable impacts could proceed, but the lead agency would be required to prepare a "statement of overriding considerations" in accordance with State CEQA Guidelines Section 15093, explaining why the lead agency would proceed with the project in spite of the potential for significant impacts.

- **Beneficial impact:** A beneficial impact is an impact that is considered to cause a positive change or improvement in the environment and for which no mitigation measures are required.

- An impact may have a level of significance that is too uncertain to be reasonably determined, which would be designated **too speculative for meaningful evaluation**, in accordance with State CEQA Guidelines Section 15145. Where some degree of evidence points to the reasonable potential for a significant effect, the EIR may explain that a determination of significance is uncertain, but is still assumed to be "potentially significant," as described above. In other circumstances, after thorough investigation, the determination of significance may still be too speculative to be meaningful. This is an effect for which the degree of significance cannot be determined for specific reasons, such as because aspects of the impact itself are either unpredictable or the severity of consequences cannot be known at this time.

- **Short-Term Impacts:** Short-term impacts are those that occur for only a limited, temporary duration (e.g., construction traffic that results in a decrease of a level of service on area roadways only during a project's construction phase would be considered a short-term impact).

- **Long-Term Impacts:** Long-term impacts occur over a relatively long period (e.g., a permanent loss of biological habitat as a result of project operations would be considered a long-term impact.)

- A **direct impact** is an impact that would be caused by the project and would occur at the same time and place as the project.

- An **indirect impact** is an impact that would be caused by an action but would occur later in time, or at another location, yet is reasonably foreseeable in the future.

1.9 EIR ORGANIZATION

This DEIR is organized into chapters, as identified and briefly described below. Chapters are further divided into sections (e.g. Section 3.1, "Air Quality and Odors").

- The **"Executive Summary"** presents an overview of the project and alternatives and associated environmental impacts/consequences; a listing of environmental impacts/consequences and mitigation measures; and known areas of controversy and issues to be resolved.

- **Chapter 1, "Introduction,"** explains the CEQA process; provides a brief summary of the project that is being evaluated; lists the lead, responsible, and trustee agencies that may have discretionary authority over the project; provides information on public participation; and outlines the organization of the document;.

- **Chapter 2, "Project Description,"** describes project location, background, proposed actions by the City of Pinole, project characteristics, and project objectives. Project construction and facility operations are also described.

- **Chapter 3, "Affected Environment, Environmental Consequences, and Mitigation Measures,"** is divided into nine sections. Each section is devoted to a particular topic area and describes the baseline (i.e., existing conditions), and the regulatory setting, then provides an analysis of impacts and mitigation measures that would avoid or eliminate significant impacts or reduce them to a less-than-significant level, where feasible and available.
- **Chapter 4, "Other CEQA-Mandated Sections,"** discusses cumulative impacts that could result from the project when considered in combination with other reasonably foreseeable projects in the area. Chapter 4 also addresses the potential for the project to foster economic or population growth, or remove obstacles to growth, discusses any significant and unavoidable adverse impacts that would result from project implementation, and discusses any irreversible or irretrievable commitment of resources that could be caused by the project.
- **Chapter 5, "Alternatives,"** describes a range of reasonable alternatives to the project (consistent with State CEQA Guidelines Section 15126.6[a]) that are feasible (i.e., that may be accomplished in a successful manner within a reasonable period of time) and that take economic, environmental, social, and technological factors into account.
- **Chapter 6, "References,"** provides a bibliography of sources cited in the EIR and identifies the names and affiliations of persons who provided information used in preparing the document.
- **Chapter 7, "List of Preparers,"** lists individuals who were involved in preparing this EIR.
- **The Appendices** contain the appendix materials cited in the text of the DEIR.

1.10 LIST OF ACRONYMS AND ABBREVIATIONS

°F	Fahrenheit
µg/L	part-per-billion
AB	Assembly Bill
ABAG	Association of Bay Area Governments
ACHP	Advisory Council on Historic Preservation
ADT	average daily traffic
Alquist-Priolo Act	Alquist-Priolo Earthquake Fault Zoning Act
ANSI	American National Standards Institute
APS	Alternative Planning Strategy
ARB	California Air Resources Board
ASTM	American Society for Testing and Materials
ATCM	airborne toxics control measure
B.P.	Before Present
BAAQMD	Bay Area Air Quality Management District
BACT	best available control technology
Basin Plan	*Water Quality Control Plan for the San Francisco Bay Basin*
Bay Area	San Francisco Bay Area
BCDC	Bay Conservation and Development Commission
BDCP	Bay Delta Conservation Plan
BMI	Benthic macroinvertebrates

BMP	best management practice
BOD	biochemical oxygen demand
BSC	California Building Standards Commission
CAA	Clean Air Act
CAAA	Clean Air Act Amendments of 1990
CAAQS	California ambient air quality standards
Cal/EPA	California Environmental Protection Agency
CBC	California Building Standards Code
CBOD	biological oxygen demand
CCAA	California Clean Air Act
CCAR	California Climate Action Registry
CCAT	California Climate Action Team
CCCFCWCD	Contra Costa County Flood Control and Water Conservation District
CCCWP	Contra Costa County Clean Water Program
CCR	California Code of Regulations
CEC	California Energy Commission
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
cfs	cubic feet per second
CGS	California Geological Survey
City	City of Pinole
cm	centimeters
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CNRA	California National Resources Agency
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide-equivalent
COMM	Ocean, Commercial, and Sport Fishing
CPUC	California Public Utilities Commission
CSC	California Species of Concern
CTR	California Toxics Rule
CVP	Central Valley Project
CWA	Clean Water Act
dB	decibel
dBA	A-weighted sound levels
DDD	dichlorodiphenyldichloroethane
DDE	dichlorodiphenyldichloroethylene
DDT	dichlorodiphenyltrichloroethane
Delta	Sacramento–San Joaquin Delta

DFG	California Department of Fish and Game
diesel PM	diesel exhaust
DO	dissolved oxygen
DPS	distinct population segment
DWR	California Department of Water Resources
EBMUD	East Bay Municipal Utility District
EDC	endocrine-disrupting compound
EFH	essential fish habitat
EIR	environmental impact report
EIS	environmental impact statement
EPA	U.S. Environmental Protection Agency
EPS	emission performance standard
EPT Taxa	Ephemeroptera, Plecoptera, and Trichoptera
ESA	federal Endangered Species Act
EST	Estuarine Habitat
ESU	evolutionarily significant units
FEMA	Federal Emergency Management Agency
FIP	federal implementation plan
FR	Federal Register
GHG	greenhouse gas
GVW	gross vehicle weight
GWP	global warming potential
HAP	hazardous air pollutant
HCP/NCCP	*Habitat Conservation Plan/Natural Community Conservation Plan*
HDD	horizontal directional drilling
HHS	U.S. Department of Health and Human Services
hp	horsepower
HVAC	Heating, ventilation, and air conditioning
I-	Interstate
IBI	Index of Biotic Integrity
in/sec	inches per second
IND	Industrial Service Supply
JPA	Joint Powers Authority
kg	mercury per kilogram
Ksat	saturated hydraulic conductivity
lb/in	pounds per inch
lb/sq. ft.	pounds per square foot
lbs	pounds
LDL	Larson Davis Laboratories
LOS	level of service

LVW	loaded vehicle weight
MACT	maximum available control technology
MBTA	Migratory Bird Treaty Act
mg	milligram
mg/l	milligrams per liter
mgd	million gallons per day
MIGR	Migration of Aquatic Organisms
mm	millimeters
MMT	million metric tons
MOA	memorandum of agreement
MPN/100 ml	most probable number per 100 milliliters
MPO	Metropolitan Planning Organization
msl	mean sea level
MT	metric tons
MT CO_2e/yr	metric tons of carbon dioxide-equivalent per year
MTC	Metropolitan Transportation Commission
MWh	megawatt-hour
N_2O	nitrous oxide
NAAQS	national ambient air quality standards
NAHC	Native American Heritage Commission
NAV	Navigation
NCCPA	California Natural Community Conservation Planning Act
NDO	Net Delta Outflow
NEHRP	National Earthquake Hazards Reduction Program
NEHRPA	National Earthquake Hazards Reduction Program Act
NESHAP	national emissions standards for hazardous air pollutant
NFIP	National Flood Insurance Program
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NO	nitric oxide
NO_2	nitrogen dioxide
NO_X	oxides of nitrogen
NPDES	National Pollutant Discharge Elimination System
NTR	National Toxics Rule
NWIC	Northwest Information Center
OCAP	Operations Criteria and Plan
OMR	Old and Middle River
OPR	California Office of Planning and Research
PAH	polycyclic aromatic hydrocarbons
PCB	polychlorinated biphenyl

pg/l	picograms per liter
PM	particulate matter
PM_{10}	respirable particulate matter
$PM_{2.5}$	fine particulate matter
Porter-Cologne Act	Porter-Cologne Water Quality Control Act
POTW	publicly owned treatment works
ppm	part per million
PPV	peak particle velocity
PRC	California Public Resources Code
RARE	Preservation of Rare and Endangered Species
RBDD	Red Bluff Diversion Dam
REC1	Water Contact Recreation
REC2	Noncontact Water Recreation
Reclamation	U.S. Bureau of Reclamation
RM	river mile
RMA	Resource Management Associates
RMP	Regional Monitoring Program
RMS	root-mean-square
RNHA	Regional Housing Needs Allocation
ROG	reactive organic gases
RPA	reasonable and prudent alternative
RSD	Rodeo Sanity District
RTP	Regional Transportation Plan
RWQCB	Regional Water Quality Control Board
SB	Senate Bill
Scoping Plan	*Climate Change Scoping Plan*
SCS	Sustainable Communities Strategy
SFBAAB	San Francisco Bay Area Air Basin
SHELL	Shellfish Harvesting
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SLM	sound level meter
SMAQMD	Sacramento Metropolitan Air Quality Management District
SO_2	sulfur dioxide
SPWN	Fish Spawning
SR	State Route
SRA	shaded riparian aquatic
State CEQA Guidelines	California Environmental Quality Act Guidelines
STC	Sound Transmission Class
SWP	State Water Project

SWPPP	Stormwater Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TAC	toxic air contaminant
Thermal Plan	SWRCB's Water Quality Control Plan for Control of Temperatures in Coastal and Interstate Waters and Enclosed Bays and Estuaries of California
TMDL	total maximum daily load
TSS	Total suspended solids
UCMP	University of California Museum of Paleontology
UILT	upper incipient lethal temperature
UPRR	Union Pacific Railroad
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UV	Ultraviolet
VdB	vibration decibels
VMT	vehicle miles traveled
VOC	volatile organic compound
WCWD	West County Wastewater District
WHO	World Health Organization
WILD	Wildlife Habitat
WPCP	Water Pollution Control Plant
WWTP	wastewater treatment plant
µg/l	micrograms per liter
µin/sec	microinch per second

2 PROJECT DESCRIPTION

2.1 INTRODUCTION

This chapter presents a description of the Pinole-Hercules Water Pollution Control Plant (WPCP) Improvement Project. Elements specifically discussed are the project location, the background of the project, the objectives of the project, the characteristics of the existing facility, and the proposed improvement options. It also provides an overview of planned construction activities, and activities the City would undertake as part of the project to help protect the environment.

2.2 PROJECT LOCATION

The Pinole-Hercules WPCP is located along the shoreline of San Pablo Bay at 11 Tennent Avenue, Pinole, California, within Contra Costa County (see Exhibit 2-1). The WPCP is bordered by the Union Pacific Railroad tracks to the south; Pinole Creek to the northeast; Bayfront Park to the southwest; and San Pablo Bay to the west (see Exhibit 2-2). Land east and south of the project site, across the railroad tracks, consists of residential housing and a storage facility. The WPCP facility, including the preliminary, primary, and secondary treatment processes, is located within an approximately 4.5-acre area.

Regional access to the Pinole-Hercules WPCP is provided from Interstate 80 (I-80) via San Pablo Avenue. Local access to the WPCP is provided by Tennent Avenue, adjacent to a parking lot associated with Bayfront Park.

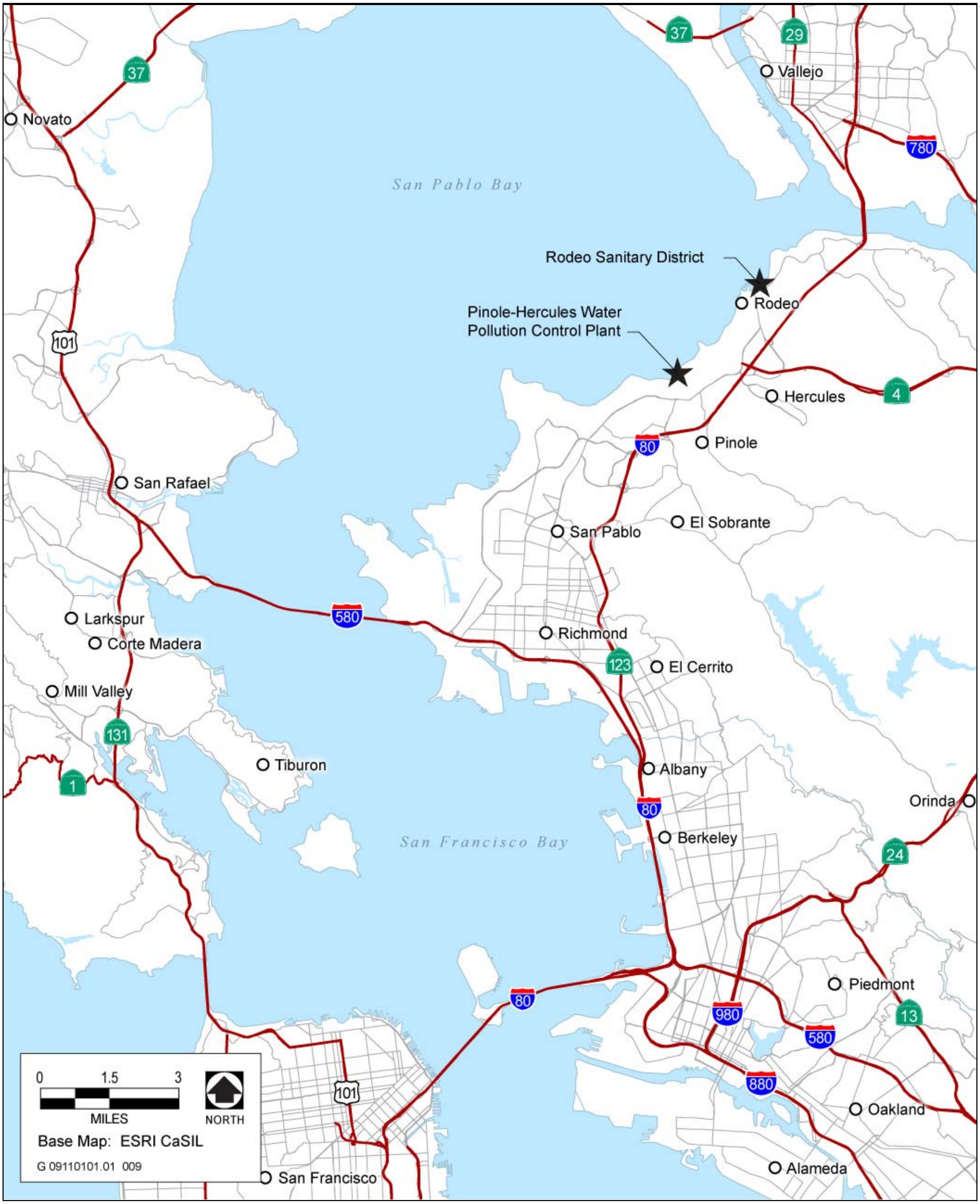
2.3 PROJECT BACKGROUND AND HISTORY

The Pinole water pollution control facility began operations in 1956 as a primary treatment facility, which treated wastewater generated only by the city of Pinole, with discharge into San Pablo Bay. In 1971, the Cities of Pinole and Hercules entered into a joint use agreement, which included expansion and upgrades. The plant is currently administered by the Pinole-Hercules WPCP Joint Powers Authority (JPA) and treats wastewater from both cities to secondary standards.

All wastewater treatment plants that discharge to San Francisco Bay are issued a National Pollutant Discharge Elimination System (NPDES) permit that sets specific discharge requirements to ensure protection of public health, environmental health, and water quality. These permits are renewed every 5 years by the appropriate regional water quality control board (RWQCB).

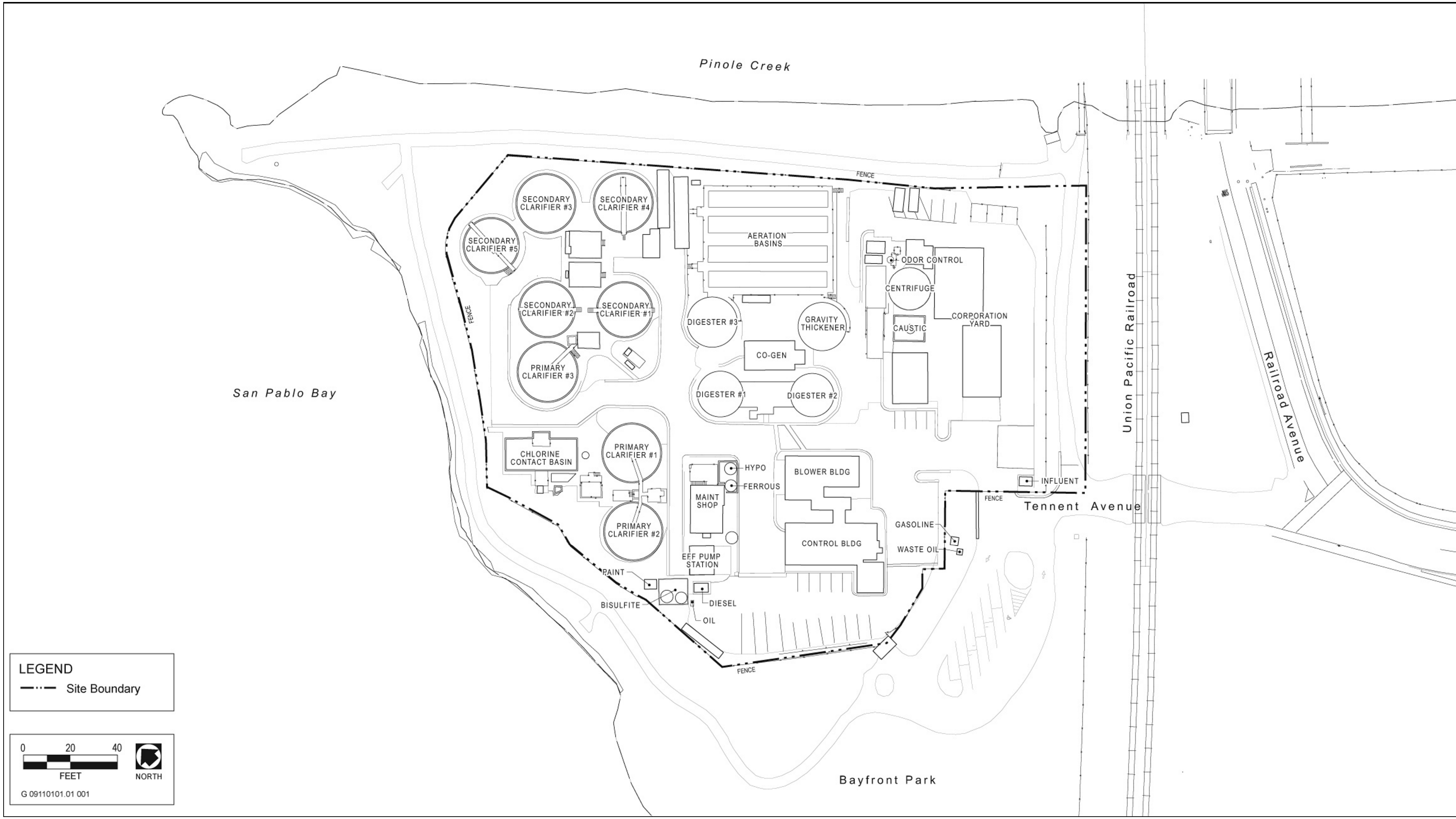
Discharge from the Pinole-Hercules WPCP is regulated by the San Francisco Bay RWQCB under a NPDES permit, which was adopted as Order R2-2007-0024 in March 2007. Order R2-2007-0024 mandates corrective measures to increase wet-weather treatment capacity and correct issues related to effluent discharge at the WPCP. The San Francisco Bay RWQCB has set a compliance time schedule, requiring that all facilities be completed and online by June 1, 2016.

The Pinole-Hercules WPCP is permitted to treat 4.06 million gallons per day (mgd) dry weather flow and 10.3 mgd wet weather flow. Issuance of the most recent NPDES permit included the requirement that the City of Pinole must examine alternatives and implement improvements to eliminate the use of the shallow-water Outfall 002, and eliminate blending of primary- and secondary-treated effluent, which occasionally occurs during periods of high rainfall during winter storm events. As a result, the Cities of Pinole and Hercules will be requesting a permit that would increase the maximum daily wet-weather treatment capacity at the Pinole-Hercules WPCP 14.59 mgd. As a result of this increase, the wet-weather discharge from deepwater Outfall 001 (which consists of the combined discharges from Pinole-Hercules and the Rodeo Sanitary District) would increase from the current maximum of 12.8 mgd to a maximum of 17.09 mgd on an average daily basis. The total 17.09-mgd discharge would consist of the entire 14.59-mgd wet-weather capacity of the upgraded Pinole-Hercules WPCP, and the existing discharge



Source: Provided by the City of Pinole in 2009

Regional Project Location **Exhibit 2-1**



Source: Dodson-Psomas 2009

Layout of the Existing Pinole-Hercules WPCP Facility **Exhibit 2-2**

of 2.5 mgd Pinole-Hercules WPCP, and the existing discharge of 2.5 mgd from RSD (which would not change from existing conditions). The City of Pinole will also be requesting that the RWQCB consider including a permit term that would allow an instantaneous wet-weather-flow capacity of 20 mgd (to accommodate extremely high rainfall events). The permit modifications would not include any increase in the plant's dry-weather treatment capacity. To accomplish the proposed wet-weather capacity increase, the City of Pinole evaluated six potential project alternatives in a constraints analysis in 2008. Based on the results of that analysis, which considered biological resources, cultural resources, land use and planning, water quality, and financial feasibility, two options, which are the subject of this EIR, were selected for detailed environmental analysis—Option 1: New Larger Effluent Pipe to RSD, and Option 2: Pinole-Only Flows at Existing Plant.

2.4 PROJECT OBJECTIVES

The project is intended to achieve the following primary objectives:

- construct improvements to eliminate blending and avoid use of the existing shallow-water outfall, and
- comply with conditions set forth in San Francisco Bay RWQCB Order Number R2-2007–0024.

2.5 EXISTING TREATMENT PROGRAM, PROCESSES, AND FACILITIES

2.5.1 WASTEWATER SERVICE AREA AND TREATMENT CAPACITY

The Pinole-Hercules WPCP is currently permitted to treat and discharge 4.06 mgd average dry-weather flow and 10.3 mgd average wet-weather flow. Treated effluent from the WPCP is conveyed northeast through a pipeline to the Rodeo Sanitary District Wastewater Treatment Plant (RSD), where flows from the two treatment facilities are combined and discharged into San Pablo Bay through a permitted deep-water outfall (Outfall 001).

The WPCP also occasionally uses a shallow-water discharge outfall (Outfall 002), located at the west boundary of the WPCP property. This outfall is used when the WPCP treatment capacity is exceeded, which occasionally occurs during winter storm events that produce influent levels above the plant's 10.3-mgd permitted wet-weather capacity. During these high-influent-flow periods, the excess influent is treated to a primary level, blended with secondary treated wastewater, disinfected, and then dechlorinated before release into San Pablo Bay from this shallow-water outfall.

The existing facility layout is shown in Exhibit 2-2.

2.5.2 EXISTING WASTEWATER COLLECTION, TREATMENT, AND DISPOSAL

PRELIMINARY TREATMENT PROCESS

Raw wastewater is conveyed separately from the cities of Pinole and Hercules and combined into a single pipeline before entering the preliminary treatment facility, where it is conveyed to a mechanical screen. Upon entering the facility, ferrous chloride is added for odor control and hydrogen sulfide gas reduction. Flows in excess of 6 mgd pass through a manually cleaned bar screen to the wet well at the influent pump station. Four influent pumps driven by variable-speed electric motors deliver influent to the primary treatment facility.

PRIMARY TREATMENT PROCESS

Wastewater pumped to the primary clarifier's flow distribution box is dispersed to three primary clarifiers. Floatable material is removed as scum and settleable organic and inorganic materials are removed from the flow stream by gravity settling. The remaining inorganic material is removed using a centrifugal separator. Sludge is then allowed to stabilize in the anaerobic digester, producing methane gas that can be used for fueling the engine-driven generator at the WPCP (see "Cogeneration Plant" below).

SECONDARY TREATMENT PROCESS

The secondary treatment process uses an activated sludge process. This process combines flows from the primary clarifiers, which contain soluble organic material and fine suspended organic material, with microorganisms in the aeration basins creating a solution referred to as mixed liquor. The basins are aerated by fine bubble diffusers to maintain dissolved oxygen throughout the mixed liquor. Aeration creates an environment that promotes consumption of the soluble organic material and coagulates the fine suspended organic material into biological floc.

The secondary clarifiers separate out the microorganisms from the mixed liquor, using gravity settling, and return them to the aeration tanks. Settleable material is swept from the tank bottom, transported to the solids handling area for thickening, and then conveyed to the anaerobic digesters. Effluent flows from the clarifiers are directed to the disinfection system. Chlorine is added to the effluent flow before it enters the chlorine contact tank. After treatment in the chlorine contact tank, sodium bisulfate is added to remove the chlorine before it reaches the effluent pump station.

The wet-weather capacity of the five existing secondary clarifiers without chemical enhancement is approximately 10.3 mgd. As described above, because of the limited secondary treatment capacity, flows during high-rainfall events that exceed the secondary system’s capacity bypass secondary treatment. The excess flows are then blended with the secondary treated sewage before delivery to the disinfection system. This process is referred to as blending.

SOLIDS TREATMENT

Primary solids and secondary solids (waste activated sludge) are treated by anaerobic digestion in four anaerobic digesters. Primary solids and grit are conveyed to the solids handling area, where grit is removed using a vortex-type system. The primary solids are then sent to a rotary belt thickener, where they are thickened with waste activated sludge before being conveyed to the anaerobic digesters. Digested sludge is returned to the solids handling area, where it is dewatered by centrifuge. Washed and dewatered solids are hauled to Keller Canyon Landfill in Pittsburg, California.

EFFLUENT DISPOSAL

Disinfected and dechlorinated effluent is conveyed through a pipeline to RSD, where it is combined with RSD flows and pumped to Outfall 001 and disposed into the bay through a diffuser. Outfall 001 is approximately 3,600 feet offshore and approximately 18 feet below mean lower low water. The diffuser section is 120 feet long, with 15 pairs of 2.5-inch diffuser ports. A recent inspection indicated that two of the ports are plugged and that erosion has enlarged some of the ports.

As discussed above, the Pinole-Hercules WPCP has also occasionally used Outfall 002, a shallow-water outfall, located approximately 30 feet offshore from the WPCP facility at a depth of 2 feet below lower low water. This outfall is used approximately six times per year during repairs and when influent flows exceed 10.3 mgd during high-rainfall events.

STORM DRAINAGE SYSTEM

Existing on-site storm drainage is routed back into the plant headworks (i.e., preliminary treatment facility) for treatment along with the wastewater influent. It is treated and discharged as described above.

COGENERATION PLANT

The Pinole-Hercules WPCP includes a cogeneration plant that has been constructed to take advantage of the methane gas produced during the wastewater treatment process. The cogeneration process uses sludge from the wastewater stream that is fed into digesters as part of the treatment process. Microorganisms break down organic materials within the sludge and produce methane gas as a byproduct of the process. The gas is piped into an engine that has been constructed to run on methane instead of diesel as its fuel source. This engine powers a generator, which in turn produces electricity. The electricity is then fed back into the WPCP, where it is used to help run the facility, thus reducing the plant's use of energy from Hercules Municipal Utility. In addition, the digesters must be held at temperatures of 98–100 degrees Fahrenheit. This heat is provided by boilers that are also powered by methane sequestered from the digesters. The Pinole-Hercules WPCP produces more methane than can currently be used at the plant; therefore, the excess methane is bled off to a flare, where it is burned.

CORPORATION YARD

A corporation yard used by the City of Pinole Department of Public Works, Maintenance Division, is located within the boundaries of the Pinole-Hercules WPCP property. It functions as the administrative headquarters and equipment yard for the maintenance of city streets, parks, sewers, buildings, and storm drains.

2.6 WPCP FACILITY IMPROVEMENTS

As described above, the City of Pinole initially considered six alternatives to comply with the requirements of San Francisco Bay RWQCB Order Number R2-2007–0024. Based on consideration of biological resources, cultural resources, land use and planning, water quality, and financial feasibility, two options were selected for detailed environmental analysis. Table 2-1 compares elements associated with each of the project options. Alternatives to the project options are discussed in Chapter 5, "Alternatives."

Table 2-1
Comparison of the Project Options

Project Element	Option 1 New Larger Effluent Pipeline to RSD	Option 2 Pinole-Only Flows at Existing Plant
Preliminary treatment process	New equipment: - Submersible wastewater pumps - Mechanical bars screen - Washer compactor - Grit removal system - Diversion channel - Parshall flume	No change
Primary treatment process	New equipment: - Variable-speed progressive cavity pumps - Single-pass aeration tanks - Diffuser blowers	New equipment: - 450,000-gallon storage tank and associated piping and accessories
Secondary treatment process	New equipment: - 75-foot-diameter secondary clarifiers - Vertical solids handling sludge pumps - Ultraviolet disinfection channels to replace chlorination system	No change
Effluent disposal	- Installation of an additional pipeline to RSD - Outfall diffuser modification	No change
Solids treatment	Facility relocation and new equipment: - Rotary drum thickeners - Centrifuge	No change
Storm drainage system	No change	No change
Energy infrastructure	New electrical building	No change
Corporation yard	Relocation of corporation yard	No change
Easements and rights-of-way	Required for installation of the new pipeline	None required

Note: RSD = Rodeo Sanitary District Wastewater Treatment Plant
Source: Compiled by AECOM in 2009

2.6.1 OPTION 1: NEW LARGER EFFLUENT PIPE TO RSD

Option 1 involves increasing the maximum daily wet-weather-flow capacity to 14.59 mgd at the Pinole-Hercules WPCP. Wet-weather discharges from deepwater Outfall 001 (the combined discharges from Pinole-Hercules and RSD) would increase from the current maximum of 12.8 mgd to a maximum of 17.09 mgd on an average daily basis. The total 17.09-mgd discharge would consist of the entire 14.59-mgd wet-weather capacity of the upgraded Pinole-Hercules WPCP, and the existing discharge of 2.5 mgd from RSD (which would not change from existing conditions). The instantaneous wet-weather-flow capacity would be increased to 20 mgd. All treated, disinfected wastewater would be discharged to the existing Outfall 001 at RSD. A new force main, generally parallel to the existing force main route, would be constructed to provide delivery of an instantaneous wet-weather-flow capacity up to 20 mgd secondary-treated effluent to RSD (see Exhibit 2-3). The current combined dry-weather effluent discharge rate at Outfall 001 of 5.20 mgd (4.06 mgd from the Pinole-Hercules WPCP and 1.14 mgd from RSD) would not be changed. Exhibit 2-4 provides a diagram of proposed WPCP facility improvements under Option 1.

Preliminary Treatment Process

The new headworks facility would include four submersible wastewater pumps, two mechanical bar screens with 20 mgd capacity, a washer compactor, a grit removal system, a parshall flume associated with Pinole flows for metering, and a diversion channel. Flows from the cities of Pinole and Hercules would be routed through separate metering vault that would be located east of the control building. Flows would be combined after metering. The existing influent sewer under the control building would no longer be used, and influent sampling would be relocated to the new metering vault. Flows would be directed to the mechanical bar screens, and then to a vortex-type grit removal system. Washed and dewatered grit and screenings from the mechanical bar screens would be collected in a dumpster and hauled off-site. When flows reach approximately 12 mgd, wastewater would overflow into the diversion channel, where it would be metered by a parshall flume and conveyed to the primary effluent pipeline and on to the aeration tanks.

Primary Treatment Process

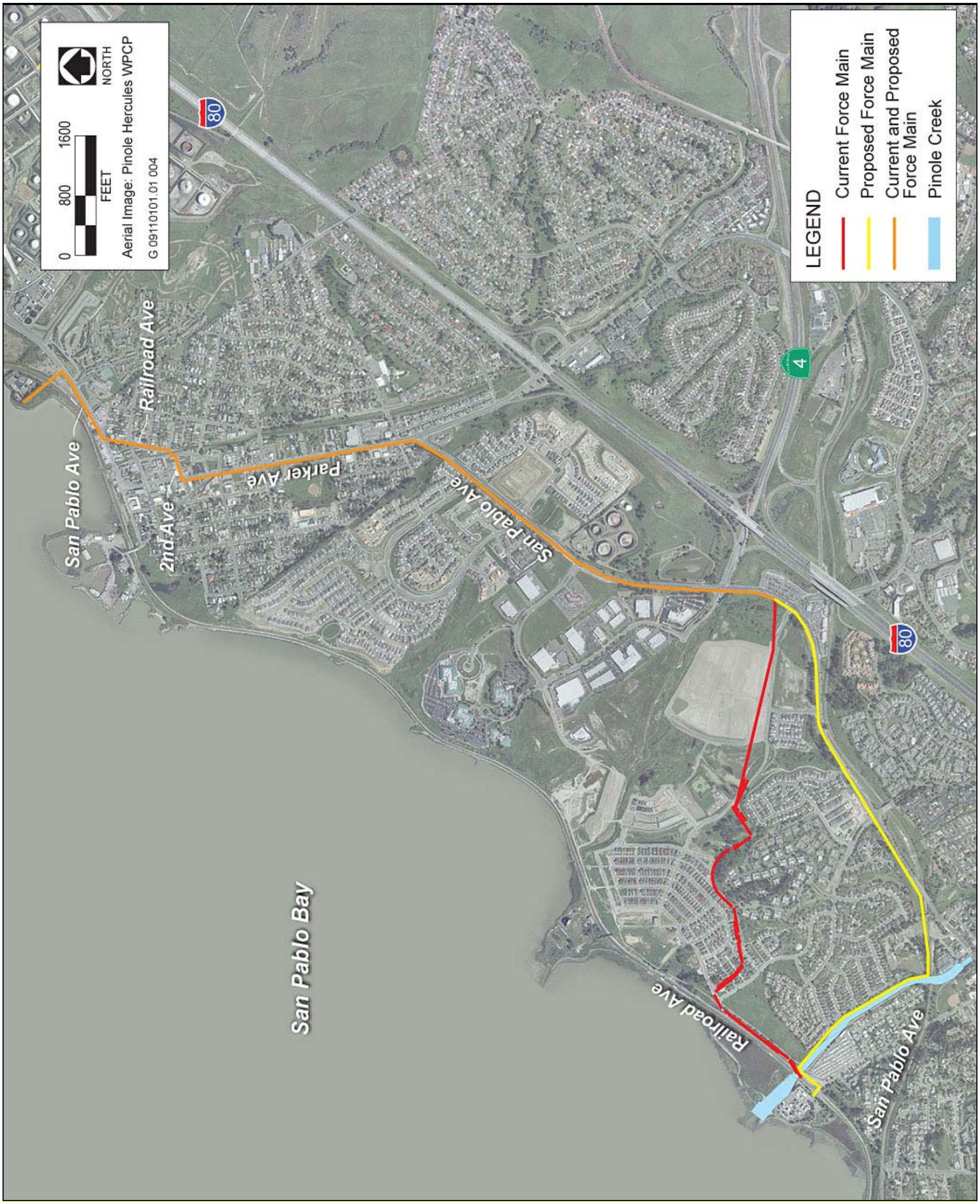
Flows of up to 12 mgd would be conveyed from the new headworks facility to the existing primary distribution box, where it would be equally distributed to the three existing primary clarifiers. Flows from two of the primary clarifiers would be discharged to the existing diversion box, which contains an overflow weir for blending primary effluent with secondary effluent. The overflow weir and the west half of the diversion box would no longer be used.

Primary sludge would be thickened in the primary clarifier. The existing sludge pumps would be replaced by variable-speed progressive cavity pumps. Primary sludge and floatables would be pumped directly into the anaerobic digesters.

The aeration tanks, which currently consist of two two-pass tanks, would be converted to four single-pass tanks. The aeration tanks would continue to use a fine bubble diffuser and two new 1,200-cubic-feet-per-minute blowers would be installed. The influent ends of the aeration tanks would be modified to accommodate these improvements.

Secondary Treatment Process

The existing secondary clarifiers would be demolished and three new 80-foot-diameter secondary clarifiers would be constructed. Waste activated sludge and secondary scum would be conveyed to the solids handling area for thickening before delivery to the anaerobic digesters. After treatment in the secondary clarifiers, flows would be transported to two new ultraviolet (UV) disinfection channels, which would replace the function of the existing chlorine disinfection system. The existing chlorine contact tank disinfection and dechlorination system would no longer be used.



Source: Dodson-Psomas 2009

Proposed Pipeline Route to Rodeo Sanitary District—Option 1 **Exhibit 2-3**

Effluent Disposal

A new 24-inch force main would be constructed from the Pinole-Hercules WPCP to RSD to increase effluent disposal capacity. Flows from the UV channels would enter the effluent pump station's wet well, where four pumps would convey peak flow through two 24-inch force mains, one new and one existing, to the existing 30-inch outfall and diffuser at RSD. Two of the diffuser's ports would be repaired to decrease the size to 3 inches (in order to attach duckbill valves). Three-inch duckbill valves would be attached using stainless steel clamps on each of the diffuser ports (for a total of 30 valves) to provide enhanced jet velocity and to improve initial dilution. All work would be performed by hand by divers launched from boats and no dredging would occur as part of the diffuser modification.

The proposed 24-inch force main would exit the WPCP from Tennent Avenue and make a 90-degree turn northeast to cross Pinole Creek, parallel to the Bay Trail footbridge. Northeast of the footbridge, the proposed force main would make a 90-degree turn southeast to travel parallel to Pinole Creek for approximately 1,100 feet. The force main would then be routed east and would be installed parallel to the existing Union Pacific Railroad line until reaching San Pablo Avenue. The path of the proposed force main would coincide with the path of the existing force main northeast of the San Pablo Avenue–Sycamore Avenue intersection. At this point, the proposed force main would be installed parallel to the existing force main for the remainder of the route to RSD (Exhibit 2-3). For approximately 100 feet, the pipeline would follow the existing access road before entering the RSD boundary.

Pipeline Creek Crossings

Installation of the force main would requiring crossing four creeks: Pinole Creek, Ohlone Creek, Refugio Creek, and Rodeo Creek. The Pinole Creek crossing would be accomplished by suspending the new pipeline underneath the bridge next to the existing force main. For the other three creek crossings, either the pipeline would be attached to existing road crossings (e.g., suspending the pipeline over the creek) or the jack-and-bore method of horizontal directional drilling beneath the creek bed would be used.

Solids Treatment

The existing solids handling facility would be relocated. A new solids handling facility would be constructed that would thicken the waste activated sludge by using rotary drum thickeners. The thickened waste activated sludge would then be sent to the anaerobic digesters. Digested sludge would be returned from the anaerobic digesters to the solids handling facility, where it would be dewatered by centrifuge and hauled off-site to an appropriately permitted landfill.

Storm Drainage System

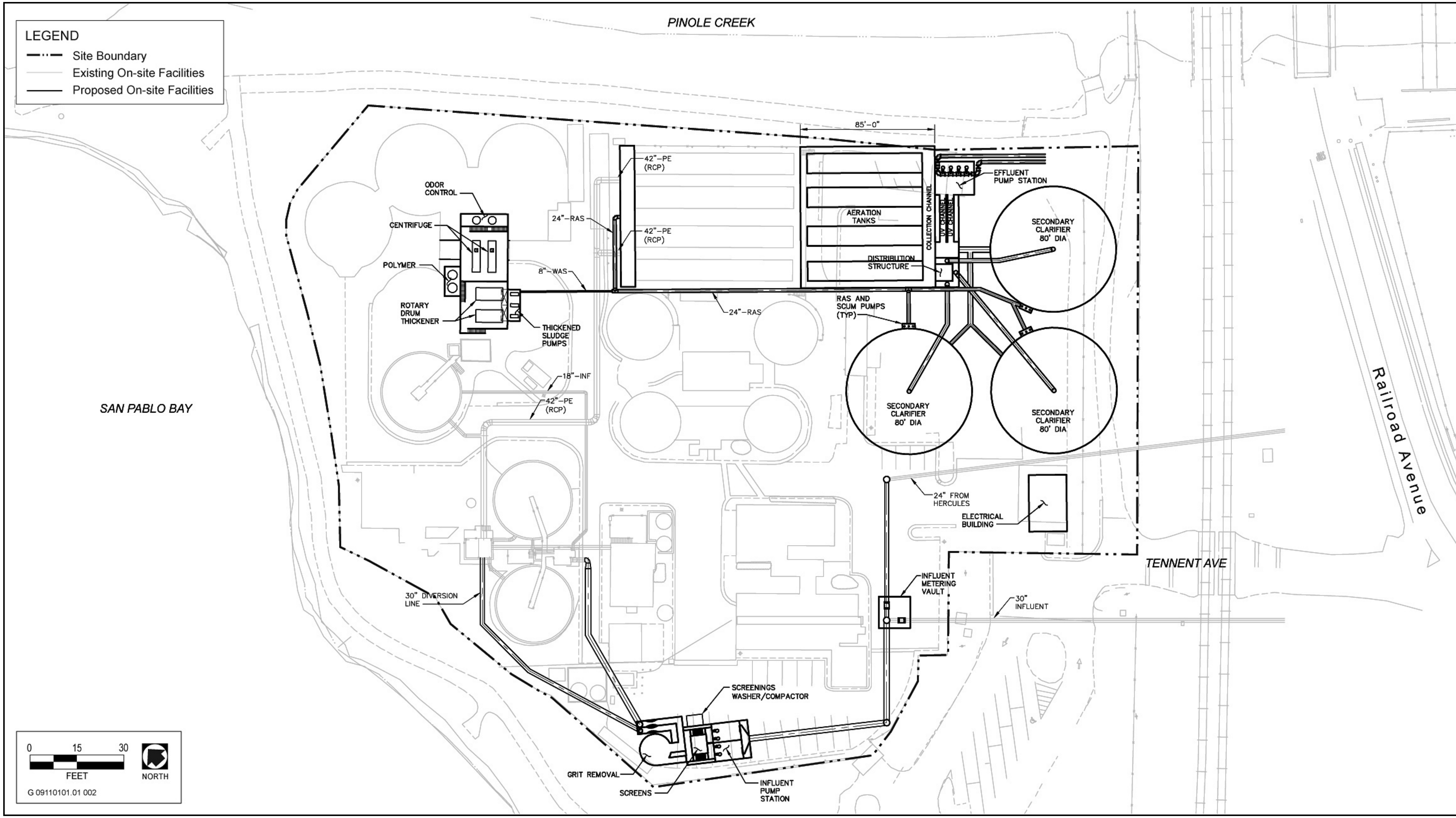
The existing storm drainage system within the WPCP facility would not change.

Energy Infrastructure

Improvements would include a new electrical service plant and distribution panels. The new electrical building would house the motor control center for the new secondary treatment facilities, the UV disinfection system, and effluent pump station.

Cogeneration Plant

The configuration of the existing cogeneration plant would not change. However, the amount of methane generated at the plant would increase, and therefore the amount of electricity and heat generated for on-site use in WPCP facilities would also increase. (See Section 3.3, "Climate Change," of this DEIR for an analysis of impacts associated with changes in methane generation and use at the plant.)



Source: Dodson-Psomas 2009

Proposed Pinole-Hercules WPCP Facility Improvements—Option 1 **Exhibit 2-4**

Corporation Yard

Because WPCP facility upgrades would require additional space within the WPCP facility boundary, the existing corporation yard would need to be relocated. The new location would be on Pinole Shores Drive, between the Union Pacific Railroad tracks and San Pablo Avenue (Exhibit 2-5). The new corporation yard would be approximately 1.22 acres and would serve the same purpose as the old yard, as discussed above under Section 2.5.2, "Existing Wastewater Collection, Treatment, and Disposal."

Easements and Rights-of Way

Installation of the proposed pipeline to RSD would require temporary or permanent easements and rights-of-way on privately and publicly owned lands. The City of Pinole and City of Hercules would work together to secure these easements and rights-of-way and would coordinate with the applicable property owner(s) and appropriate regulatory agencies before the start of construction activities.

2.6.2 Option 2: Pinole-Only Flows at Existing Plant

There is a potential that in the future, the City of Hercules could decide to send its wastewater flows to the West County Wastewater District (WCWD) water pollution control facility in Richmond. If this were to occur, the wastewater flows generated by the city of Pinole would continue to be treated at the Pinole-Hercules WPCP, which would undergo minor facility upgrades (Exhibit 2-6). Under Option 2, the City of Pinole would not seek an increase in the WPCP's permitted wet-weather capacity, because the existing permitted wet-weather capacity of the plant would be sufficient to handle the Pinole-only flows with the proposed improvements.

If the City of Hercules were to choose to send its flows to Richmond for treatment at the WCWD, the City of Hercules would be required to prepare a separate CEQA analysis to evaluate the environmental impacts of constructing the new pipeline and treating the flows at WCWD. This document is intended to provide CEQA coverage for the City of Pinole (i.e., Pinole-only flows at the existing WPCP) should the City of Hercules make this decision.

Preliminary Treatment Process

No change to the existing preliminary treatment process would be made under Option 2. The process would remain the same as described above under Section 2.5.2, "Existing Wastewater Collection, Treatment, and Disposal."

Primary Treatment Process

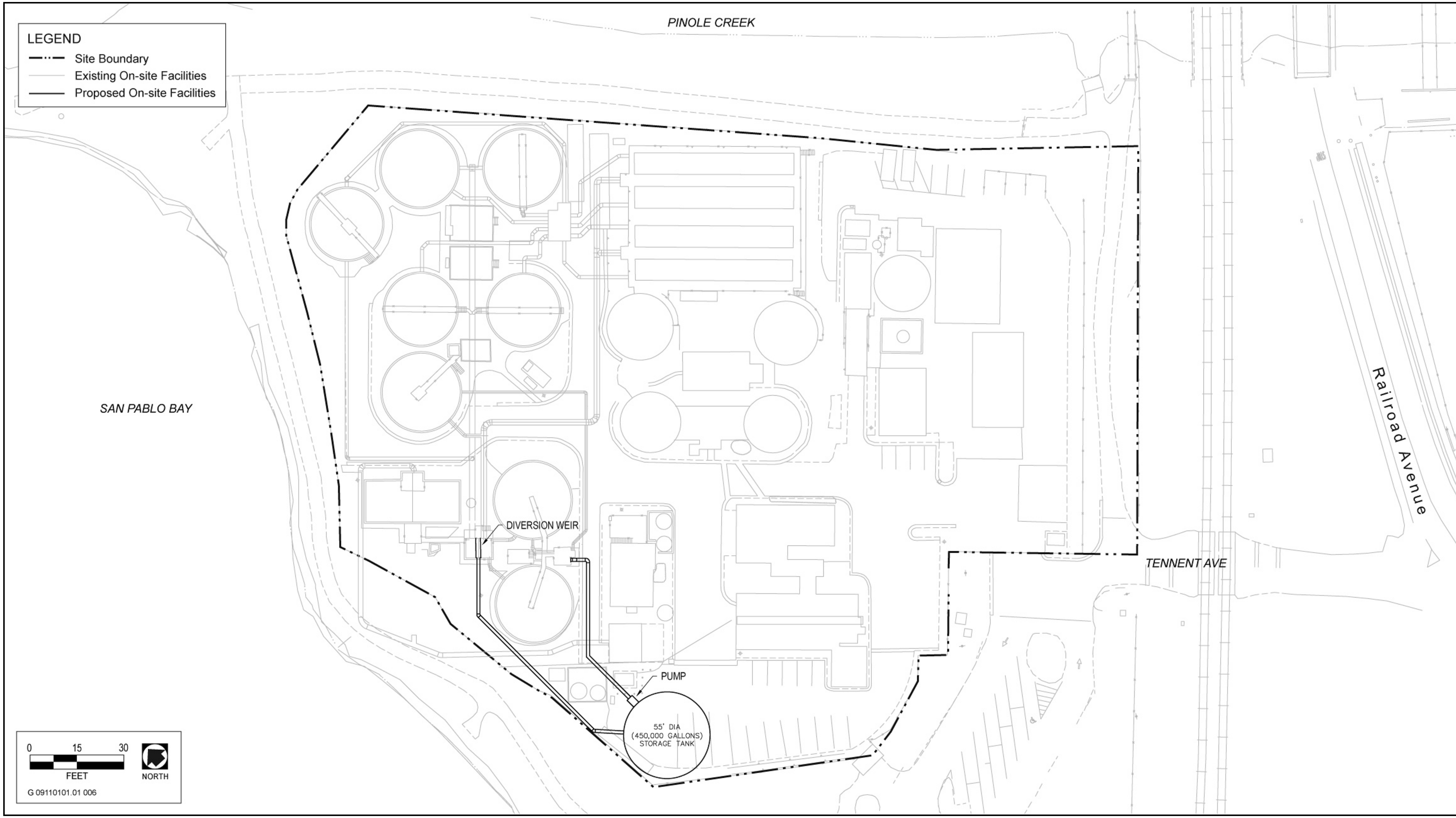
Under Option 2, modifications to the WPCP would consist of installation of a 450,000-gallon concrete storage tank (i.e., a flow equalization tank), a diversion box, pumps, 24-inch piping, and minor modifications to the primary clarifier effluent structure. The storage tank would be mostly buried, with the base located approximately 28 feet below the ground surface. Any flows above 10.3 mgd would be stored in the new tanks and returned to the treatment process when flows drop below 10.3 mgd. The storage facility would be empty except during severe storm events. During a peak storm event, the equalizing storage facility would generally be filled and emptied within a 24-hour period.

Effluent Disposal

No change to the existing effluent disposal process would be made under Option 2. Effluent disposal would remain the same as described above under Section 2.5.2, "Existing Wastewater Collection, Treatment, and Disposal."

Source: Provided by the City of Pinole in 2009

Proposed Corporation Yard—Option 1 **Exhibit 2-5**



Source: Dodson-Psomas 2009

Proposed WPCP Facility Improvements—Option 2 **Exhibit 2-6**

Pipeline Creek Crossings

No new pipeline would be built under Option 2.

Solids Treatment

No change to existing solids treatment would be made under Option 2. The solids treatment process would remain the same as described above under Section 2.5.2, “Existing Wastewater Collection, Treatment, and Disposal.”

Storm Drainage System

No change to the existing storm drainage system would be made under Option 2. The storm drainage system would remain the same as described above under Section 2.5.2, “Existing Wastewater Collection, Treatment, and Disposal.”

Energy Infrastructure

No change to existing energy infrastructure would be made under Option 2. The energy infrastructure would remain the same as described above under Section 2.5.2, “Existing Wastewater Collection, Treatment, and Disposal.”

Corporation Yard

The corporation yard would remain at its current location under Option 2.

Easements and Rights-of-Way

No easements or rights-of-way would be required under Option 2.

2.7 CONSTRUCTION EQUIPMENT, SCHEDULE, AND WORKFORCE

2.7.1 OPTION 1: NEW LARGER EFFLUENT PIPE TO RSD

Construction activities at the Pinole-Hercules WPCP would include site preparation, grading, excavation, backfilling, building construction, and installation of pipelines. Equipment typically used for construction activities includes scrapers, earthmovers, bulldozers, compactors, graders, dump trucks, delivery trucks, loaders, and jackhammers. The quantities of each type of construction equipment would vary depending on the type of project components being constructed.

Construction under the proposed Pinole-Hercules WPCP Improvement Project would require up to eight construction workers. The number of workers required is a function of the type of facilities under construction at a given time, the number of simultaneous construction jobs, and the construction schedule. Construction of the proposed facilities is expected to begin in June 2014 and last for a total of approximately 30 months (including on-site facilities, force main installation, and diffuser modifications). Construction of the pipeline would occur in phases and would take approximately 9 months. Pipeline installation would require closure of the Bay Trail for 1 day and intermittent closure of affected roadways in phases during the 9-month construction period (see Exhibit 2-3). Horizontal directional drilling associated with pipeline creek crossings and connection with existing equipment at the WPCP would likely require work during the evening hours on approximately 5 to 6 occasions during the life of the construction phase of the project.

2.7.2 OPTION 2: PINOLE-ONLY FLOWS AT EXISTING PLANT

Construction activities under Option 2 would be similar to those described above for Option 1. However, because fewer improvements would occur under Option 2, project construction would be expected to last for a total of approximately 9 months, as opposed to 30 months. Because no new force main would be built under this option, there would be no closure of the Bay Trail or any roadways.

2.8 PROPOSED WPCP OPERATIONS AFTER UPGRADES

The Pinole-Hercules WPCP Improvement Project would not require additional personnel for operation of the proposed facilities under either option.

2.9 COMMITMENTS TO REDUCE ENVIRONMENTAL IMPACTS

The City of Pinole plans to take the following actions as part of the project, under either Option 1 or Option 2, in order to reduce the potential environmental impacts of the project:

- Coordination with the Association of Bay Area Governments and East Bay Regional Park District to provide public notice and potential alternate route information regarding the closure of the Bay Trail during pipeline installation along Pinole Creek.
- Submittal of proposed trench design/street sections (for pipeline installation) to Contra Costa County Public Works Department for review and approval for portions within their jurisdiction.
- Preparation of a traffic control plan and coordination with Contra Costa County Public Works Department regarding lane closures of affected roadways (for pipeline installation) shown in Exhibit 2-3.
- Coordination with Rodeo Sanitary District for construction, and submittal of applications for appropriate permits from Contra Costa County and the City of Hercules for grading and erosion control and construction of project facilities.
- Submittal of application for an appropriate permit from the Southern Pacific Railroad to trench under railroad tracks.
- Submittal of applications for permits, right-of-ways (as necessary), easements, and leases to Caltrans, Contra Costa County, California State Lands Commission, Regional Water Quality Control Board, San Francisco Bay Conservation and Development Commission, California Department of Fish and Game, U.S. Army Corps of Engineers, and other agencies as appropriate.
- Implementation of a Storm Water Pollution Prevention Plan, Best Management Practices, and a Stormwater Control Plan (pursuant to provision C.3) in compliance with the NPDES permit.
- No construction work associated with pipeline installation would take place in the bed or bank of any stream at any of the four stream crossings. The pipeline would either be installed via suspension from an existing bridge or via jack-and-boring underneath the creeks.
- Sediments removed during excavation of the pipeline would either be used to backfill the trench or would be removed off-site to an appropriate facility; no sediments would be deposited within any body of water, jurisdictional or otherwise, along the pipeline alignment.
- The Pinole-Hercules WPCP has an existing storm drain system that routes flow back into the plant for treatment. The existing storm drain system would also accommodate the proposed improvements at the WPCP.
- Construction would generally occur during the hours of 7am - 5pm Monday through Friday, and on Saturdays during the hours of 9am – 6pm.

3.1 AIR QUALITY AND ODORS

3.1.1 ENVIRONMENTAL SETTING

The project site is located along the shoreline of San Pablo Bay in Contra Costa County, which is within the San Francisco Bay Area Air Basin (SFBAAB). The SFBAAB also includes all of Alameda, Marin, Napa, San Francisco, San Mateo, and Santa Clara Counties, as well as the southern portion of Sonoma County and the southwest portion of Solano County. Ambient concentrations of air pollutant emissions are determined by the amount of emissions released by pollutant sources and the atmosphere's ability to transport and dilute such emissions. Natural factors that affect transport and dilution include terrain, wind, atmospheric stability, and the presence of sunlight. Existing air quality conditions in the project area are determined by such natural factors as topography, meteorology, and climate, in addition to the amount of emissions released by existing air pollutant sources. The environmental factors and pollutant sources that affect ambient air pollutant concentrations are discussed separately below.

TOPOGRAPHY, METEOROLOGY, AND CLIMATE

The SFBAAB covers approximately 5,540 square miles of complex terrain consisting of coastal mountain ranges, inland valleys, and San Francisco Bay. The SFBAAB is generally bounded on the west by the Pacific Ocean, on the north by the Coast Ranges, and on the east and south by the Diablo Range.

The climate is dominated by a strong, semipermanent, subtropical high-pressure cell over the northeastern Pacific Ocean. Climate is also affected by the moderating effects of the adjacent oceanic heat reservoir. Mild summers and winters, moderate rainfall and humidity, and daytime onshore breezes characterize regional climatic conditions in the San Francisco Bay Area (Bay Area). In summer, when the high-pressure cell is strongest and farthest north, fog forms in the morning, and temperatures are mild. In winter, when the high-pressure cell is weakest and farthest south, occasional rainstorms occur.

Regional wind flow patterns affect air quality patterns by directing pollutants downwind of sources. Localized meteorological conditions, such as moderate winds, disperse pollutants and reduce pollutant concentrations. When a warm layer of air traps cooler air close to the ground, an inversion is produced that traps air pollutants near the ground. Inversions occur in the project area during summer mornings and afternoons. During summer's long daylight hours, plentiful sunshine fuels photochemical reactions between oxides of nitrogen (NO_X) and reactive organic gases (ROG) that result in ozone formation. In the winter, temperature inversions dominate during the night and early morning hours but frequently dissipate by afternoon.

The local climate of the project area is represented by measurements recorded at the station in Richmond, California. The region receives an average of 23 inches of precipitation per year, which occurs primarily during the months of October through April (WRCC 2009). Off-season rains (May through September) account for approximately 4% of the annual average. Maximum temperatures range from 57 to 74 degrees Fahrenheit (°F). Minimum temperatures range from 43° to 56°F (WRCC 2009).

EXISTING AIR QUALITY—CRITERIA AIR POLLUTANTS

The U.S. Environmental Protection Agency (EPA) and California Air Resources Board (ARB) currently focus on the following air pollutants as indicators of ambient air quality: ozone, carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter (PM), and lead. Because these are the most prevalent air pollutants known to be deleterious to human health and extensive health-effects criteria documents are available, they are commonly referred to as "criteria air pollutants."

EPA has established primary and secondary national ambient air quality standards (NAAQS) for the following criteria air pollutants: ozone, CO, NO_2, SO_2, respirable particulate matter (PM_{10}), fine particulate matter ($PM_{2.5}$), and lead. The primary standards protect the public health and the secondary standards protect public welfare. In addition, ARB has established California ambient air quality standards (CAAQS) for sulfates, hydrogen sulfide, vinyl chloride, visibility-reducing particulate matter, and the above-mentioned criteria air pollutants. In most cases the CAAQS are more stringent than the NAAQS. Differences in the standards are generally explained by the health-effects studies considered during the standard-setting process and the respective interpretation of the studies by EPA and ARB. The CAAQS incorporate an additional margin of safety to protect sensitive individuals. The NAAQS and CAAQS as discussed above are listed in Table 3.1-1.

A brief description of each criteria air pollutant including source types, health effects, and future trends is provided below.

Ozone

Ozone is a photochemical oxidant, a substance whose oxygen combines chemically with another substance in the presence of sunlight, and the primary component of smog. Ozone is not directly emitted into the air, but is formed through complex chemical reactions between precursor emissions of ROG and NO_X in the presence of sunlight. ROG are volatile organic compounds (VOCs) that are photochemically reactive. ROG emissions result primarily from incomplete combustion and the evaporation of chemical solvents and fuels. NO_X refers to a group of gaseous compounds of nitrogen and oxygen that result from the combustion of fuels. A highly reactive molecule, ozone readily combines with many different components of the atmosphere. Consequently, high levels of ozone tend to exist only while high ROG and NO_X levels are present to sustain the ozone formation process. Once the precursors have been depleted, ozone levels rapidly decline. Because these reactions occur on a regional scale, ozone is a regional pollutant. Ozone located in the upper atmosphere (stratosphere) acts in a beneficial manner by shielding the earth from harmful ultraviolet radiation emitted by the sun. However, ozone located in the lower atmosphere (troposphere) is a major health and environmental concern. Meteorology and terrain play a major role in ozone formation. Generally, low wind speeds or stagnant air coupled with warm temperatures and clear skies provide the optimum conditions for ozone formation. As a result, summer is generally the peak ozone season. Because of the reaction time involved, peak ozone concentrations often occur far downwind of the precursor emissions. In general, ozone concentrations over or near urban and rural areas reflect an interplay of emissions of ozone precursors, transport, meteorology, and atmospheric chemistry (Godish 2004).

The adverse health effects associated with exposure to ozone pertain primarily to the respiratory system. Scientific evidence indicates that ambient levels of ozone affect not only sensitive receptors, such as asthmatics and children, but healthy adults. Exposure to ambient levels of ozone ranging from 0.10 part per million (ppm) to 0.40 ppm for 1–2 hours has been found to substantially alter lung functions by increasing respiratory rates and pulmonary resistance, decreasing tidal volumes (the amount of air inhaled and exhaled), and impairing respiratory mechanics. Ambient levels of ozone above 0.12 ppm are linked to such symptoms as throat dryness, chest tightness, headache, and nausea. In addition to these adverse health effects, evidence exists relating ozone exposure to an increase in the permeability of respiratory epithelia; such increased permeability leads to an increased response of the respiratory system to challenges and a decrease in the immune system’s ability to defend against infection (Godish 2004).

In 1997, EPA promulgated a new 8-hour standard in recognition of effects resulting from daylong exposure. On April 15, 2004, EPA designated areas of the country that exceed the 8-hour standard ozone standard as nonattainment. The designations were in place as of February 2009. These designations triggered new planning requirements for the 8-hour standard.

Table 3.1-1
Summary of Ambient Air Quality Standards and Attainment Designations

Pollutant	Averaging Time	California		National Standards		
		Standards[1]	Attainment Status (SFBAAB)	Primary[2,3]	Secondary[3]	Attainment Status (SFBAAB)
Ozone	1-hour	0.09 ppm (180 $\mu g/m^3$)	N[9]	–	–	–[5]
	8-hour	0.07 ppm (137 $\mu g/m^3$)	N	0.08 ppm (157 $\mu g/m^3$)	Same as primary standard	N[4]
Carbon monoxide (CO)	1-hour	20 ppm (23 mg/m^3)	A	35 ppm (40 mg/m^3)	–	A
	8-hour	9 ppm (10 mg/m^3)	A	9 ppm (10 mg/m^3)		A[6]
Nitrogen dioxide (NO_2) [8]	Annual arithmetic mean	0.030 ppm (56 $\mu g/m^3$)	–	0.053 ppm (100 $\mu g/m^3$)	Same as primary standard	A
	1-hour	0.18 ppm (338 $\mu g/m^3$)	A	–		–
Sulfur dioxide (SO_2)	Annual arithmetic mean	–	–	0.030 ppm (80 $\mu g/m^3$)	–	A
	24-hour	0.04 ppm (105 $\mu g/m^3$)	A	0.14 ppm (365 $\mu g/m^3$)	–	A
	3-hour	–	–	–	0.5 ppm (1,300 $\mu g/m^3$)	–
	1-hour	0.25 ppm (655 $\mu g/m^3$)	A	–	–	–
Respirable particulate matter (PM_{10})	Annual arithmetic mean	20 $\mu g/m^3$	N[7]	–	Same as primary standard	–
	24-hour	50 $\mu g/m^3$	–	150 $\mu g/m^3$		U
Fine particulate matter ($PM_{2.5}$)	Annual arithmetic mean	12 $\mu g/m^3$	N	15 $\mu g/m^3$	Same as primary standard	A
	24-hour	–	–	35 $\mu g/m^3$ [10]		N
Lead [9]	30-day average	1.5 $\mu g/m^3$	A	–	–	A
	Calendar quarter	–	–	1.5 $\mu g/m^3$	Same as primary standard	–
Sulfates	24-hour	25 $\mu g/m^3$	A	No national standards		
Hydrogen sulfide	1-hour	0.03 ppm (42 $\mu g/m^3$)	U			

Table 3.1-1
Summary of Ambient Air Quality Standards and Attainment Designations

Pollutant	Averaging Time	California		National Standards		
		Standards[1]	Attainment Status (SFBAAB)	Primary[2,3]	Secondary[3]	Attainment Status (SFBAAB)
Vinyl chloride [9]	24-hour	0.01 ppm (26 µg/m³)	U/A	No national standards		
Visibility-reducing particle matter	8-hour (10:00 to 18:00 PCT)	Extinction coefficient of 0.23 per kilometer—visibility of 10 miles or more because of particles when the relative humidity is less than 70%.	U			

Notes: µg/m³ = micrograms per cubic meter; ppm = parts per million; SFBAAB = San Francisco Bay Area Air Basin.

U = Unclassified. (The data are incomplete and do not support a designation of attainment or nonattainment.)

A = Attainment. (The state standard for that pollutant was not violated at any site in the area during a 3-year period.)

N = Nonattainment. (There was at least one violation of a state standard for that pollutant in the area.)

1 California standards for ozone, carbon monoxide (except Lake Tahoe), sulfur dioxide (1-hour and 24-hour), nitrogen dioxide, suspended particulate matter (PM_{10}), and visibility-reducing particles are values that are not to be exceeded. The standards for sulfates, Lake Tahoe carbon monoxide, lead, hydrogen sulfide, and vinyl chloride are not to be equaled or exceeded. If the standard is for a 1-hour, 8-hour, or 24-hour average (i.e., all standards except for lead and the PM_{10} annual standard), then some measurements may be excluded. In particular, measurements are excluded that the California Air Resource Board (ARB) determines would occur less than once per year on the average. The Lake Tahoe carbon monoxide standard is 6.0 ppm, a level one-half the national standard and two-thirds the state standard.

2 National standards shown are the "primary standards" designed to protect public health. National standards other than for ozone, particulates, and those based on annual averages are not to be exceeded more than once a year. The 1-hour ozone standard is attained if, during the most recent 3-year period, the average number of days per year with maximum hourly concentrations above the standard is equal to or less than 1. The 8-hour ozone standard is attained when the 3-year average of the fourth highest daily concentrations is 0.075 ppm (75 parts per billion [ppb]) or less. The 24-hour PM_{10} standard is attained when the 3-year average of the 99th percentile of monitored concentrations is less than 150 µg/m³. The 24-hour $PM_{2.5}$ standard is attained when the 3-year average of 98th percentiles is less than 35 µg/m³. Except for the national particulate standards, annual standards are met if the annual average falls below the standard at every site. The national annual particulate standard for PM_{10} is met if the 3-year average falls below the standard at every site. The annual $PM_{2.5}$ standard is met if the 3-year average of annual averages spatially-averaged across officially designed clusters of sites falls below the standard.

3 National air quality standards are set by the U.S. Environmental Protection Agency (EPA) at levels determined to be protective of public health with an adequate margin of safety.

4 In June 2004, the Bay Area was designated as a marginal nonattainment area of the national 8-hour ozone standard. EPA lowered the national 8-hour ozone standard from 0.80 to 0.75 ppm (i.e., 75 ppb) effective May 27, 2008. EPA will issue final designations based on the new 0.75 ppm ozone standard by March 2010.

5 The national 1-hour ozone standard was revoked by EPA on June 15, 2005.

6 In April 1998, the Bay Area was redesignated to attainment for the national 8-hour carbon monoxide standard.

7 In June 2002, ARB established new annual standards for $PM_{2.5}$ and PM_{10}.

8 Statewide visibility-reducing particle matter standard (except Lake Tahoe Air Basin): Particles in sufficient amount to produce an extinction coefficient of 0.23 per kilometer when the relative humidity is less than 70%. This standard is intended to limit the frequency and severity of visibility impairment caused by regional haze and is equivalent to a 10-mile nominal visual range.

9 The 8-hour California ozone standard was approved by ARB on April 28, 2005, and became effective on May 17, 2006.

10 EPA lowered the 24-hour $PM_{2.5}$ standard from 65 µg/m³ to 35 µg/m³ in 2006. EPA issued attainment status designations for the 35-µg/m³ standard on December 22, 2008. EPA has designated the Bay Area as nonattainment for the 35-µg/m³ $PM_{2.5}$ standard. The EPA designation will be effective 90 days after publication of the regulation in the *Federal Register*. President Obama has ordered a freeze on all pending federal rules; therefore, the effective date of the designation is unknown at this time.

Sources: BAAQMD 2009a

Emissions of ozone precursors (i.e., ROG and NO_X) have decreased in the SFBAAB since 1975 and are projected to continue to decline through 2020 (ARB 2009a). The Bay Area has a large motor vehicle population, and the implementation of stricter motor vehicle controls has resulted in substantial reductions in NO_X and ROG emissions. Stationary-source emissions of ROG have declined over the last 20 years as a result of new controls for oil refinery fugitive emissions and new rules for control of ROG from various industrial coatings and solvent operations. Consequently, peak 1-hour and 8-hour ozone concentrations in the SFBAAB have declined by approximately 17% and 18%, respectively, in the past 20 years (1988–2007) (ARB 2009). However, it is not clear whether this reduction represents a substantial change in the overall trend because of the variability caused by meteorological conditions in the SFBAAB (ARB 2009).

Carbon Monoxide

CO is a colorless, odorless gas that is formed when carbon in fuel is not burned completely. It is a component of motor vehicle exhaust, which contributes about 56% of all CO emissions nationwide. Other nonroad engines and vehicles (such as construction equipment and boats) contribute about 22% of all CO emissions nationwide. Higher levels of CO generally occur in areas with heavy traffic congestion. In cities, 85–95% of all CO emissions may come from motor vehicle exhaust. Other sources of CO emissions include industrial processes (such as metals processing and chemical manufacturing), residential wood burning, and natural sources such as forest fires. Wood stoves, gas stoves, cigarette smoke, and unvented gas and kerosene space heaters are sources of CO indoors. The highest levels of CO in the outside air typically occur during the colder months of the year when inversion conditions are more frequent, causing the air pollution to become trapped near the ground beneath a layer of warm air (EPA 2009a).

CO enters the bloodstream through the lungs by combining with hemoglobin, which normally supplies oxygen to the cells. However, CO combines with hemoglobin much more readily than oxygen does, resulting in a drastic reduction in the amount of oxygen available to the cells. Adverse health effects associated with exposure to CO concentrations include such symptoms as dizziness, headaches, and fatigue. CO exposure is especially harmful to individuals who suffer from cardiovascular and respiratory diseases (EPA 2009a).

The highest concentrations are generally associated with cold, stagnant weather conditions that occur during the winter. In contrast to problems caused by ozone, which tends to be a regional pollutant, CO problems tend to be localized.

CO concentrations in the SFBAAB have declined substantially over the last 20 years. The peak 8-hour indicator value during 2007 is 32% of what it was during 1988 and is now well below the level of the standards. In fact, neither the national standard nor the state standard has been exceeded in this area since 1991 (ARB 2009a).

Particulate Matter

Respirable particulate matter with an aerodynamic diameter of 10 micrometers or less is referred to as PM_{10}. PM_{10} consists of particulate matter emitted directly into the air, such as fugitive dust, soot, and smoke from mobile and stationary sources; construction operations; fires and natural windblown dust; and particulate matter formed in the atmosphere by condensation and/or transformation of SO_2 and ROG (EPA 2009a). Fine particulate matter ($PM_{2.5}$) is a subgroup of PM_{10}, consisting of smaller particles that have an aerodynamic diameter of 2.5 micrometers or less (ARB 2009b).

The adverse health effects associated with PM_{10} depend on the specific composition of the particulate matter. For example, health effects may be associated with metals, polycyclic aromatic hydrocarbons (PAH), and other toxic substances adsorbed onto fine particulate matter (referred to as the “piggybacking effect”) or with fine dust particles of silica or asbestos. Generally, effects may result from both short-term and long-term exposure to elevated concentrations of PM_{10} and may include breathing and respiratory symptoms, aggravation of existing respiratory and cardiovascular diseases, alterations to the immune system, carcinogenesis, and premature death

(EPA 2009a). $PM_{2.5}$ poses an increased health risk because the particles can deposit deep in the lungs and may contain substances that are particularly harmful to human health.

Direct emissions of PM_{10} increased in the SFBAAB between 1975 and 2005 and are projected to continue increasing through 2020. This increase is the result of growth in emissions from areawide sources, primarily fugitive dust sources. Emissions of directly emitted PM_{10} from diesel motor vehicles have been decreasing since 1990 even though population and vehicle miles traveled (VMT) are growing, because of the adoption of more stringent emission standards. PM can be directly emitted into the air (primary PM) or, similar to ozone, it can be formed in the atmosphere (secondary PM) from the reaction of gaseous precursors such as NO_X, SO_X, ROG, and ammonia. The PM_{10} emission inventory includes only directly emitted particulate emissions. On an annual average basis, directly emitted PM_{10} emissions contribute approximately 75% of the ambient PM_{10} in the SFBAAB (ARB 2009a).

Nitrogen Dioxide

NO_2 is a brownish, highly reactive gas that is present in all urban environments. The major human-made sources of NO_2 are combustion devices, such as boilers, gas turbines, and mobile and stationary reciprocating internal combustion engines. Combustion devices emit primarily nitric oxide (NO), which reacts through oxidation in the atmosphere to form NO_2 (EPA 2009a). The combined emissions of NO and NO_2 are referred to as NO_X and reported as equivalent NO_2. Because NO_2 is formed and depleted by reactions associated with ozone, the NO_2 concentration in a particular geographical area may not be representative of the local NO_X emission sources.

Inhalation is the most common route of exposure to NO_2. Because NO_2 has relatively low solubility in water, the principal site of toxicity is in the lower respiratory tract. The severity of the adverse health effects depends primarily on the concentration inhaled rather than the duration of exposure. An individual may experience a variety of acute symptoms, including coughing, difficulty in breathing, vomiting, headache, and eye irritation during, or shortly after exposure. After a period of approximately 4–12 hours, an exposed individual may experience chemical pneumonitis or pulmonary edema with breathing abnormalities, cough, cyanosis, chest pain, and rapid heartbeat. Severe, symptomatic NO_2 intoxication after acute exposure has been linked on occasion with prolonged respiratory impairment with such symptoms as chronic bronchitis and decreased lung function (EPA 2009a).

Sulfur Dioxide

SO_2 is produced by such stationary sources as coal and oil combustion, steel mills, refineries, and pulp and paper mills. The major adverse health effects associated with SO_2 exposure pertain to the upper respiratory tract. SO_2 is a respiratory irritant; constriction of the bronchioles occurs with inhalation of SO_2 at 5 ppm or more. On contact with the moist mucous membranes, SO_2 produces sulfurous acid, which is a direct irritant. Concentration rather than duration of exposure is an important determinant of respiratory effects. Exposure to high SO_2 concentrations may result in edema of the lungs or glottis and respiratory paralysis.

Lead

Lead is a metal found naturally in the environment as well as in manufactured products. The major sources of lead emissions have historically been mobile and industrial sources. As a result of the phase-out of leaded gasoline (discussed in detail below), metal processing is currently the primary source of lead emissions. The highest levels of lead in air are generally found near lead smelters. Other stationary sources are waste incinerators, utilities, and lead-acid battery manufacturers.

Twenty years ago, mobile sources were the main contributor to ambient lead concentrations in the air. In the early 1970s, EPA set national regulations to gradually reduce the lead content in gasoline. In 1975, unleaded gasoline was introduced for motor vehicles equipped with catalytic converters. EPA banned the use of leaded gasoline in highway vehicles in December 1995 (EPA 2009a).

As a result of EPA's regulatory efforts to remove lead from gasoline, emissions of lead from the transportation sector have declined dramatically (by 95% between 1980 and 1999), and levels of lead in the air decreased by 94% between 1980 and 1999. Transportation sources, primarily airplanes, now contribute only 13% of lead emissions. A recent National Health and Nutrition Examination Survey reported a 78% decrease in the levels of lead in human blood between 1976 and 1991. This dramatic decline can be attributed to the move from leaded to unleaded gasoline (as well as the removal of lead from soldered cans) (EPA 2009a).

The decrease in lead emissions and ambient lead concentrations over the past 25 years is California's most dramatic success story with regard to air quality management. The rapid decrease in lead concentrations can be attributed primarily to phasing out the lead in gasoline. This phase-out began during the 1970s, and subsequent ARB regulations have virtually eliminated all lead from gasoline now sold in California. All areas of the state are currently designated as attainment for the state lead standard (EPA does not designate areas for the national lead standard). Although the ambient lead standards are no longer violated, lead emissions from stationary sources still pose "hot spot" problems in some areas. As a result, ARB identified lead as a toxic air contaminant (TAC).

Monitoring Station Data

Criteria air pollutants are monitored at several monitoring stations within the SFBAAB. In general, the ambient air-quality measurements from nearby monitoring stations are representative of the air quality in the vicinity of the project site. Table 3.1-2 summarizes the air quality data from the most recent 3 years (2006–2008). Table 3.1-2 also lists the registered concentrations and exceedances of the NAAQS and CAAQS that occurred at nearby monitoring station from 2006 through 2008. During this period, the station did not register any days above the state 1-hour or 8-hour ozone standards at the Rumrill Road station in San Pablo. The state CO and NO_2 standards were also not exceeded in any of the last 3 years at this station. The state 24-hour PM_{10} standard was exceeded on 1 measured day in 2006, none in 2007, and 3 measured days in 2008 at the Bethel Island Road station. The national 24-hour $PM_{2.5}$ standard was exceeded during 2006, 2007, and 2008 at the Treat Boulevard station in Concord.

Attainment Status

The determination of whether a region's air quality is healthful or unhealthful is made by comparing contaminant levels in ambient air samples to the NAAQS and CAAQS. Both EPA and ARB use the type of monitoring data presented above (Table 3.1-2) to designate an area's attainment status with respect to the NAAQS and CAAQS, respectively, for criteria air pollutants. The purpose of these designations is to identify areas with air quality problems and thereby initiate planning efforts for improvement. The three basic designation categories are "nonattainment," "attainment," and "unclassified." The "unclassified" designation is used in an area that cannot be classified on the basis of available information as meeting or not meeting the standards. The most recent attainment designations with respect to the SFBAAB are also shown in Table 3.1-1 for each criteria air pollutant. With respect to the NAAQS, the SFBAAB is designated as a nonattainment area for ozone, nonattainment area for $PM_{2.5}$, and as an attainment or unclassified area for all other pollutants (see Table 3.1-1). With respect to the CAAQS, the SFBAAB is currently designated as a nonattainment area for ozone, PM_{10}, and $PM_{2.5}$ and as an attainment or unclassified area for all other pollutants (see Table 3.1-1).

Existing Emissions—Contra Costa County

According to the emissions inventory for criteria air pollutants within Contra Costa County, sewage treatment generates approximately 0.1% of the ROG emissions and 0.1% of NO_X emissions generated in Contra Costa County and sewage treatment is not responsible for any of the emissions of PM_{10} and $PM_{2.5}$ in Contra Costa County (ARB 2009d).

Table 3.1-2
Summary of Annual Ambient Air Quality Data (2006-2008)

Pollutant	2006	2007	2008
OZONE (Rumrill Road station in San Pablo, California)			
Maximum concentration (1-hour/8-hour, ppm)	0.061/0.050	0.074/0.051	0.063/0.066
Number of days state standard exceeded (1-hour/8-hour)	0/0	0/0	0/0
Number of days national standard exceeded (1-hour/8-hour)[a]	0.0/0	0.0/0	0.0/0
CARBON MONOXIDE (CO) (Rumrill Road station in San Pablo, California)			
Maximum concentration (1-hour/8-hour, ppm)	2.4/1.40	2.4/1.23	2.5/1.30
Number of days state standard exceeded (8-hour)	0	0	0
Number of days national standard exceeded (1-hour/8-hour)	0/0	0/0	0/0
NITROGEN DIOXIDE (NO_2) (Rumrill Road station in San Pablo, California)			
Maximum concentration (1-hour, ppm)	0.055	0.052	0.067
Number of days state standard exceeded	0	0	0
Annual average (ppm)	0.013	0.012	0.012
SULFUR DIOXIDE (SO_2) (Kendall Avenue in Crockett, California)			
Maximum concentration (24-hour, ppm)	0.008	0.010	0.014
Number of days state standard exceeded	0	0	0
Number of days national standard exceeded	0	0	0
FINE PARTICULATE MATTER ($PM_{2.5}$) (Treat Boulevard in Concord, California)			
Maximum 24-hour concentration ($\mu g/m^3$) (National)	62.1	56.2	60.3
Number of days national standard exceeded (measured/calculated[c])	5/5.5	7/7.1	3/7.0
State annual average ($\mu g/m^3$) (National/California)	9.3	8.3	9.3
RESPIRABLE PARTICULATE MATTER (PM_{10}) (Bethel Island Road)			
Maximum concentration ($\mu g/m^3$) (National/California[b])	82.1/84.3	46.7/49.4	78.2/77.0
Number of days state standard exceeded (measured/calculated[c])	1/6.1	0/0.0	3/18.3
Number of days national standard exceeded (measured/calculated[c])	0/0.0	0/0.0	0/0.0
State annual average ($\mu g/m^3$) (National/California)	22.9	21.9	2.00

Notes: $\mu g/m^3$ = micrograms per cubic meter; ppm = parts per million

[a] The 1-hour national ozone standard was revoked on June 15, 2005. Statistics for the 1-hour national ozone standard are shown for informational purposes.

[b] National and state statistics may differ for the following reasons: State statistics are based on California-approved samplers, whereas national statistics are based on samplers using federal reference or equivalent methods. National and state statistics may therefore be based on different samplers. State statistics are based on local conditions while national statistics are based on standard conditions. State criteria for ensuring that data are sufficiently complete for calculating valid annual averages are more stringent than the national criteria.

[c] Measured days are those days that an actual measurement was greater than the level of the state daily standard or the national daily standard. Measurements are typically collected every 6 days. Calculated days are the estimated number of days that a measurement would have been greater than the level of the standard had measurements been collected every day. The number of days above the standard is not necessarily the number of violations of the standard for the year.

Sources: ARB 2009c, EPA 2009b

Sensitive Receptors

Sensitive land uses, or sensitive receptors, are people or facilities that generally house people that may experience adverse effects from unhealthful concentrations of air pollutants. Commonly identified sensitive land uses are residences, schools, playgrounds, childcare centers, retirement homes or convalescent homes, hospitals, and clinics.

The closest sensitive receptors to the Pinole-Hercules Water Pollution Control Plant (WPCP) are the single-family homes located approximately 500 feet southeast of the site across the railroad tracks, and approximately 500 feet northeast of the Pinole-Hercules WPCP site adjacent to Pinole Creek. People recreating in Bayfront Park, which is located south of the WPCP, may also be considered sensitive receptors to air quality. The new effluent pipeline to the Rodeo Sanitary District Wastewater Treatment Plant (RSD) would also be near homes located along the north side of Pinole Creek, as well as neighborhoods along portions of Parker Avenue, Railroad Avenue, San Pablo Avenue, Cardoza Drive, and Calais Drive. The closest sensitive receptors to the proposed corporation yard are in a residential community located approximately 250 feet to the northwest along Dohermann Lane and west of Pinole Shores Drive.

EXISTING AIR QUALITY—TOXIC AIR CONTAMINANTS

Concentrations of TACs, or in federal terminology hazardous air pollutants (HAPs), are also used as indicators of ambient air quality conditions. A TAC is defined as an air pollutant that may cause or contribute to an increase in mortality or in serious illness, or that may pose a hazard to human health. TACs are usually present in minute quantities in the ambient air; however, their high toxicity or health risk may pose a threat to public health even at low concentrations. In general, for those TACs that may cause cancer, there is no concentration that does not present some risk. In other words, there is no threshold level below which adverse health impacts may not be expected to occur. This contrasts with the criteria air pollutants for which acceptable levels of exposure can be determined and for which the ambient standards have been established (Table 3.1-1).

According to the *California Almanac of Emissions and Air Quality* (ARB 2009a:5-59), the majority of the estimated health risk from TACs is attributed to relatively few compounds, the most dominant being PM exhaust from diesel-fueled engines (diesel PM). Diesel PM differs from other TACs in that it is not a single substance, but rather a complex mixture of hundreds of substances. Although diesel PM is emitted by diesel-fueled internal combustion engines, the composition of the emissions varies depending on engine type, operating conditions, fuel composition, lubricating oil, and whether an emission control system is present.

Unlike some other TACs, no ambient monitoring data are available for diesel PM because no routine measurement method for diesel PM currently exists. However, ARB has made preliminary concentration estimates based on a PM exposure method. This method uses the ARB emissions inventory's PM_{10} database, ambient PM_{10} monitoring data, and the results from several studies on chemical speciation to estimate concentrations of diesel PM. In addition to diesel PM, benzene, 1, 3-butadiene, acetaldehyde, carbon tetrachloride, hexavalent chromium, *para*-dichlorobenzene, formaldehyde, methylene chloride, and perchloroethylene are the TACs for which data are available that pose the greatest existing ambient risk in California. (ARB 2009a:5-2).

Diesel PM poses the greatest health risk among these 10 TACs. Based on receptor modeling techniques, ARB estimated the diesel PM health risk in the SFBAAB in 2000 to be 480 excess cancer cases per million people, which is higher than any other TAC. The health risk associated with diesel PM decreased by 36% from 1990 to 2000. Overall, levels of all monitored TACs, except para-dichlorobenzene, have decreased since 1990 (ARB 2009a:5-59 to 5-60).

EXISTING AIR QUALITY—ODORS

Typically odors are regarded as an annoyance rather than a health hazard. However, manifestations of a person's reaction to foul odors can range from psychological (e.g., irritation, anger, or anxiety) to physiological (e.g., circulatory and respiratory effects, nausea, vomiting, and headache).

With respect to odors, the human nose is the sole sensing device. The ability to detect odors varies considerably among the population and overall is quite subjective. Some individuals have the ability to smell minute quantities of specific substances; others may not have the same sensitivity but may have sensitivities to odors of other substances. In addition, people may have different reactions to the same odor; in fact, an odor that is offensive to one person (e.g., from a fast-food restaurant) may be perfectly acceptable to another. It is also important to note that an unfamiliar odor is more easily detected and is more likely to cause complaints than a familiar one. This is because of the phenomenon known as odor fatigue, in which a person can become desensitized to almost any odor and recognition only occurs with an alteration in the intensity.

Quality and intensity are two properties present in any odor. The quality of an odor indicates the nature of the smell experience. For instance, if a person describes an odor as flowery or sweet, then the person is describing the quality of the odor. Intensity refers to the strength of the odor. For example, a person may use the word "strong" to describe the intensity of an odor. Odor intensity depends on the odorant concentration in the air. When an odorous sample is progressively diluted, the odorant concentration decreases. As this occurs, the odor intensity weakens and eventually becomes so low that the detection or recognition of the odor is quite difficult. At some point during dilution, the concentration of the odorant reaches a detection threshold. An odorant concentration below the detection threshold means that the concentration in the air is not detectable by the average human.

As stated above, the existing Pinole-Hercules WPCP triggered four confirmed complaints in 2008, 11 complaints in 2007, and 40 complaints in 2006 (Tholen, pers. comm., 2008).

3.1.2 REGULATORY FRAMEWORK

Air quality within the SFBAAB is addressed through the efforts of various federal, state, regional, and local government agencies. These agencies work jointly and individually to improve air quality through legislation, regulations, planning, policy making, education, and a variety of programs. The agencies primarily responsible for improving the air quality within the SFBAAB are discussed below.

CRITERIA AIR POLLUTANTS

Federal Plans, Policies, Regulations, and Laws

At the federal level, EPA has been charged with implementing national air quality programs. EPA's air quality mandates are drawn primarily from the federal Clean Air Act (CAA), which was enacted in 1970. The most recent major amendments made by Congress were in 1990.

The CAA required EPA to establish primary and secondary NAAQS (Table 3.1-1). The CAA also required each state to prepare an air quality control plan referred to as a state implementation plan (SIP). The federal Clean Air Act Amendments of 1990 (CAAA) added requirements for states with nonattainment areas to revise their SIPs to incorporate additional control measures to reduce air pollution. The SIP is modified periodically to reflect the latest emissions inventories, planning documents, and rules and regulations of the air basins as reported by their jurisdictional agencies. EPA is responsible for reviewing all state SIPs to determine conformation to the mandates of the CAAA and to determine whether implementation will achieve air quality goals. If EPA determines a SIP is inadequate, a federal implementation plan (FIP) that imposes additional control measures may be prepared for the nonattainment area. Failure to submit an approvable SIP or to implement the plan within the mandated timeframe may result in application of sanctions to transportation funding and stationary air pollution sources in the air basin.

In addition, general conformity requirements were adopted by Congress as part of the CAAA and were implemented by EPA regulations in 1993. General conformity requires that all federal actions conform to the SIP as approved or promulgated by EPA. The purpose of the general conformity program is to ensure that actions taken by the federal government do not undermine state or local efforts to achieve and maintain NAAQS. Before a federal action is taken, it must be evaluated for conformity with the SIP. All reasonably foreseeable emissions, both direct and indirect, predicted to result from the action are taken into consideration and must be identified as to location and quantity. If it is found that the action would create emissions above *de minimis* threshold levels specified in EPA regulations, or if the activity is considered regionally significant because its emissions exceed 10% of an area's total emissions, the action cannot proceed unless mitigation measures are specified that would bring the project into conformance.

General conformity applies in both federal nonattainment and maintenance areas. Within these areas, it applies to any federal action not specifically exempted by the CAA or EPA regulations. Emissions from construction activities are also included. General conformity does not apply to projects or actions that are covered by the transportation conformity rule. If a federal action falls under the general conformity rule, the federal agency responsible for the action is responsible for making the conformity determination. In some instances, a state will make the conformity determination under delegation from a federal agency. Private developers are not responsible for making a conformity determination, but can be directly affected by a determination. General conformity with respect to the project will be determined before the record of decision is signed.

State Plans, Policies, Regulations, and Laws

ARB is the agency responsible for coordination and oversight of state and local air pollution control programs in California and for implementing the California Clean Air Act (CCAA). The CCAA, which was adopted in 1988, required ARB to establish the CAAQS (Table 3.1-1).

The CCAA requires that all local air districts in the state endeavor to achieve and maintain the CAAQS by the earliest practical date. The act specifies that local air districts should focus particular attention on reducing the emissions from transportation and areawide emission sources, and provides districts with the authority to regulate indirect sources.

Among ARB's other responsibilities are overseeing local air district compliance with California and federal laws, approving local air quality plans, submitting SIPs to EPA, monitoring air quality, determining and updating area designations and maps, and setting emissions standards for new mobile sources, consumer products, small utility engines, off-road vehicles, and fuels.

ARB and local air pollution control districts are currently developing plans for meeting new national air quality standards for ozone and $PM_{2.5}$. California's adopted 2007 state strategy was submitted to EPA as a revision to the SIP in November 2007 (ARB 2008).

Regional and Local Plans, Policies, Regulations, and Laws

Bay Area Air Quality Management District

Overview

The Bay Area Air Quality Management District (BAAQMD) attains and maintains air quality conditions in the SFBAAB through a comprehensive program of planning, regulation, enforcement, technical innovation, and promotion of the understanding of air quality issues. The clean-air strategy of the BAAQMD includes the preparation of plans for the attainment of ambient air quality standards, adoption and enforcement of rules and regulations concerning sources of air pollution, and issuance of permits for stationary sources of air pollution. BAAQMD also inspects stationary sources of air pollution and responds to citizen complaints, monitors ambient air quality and meteorological conditions, and implements programs and regulations required by the CAA, CAAA, and the CCAA.

In addition, BAAQMD provides guidance for analyzing impacts on air quality in the context of CEQA. The present version of BAAQMD's *CEQA Guidelines: Assessing the Air Quality Impacts of Projects and Plans* (BAAQMD 1999) was released in December 1999. This is an advisory document that provides lead agencies, consultants, and project applicants with uniform procedures for addressing air quality in environmental documents. BAAQMD is currently developing a new version of its guide, which will be presented to BAAQMD's board of directors in early 2010. A draft of the new version is presently available for public review (BAAQMD 2009b). The new version of the guide includes new proposed thresholds of significance, updated methodologies for evaluating potential impacts, and a refined list of recommended mitigation measures. Both the present version and the draft new version of the guide contain the following applicable components:

- criteria and thresholds for determining whether a project may have a significant adverse air quality impact;
- specific procedures and modeling protocols for quantifying and analyzing air quality impacts;
- methods available to mitigate air quality impacts; and
- information for use in air quality assessments and EIRs that will be updated more frequently such as air quality data, regulatory setting, climate, and topography.

As mentioned above, BAAQMD adopts rules and regulations. All projects are subject to BAAQMD rules and regulations in effect at the time of construction. The following are among the specific rules that may be applicable to the construction of the Pinole-Hercules WPCP Improvement Project:

- **Regulation 2: Permits.** Any project that includes the use of equipment capable of releasing emissions to the atmosphere may require permit(s) from BAAQMD before equipment operation. The applicant, developer, or operator of a project that includes an emergency generator, boiler, or heater should contact BAAQMD early to determine whether a permit is required, and to begin the permit application process. Portable construction equipment (e.g., generators, compressors, pile drivers, lighting equipment) with an internal combustion engine over 50 horsepower (hp) are required to have a BAAQMD permit or ARB portable equipment registration.
- **Regulation 2, Rule 2: New Source Review.** This rule applies to new or modified sources of emissions. Rule 2 contains requirements for best available control technology and emission offsets. Rule 2 also implements federal new-source review and requirements for prevention of significant deterioration.
- **Regulation 2, Rule 3: Power Plants.** This rule contains special provisions for the review of and standards for the approval of authorities to construct power plants within the SFBAAB.
- **Regulation 2, Rule 5: New Source Review of Toxic Air Contaminants.** This rule applies preconstruction permit review to new and modified sources of TACs; contains project health risk limits and requirements for toxics best available control technology.
- **Regulation 7: Odorous Substances.** This rule establishes general limitations on odorous substances and specific emission limitations on certain odorous compounds.
- **Regulation 9, Rule 1: Sulfur Dioxide.** This rule establishes emission limits for SO_2 from all sources and limits ground level concentrations of SO_2.
- **Regulation 9, Rule 2: Hydrogen Sulfide.** This rule limits ground-level concentrations of hydrogen sulfide.

In addition, BAAQMD is responsible for limiting the amount of emissions that can be generated throughout the SFBAAB by stationary sources. Specific rules and regulations have been adopted that limit emissions that can be generated by various uses and/or activities and identify specific pollution reduction measures that must be implemented in association with various uses and activities. These rules regulate not only the emissions of the state and federal criteria pollutants, but also the emissions of TACs.

In general, all stationary sources with air emissions are subject to BAAQMD's rules governing their operational emissions. Some emissions sources are further subject to regulation through BAAQMD's permitting process. Through this permitting process, BAAQMD also monitors the amount of stationary emissions being generated and uses this information in its air quality plans for the SFBAAB. For instance, the cogeneration plant at the existing Pinole-Hercules WPCP has received a permit to operate from BAAQMD (Permit No. 1194).

Air Quality Plans

BAAQMD periodically prepares and updates plans to achieve the goal of healthy air. Typically, a plan will analyze emissions inventories (estimates of current and future emissions from industry, motor vehicles, and other sources) and combine that information with air monitoring data (used to assess progress in improving air quality) and computer modeling simulations to test future strategies to reduce emissions in order to achieve air quality standards. Air quality plans usually include measures to reduce air pollutant emissions from industrial facilities, commercial processes, motor vehicles, and other sources. Air quality plans for the SFBAAB are prepared with the cooperation of the Metropolitan Transportation Commission (MTC) and the Association of Bay Area Governments (ABAG).

Bay Area 2005 Ozone Strategy

BAAQMD prepared the *Bay Area 2005 Ozone Strategy* (2005 Ozone Strategy) in cooperation with MTC and ABAG (BAAQMD 2006). The 2005 Ozone Strategy is a road map showing how the SFBAAB will achieve compliance with the California 1-hour air quality standard for ozone as expeditiously as practicable and how the region will reduce transport of ozone and ozone precursors to neighboring air basins.

Although ozone conditions in the SFBAAB have improved substantially over the years, there is still a need for continued improvement to meet the California 1-hour ozone standard. Accordingly, the 2005 Ozone Strategy describes how the Bay Area will fulfill CCAA planning requirements for the California 1-hour ozone standard and transport mitigation requirements through the proposed control strategy. The control strategy includes stationary-source control measures to be implemented through BAAQMD regulations; mobile-source control measures to be implemented through incentive programs and other activities; and transportation control measures to be implemented through transportation programs in cooperation with MTC, local governments, transit agencies, and others. BAAQMD will continue to adopt regulations, implement programs, and work cooperatively with other agencies, organizations, and the public on a wide variety of strategies to improve air quality in the region and reduce transport to neighboring air basins.

The 2005 Ozone Strategy explains how the Bay Area plans to achieve these goals with regard to ozone, and also discusses related air quality issues of interest including BAAQMD's public involvement process, climate change, $PM_{2.5}$, BAAQMD's Community Air Risk Evaluation Program, local benefits of ozone control measures, the environmental review process, national ozone standards, and photochemical modeling.

Particulate Matter Planning

BAAQMD has adopted a PM implementation schedule in accordance with the requirements of Senate Bill (SB) 656. In 2003 the California Legislature enacted SB 656, codified as Health and Safety Code Section 39614. This legislation seeks to reduce public exposure to PM_{10} and $PM_{2.5}$ and to make progress toward attainment of NAAQS and CAAQS for PM_{10} and $PM_{2.5}$. SB 656 required ARB, in consultation with local air quality districts, to develop and adopt a list of the most readily available, feasible, and cost-effective control measures that could be used by

ARB and air districts to reduce PM emissions. SB 656 required the ARB and air districts to adopt implementation schedules for appropriate ARB and air district measures.

To comply with SB 656, BAAQMD reviewed the list of 103 potential PM control measures prepared by ARB and developed a PM implementation schedule, which was adopted by BAAQMD's board of directors on November 16, 2005.

2009 Clean Air Plan

BAAQMD has begun the process to prepare the *2009 Bay Area Clean Air Plan*, which will:

- update the 2005 Ozone Strategy in accordance with the requirements of the CCAA to implement "all feasible measures" to reduce ozone;
- consider the impacts of ozone control measures on emissions of PM, air toxics, and greenhouse gases in a single, integrated plan;
- review progress in improving air quality in recent years; and
- establish emissions control measures to be adopted or implemented in the 2009–2012 time frame.

Contra Costa County General Plan 2005–2020

The following goals and policies of the *Contra Costa County General Plan 2005–2020* (Contra Costa County 2005) regarding air quality are applicable to the project.

Air Resources Goals

- **Goal 8-AA:** To meet Federal Air Quality Standards for all air pollutants.
- **Goal 8-AB:** To continue to support Federal, State, and regional efforts to reduce air pollution in order to protect human and environmental health.
- **Goal 8-AC:** To restore air quality in the area to a more healthful level.
- **Goal 8-AD:** To reduce the percentage of Average Daily Traffic (ADT) trips occurring at peak hours.

Air Resources Policies

- **Policy 8-100:** Vehicular emissions shall be reduced throughout the County.
- **Policy 8-103:** When there is a finding that a proposed project might significantly affect air quality, appropriate mitigation measures shall be imposed.
- **Policy 8-104:** Proposed project shall be reviewed for their potential to generate hazardous air pollutants.
- **Policy 8-105:** Land uses which are sensitive to air pollution shall be separated from sources of air pollution.

City of Pinole General Plan

The following goal and policy of the *City of Pinole General Plan* (City of Pinole 1995) regarding air quality are applicable to the project.

- **Goal OS1.6 (Air Quality):** Strive to achieve federal and state air quality standards by managing locally generated pollutants, coordinating with other jurisdictions and implementing measures to reduce automobile trips in Pinole and the region.
  - **Policy OS1P-2O:** Primary implementing programs and air quality strategies.

City of Hercules General Plan

The following objective, policy, and programs from the *Hercules General Plan* (City of Hercules 1998) regarding air quality are applicable to the project.

Objective 11: Improve air quality within the community.

- **Policy 11a:** Development within the City shall be conditioned to reduce air quality impacts during construction and subsequent operation.
  - **Program 11a.1:** Coordinate with the BAAQMD in planning future growth, implementing regional transportation plans and trip reduction measures, and controlling stationary source emissions. Incorporate the recommendation of the BAAQMD in General Plan policies and directing for regional growth and development.
  - **Program 11b.1:** Implement a dust abatement program for new development including the following dust control measures:
    - i) Sprinkle all construction areas with water (recycled when possible) at least twice a day during excavation and other ground-preparing operations, to reduce fugitive dust emissions. Wetting could reduce particulate (dust) emission by up to 50 percent.
    - ii) Cover stockpiles of sand, soil, and similar materials, or surround them with windbreaks. This measure will substantially reduce wind erosion of stockpiled materials during demolition, and construction, reducing the potential of the project to contribute to excessive suspended particulate (dust) concentrations when the wind exceeded 10 miles per hour.
    - iii) Cover trucks hauling dirt and debris to reduce spillage onto paved surfaces.
    - iv) Post signs that limit vehicle speeds on unpaved roads and over disturbed soils to 10 miles per hour during construction.
    - v) Use canvas drapes to enclose building floors during the application of mineral-based fiber insulation to structural steel frames.
    - vi) Sweep up dirt and debris spilled on paved surfaces immediately to reduce re-suspension of particulate matter through vehicle movement over those surfaces.
    - vii) Require the construction contractor to designate a person or persons to oversee the implementation of a comprehensive dust control program to increase watering, as necessary.

viii) Require construction contractors to maintain and operate construction equipment so as to minimize exhaust emissions. All internal combustion engines shall be kept well-tune with regular and periodic inspection and maintenance checks to minimize exhaust emissions. During construction, trucks and equipment shall be running only when necessary.

- **Program 11b.1:** Require that construction of large projects be timed to avoid significant periods of overlap.

TOXIC AIR CONTAMINANTS

It is important to understand that TACs are not considered criteria air pollutants and thus are not specifically addressed through the setting of ambient air quality standards. Instead, EPA and ARB regulate HAPs and TACs, respectively, through statutes and regulations that generally require the use of the maximum available control technology (MACT) or best available control technology (BACT) to limit emissions. These in conjunction with additional rules set forth by BAAQMD establish the regulatory framework for TACs.

Federal Plans, Policies, Regulations, and Laws

EPA has programs for identifying and regulating HAPs. Title III of the CAAA directed EPA to promulgate national emissions standards for HAPs (NESHAP). The NESHAP for major sources of HAPs may differ from those for area sources. Major sources are defined as stationary sources with potential to emit more than 10 tons per year (TPY) of any HAP or more than 25 TPY of any combination of HAPs; all other sources are considered area sources.

The CAAA called on EPA to promulgate emissions standards in two phases. In the first phase (1992–2000), EPA developed technology-based emissions standards designed to reduce emissions as much as feasible. These standards are generally referred to as requiring MACT. For area sources, the standards may be different, based on generally available control technology. In the second phase, EPA promulgated health risk–based emissions standards deemed necessary to address risks remaining after implementation of the technology-based NESHAP standards.

The CAAA also required EPA to promulgate vehicle or fuel standards containing reasonable requirements that control toxic emissions of, at a minimum, benzene and formaldehyde. Performance criteria were established to limit mobile-source emissions of benzene, formaldehyde, and 1,3-butadiene. In addition, Section 219 of the CAAA required the use of reformulated gasoline in selected areas with the most severe ozone nonattainment conditions to further reduce mobile-source emissions.

State, Regional, and Local Plans, Policies, Regulations, and Laws

TACs in California are regulated primarily through the Tanner Air Toxics Act (Assembly Bill [AB] 1807 [Chapter 1047, Statutes of 1983]) and the Air Toxics Hot Spots Information and Assessment Act (AB 2588 [Chapter 1252, Statutes of 1987]). AB 1807 sets forth a formal procedure for ARB to designate substances as TACs. Research, public participation, and scientific peer review must occur before ARB can designate a substance as a TAC. To date, ARB has identified more than 21 TACs and adopted EPA's list of HAPs as TACs. Most recently, particulate matter emissions from diesel exhaust (diesel PM) was added to the ARB list of TACs.

After a TAC is identified, ARB then adopts an airborne toxics control measure (ATCM) for sources that emit that particular TAC. If there is a safe threshold for a substance at which there is no toxic effect, the control measure must reduce exposure below that threshold. If there is no safe threshold, the measure must incorporate BACT to minimize emissions; for example, the ATCM limits truck idling to 5 minutes (Title 13, Section 2485 of the California Code of Regulations).

The Air Toxics Hot Spots Information and Assessment Act requires that existing facilities that emit toxic substances above a specified level prepare an inventory of toxic emissions, prepare a risk assessment if emissions are substantial, notify the public of substantial risk levels, and prepare and implement risk reduction measures.

ARB has adopted control measures for diesel PM and more stringent emissions standards for various on-road mobile sources of emissions, including transit buses and off-road diesel equipment (e.g., tractors, generators). In February 2000, ARB adopted a new rule for public-transit bus fleets and emissions standards for new urban buses. These new rules and standards include all the following elements:

- more stringent emission standards for some new urban bus engines, beginning with 2002 model year engines;
- zero-emission bus demonstration and purchase requirements applicable to transit agencies; and
- reporting requirements, under which transit agencies must demonstrate compliance with the public-transit bus fleet rule.

Recent and future milestones include the low-sulfur diesel fuel requirement and tighter emissions standards for heavy-duty diesel trucks (2007) and off-road diesel equipment (2011) nationwide. Over time, replacing older vehicles will result in a vehicle fleet that produces substantially lower levels of TACs than under current conditions. Mobile-source emissions of TACs (e.g., benzene, 1,3-butadiene, diesel PM) have been reduced substantially over the last decade and will be reduced further in California through a progression of regulatory measures (e.g., Low Emission Vehicle/Clean Fuels and Phase II reformulated gasoline regulations) and control technologies. With implementation of ARB's risk reduction plan, it is expected that diesel PM concentrations will be reduced by 75% in 2010 and 85% in 2020 from the estimated year-2000 level. Adopted regulations are also expected to continue to reduce formaldehyde emissions from cars and light-duty trucks. As emissions are reduced, it is expected that risks associated with exposure to the emissions will also be reduced.

In addition, the *Air Quality and Land Use Handbook: A Community Health Perspective*, published by ARB, provides guidance on land use compatibility with sources of TACs (ARB 2005). The handbook is not a law or adopted policy but offers advisory recommendations for the siting of sensitive receptors near uses associated with TACs, such as freeways and high-traffic roads, commercial distribution centers, rail yards, ports, refineries, dry cleaners, gasoline stations, and industrial facilities, to help keep children and other sensitive populations out of harm's way.

At the local level, air pollution control or management districts may adopt and enforce ARB control measures. Under BAAQMD Rule 2-1 (General Permit Requirements), Rule 2-2 (New Source Review), and Rule 2-5 (New Source Review of Toxic Air Contaminants), all sources that have the potential to emit TACs are required to obtain permits from BAAQMD. Permits may be granted if the sources are constructed and operated in accordance with applicable regulations, including new-source-review standards and air toxics control measures. BAAQMD limits emissions and public exposure to TACs through a number of programs and prioritizes TAC-emitting stationary sources based on the quantity and toxicity of the TAC emissions and the proximity of the facilities to sensitive receptors.

Sources that require a permit are analyzed by BAAQMD (e.g., health risk assessment) based on their potential to emit toxics. If it is determined that the project would emit toxics in excess of BAAQMD's threshold of significance for TACs (identified below), sources have to implement the BACT for TACs (T-BACT) to reduce emissions. If a source cannot reduce the risk below the threshold of significance even after T-BACT has been implemented, BAAQMD will deny the permit required by the source. This helps to prevent new problems and reduces emissions from existing older sources by requiring them to apply new technology for controlling TACs when retrofitting emissions sources. It is important to note that the air quality permitting process applies only to stationary sources; properties that may be exposed to elevated levels of TACs from nonstationary sources (e.g., high traffic-volume roadways, truck yards) and the nonstationary sources themselves are not subject to this process or to any requirements of T-BACT implementation. Rather, emissions controls on nonstationary sources are subject to regulations implemented on the state and federal level by ARB and EPA, respectively.

ODORS

Odors are typically considered a local air quality problem. EPA has not established regulations that deal with the generation of odors. However, local air districts have developed rules that apply to and regulate the generation of odors. As shown in the BAAQMD Rules and Regulations (Regulation 7), the air district enforces rules that pertain to odors.

3.1.3 ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

THRESHOLDS OF SIGNIFICANCE

The thresholds for determining the significance of impacts for this analysis are based on the environmental checklist in Appendix G of the State CEQA Guidelines and guidance from BAAQMD. The project was determined to result in a significant impact related to air quality if it would do in any of the following:

- conflict with, or obstruct implementation of, the applicable air quality plan;
- violate any air quality standard or contribute substantially to an existing or projected air quality violation;
- result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal, state, or regional ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors);
- expose sensitive receptors to substantial pollutant concentrations; or
- create objectionable odors affecting a substantial number of people.

As stated in Appendix G, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the above determinations. Thus, in accordance with the thresholds of significance outlined in the currently adopted *BAAQMD CEQA Guidelines* (BAAQMD 1999), the project would result in a significant impact on air quality if:

- BAAQMD-recommended control measures are not incorporated into project design or would not be implemented during project construction;
- long-term operational (regional) emissions of ROG, NO_X, or PM_{10} would exceed the BAAQMD-recommended mass emissions threshold of 80 pounds per day (lb/day);
- long-term operational (local) mobile-source emissions of CO would violate or contribute substantially to a violation of the NAAQS or CAAQS;
- sensitive receptors would be exposed to a substantial incremental increase in TAC emissions (e.g., stationary- or mobile-source) exceeding 10 chances per million for excess cancer risk and/or a hazard index of 1 for noncancer risk at the maximally exposed individual; or
- sensitive receptors would be located near an existing odor source where one confirmed complaint per year averaged over a 3-year period, or three unconfirmed complaints per year averaged over a 3-year period, have been documented by existing receptors as close to the odor source as the project. (If there is currently no nearby development, or for proposed odor sources near existing receptors, this significance criterion considers complaints generated by existing receptors near a similar facility, considering distance, frequency, and odor control.)

BAAQMD is currently updating its CEQA guidelines to include new recommended thresholds of significance for evaluating air quality impacts, but these proposed new guidelines had not been formally adopted by BAAQMD's Board of Directors at the time of writing of this DEIR. The proposed new CEQA guidelines will be presented to BAAQMD's board of directors in early 2010. According to BAAQMD's proposed new CEQA guidelines, a project would result in a significant impact on air quality if:

- a set of basic construction mitigation measures is not incorporated into the project and/or average daily construction exhaust emissions would exceed 54 lb/day of ROG, NO_X, or $PM_{2.5}$, or 82 lb/day of PM_{10};
- operational emissions would exceed 54 lb/day or 10 TPY of ROG, NO_X, or $PM_{2.5}$, or 82 lb/day or 15 TPY of PM_{10}; or
- proposed residents would be exposed to, or the project would cause, an excess cancer risk level exceeding 10 in 1 million or a hazard index greater than 1.0 at the maximally exposed individual.

Because these proposed thresholds have not been formally adopted by BAAQMD's board of directors, they are not relied upon in this analysis to make significance determinations. However, in anticipation of BAAQMD's adoption of these new proposed thresholds, the proposed thresholds of significance are also discussed with respect to each air quality impact for disclosure purposes. At the time of writing this DEIR (and at the time the notice of preparation was released for the project), the thresholds of significance in BAAQMD's currently adopted CEQA guidelines (BAAQMD 1999) were still the applicable and effective thresholds officially recommended by BAAQMD. Therefore, all significance conclusions in this analysis are based on the thresholds of significance in BAAQMD's currently adopted CEQA guidelines.

ANALYSIS METHODOLOGY

Emissions of short-term construction-related and long-term operational (i.e., regional and local) criteria air pollutants and precursors, odors, and TACs were assessed in accordance with BAAQMD-recommended methodologies. This includes an assessment of whether BAAQMD-recommended measures for controlling fugitive dust emissions are included in the project description. BAAQMD's currently adopted CEQA guidelines do not suggest quantification of construction emissions; however, the project's construction emissions were quantified to enable disclosure of the magnitude of these emissions.

Construction emissions generated by the on-site upgrades and relocation of the corporation yard were modeled using the construction and land use emissions model, URBEMIS 2007 Version 9.2.4 (Rimpo and Associates 2008). The land use module in URBEMIS 2007 does not include construction parameters for wastewater pollution control plants; therefore, construction equipment used for on-site upgrades and relocation of the corporation yard were estimated based on experience with previous construction projects at wastewater treatment facilities.

Construction emissions generated by the installation of the proposed pipeline under Option 1 were modeled using the Sacramento Metropolitan Air Quality Management District's Roadway Construction Emissions Model Version 6.3.2 (Roadway Construction Emissions Model), which is suitable for estimating emissions of linear construction projects (SMAQMD 2009). Because project-specific construction information was not available at the time of this writing, assumptions for the Roadway Construction Emissions Model were obtained from previous, similar pipeline projects, with input from staff in the City of Pinole (City) Department of Public Works. City staff also provided information regarding the construction schedules for Option 1 and Option 2.

Project-generated, operational (i.e., regional) emissions of criteria air pollutants and precursors associated with natural gas and methane combustion at the WPCP were quantified using EPA AP-42 emission factors (EPA 2009). Operational emissions were quantified for both the existing Pinole-Hercules WPCP and Options 1 and 2 using project-specific data (e.g., estimated changes in operational activities) provided by the City. The net change in project-generated, long-term operational emissions for both options was compared with BAAQMD's currently adopted thresholds of significance. Because operation of the project would not result in additional vehicle trips by workers or service vehicles, mobile-source emissions were not included in the analysis.

All other air quality impacts (i.e., exposure of sensitive receptors to CO, TACs, and odorous emissions) were assessed in accordance with methodologies recommended by BAAQMD.

IMPACT ANALYSIS

IMPACT 3.1-1	Generation of Short-term Construction-Related Emissions of Criteria Air Pollutants and Precursors. *Construction activities associated with project implementation would generate intermittent emissions of criteria air pollutants and precursors. Construction-generated fugitive dust emissions, including PM_{10} and $PM_{2.5}$, could violate or contribute substantially to an existing or projected air quality violation, expose sensitive receptors to substantial pollutant concentrations, and/or conflict with implementation of regional air quality plans.*

Option 1: New Larger Effluent Pipeline to RSD and Option 2: Pinole-Only Flows at Existing Plant

Proposed Construction Activities

During construction of the project under either Option 1 or Option 2, criteria air pollutant emissions would be generated from a variety of construction activities and emission sources. These emissions would be temporary and occur intermittently depending on the intensity of construction on a given day. Site grading and excavation activities would generate fugitive PM dust emissions, which is the primary pollutant of concern during construction. Fugitive PM dust emissions (PM_{10} and $PM_{2.5}$) vary as a function of parameters such as soil silt content and moisture, wind speed, acreage of disturbance area, and the intensity of activity performed with construction equipment. Exhaust emissions from off-road construction equipment, material delivery trips, and construction worker commute trips also contribute to short-term increases in PM emissions, but to a lesser extent. Exhaust emissions from construction-related mobile sources also include ROG and NO_X emissions. The project's two options would involve varying levels and types of construction activities:

Option 1: New Larger Effluent Pipeline to RSD. Option 1 would upgrade the existing Pinole-Hercules WPCP facilities with new secondary clarifiers, influent and effluent pump stations, aeration tanks, odor control facilities, and other process support equipment. Because of the resulting increase in water treatment facilities on-site, Option 1 would also require the relocation of the existing on-site corporation yard to Pinole Shores Drive between the Atchison Topeka & Santa Fe Railroad tracks and San Pablo Avenue. In addition, a new pipeline would be constructed leading from the existing Pinole-Hercules WPCP to RSD. During construction of Option 1, exhaust emissions of criteria air pollutants would be generated from off-road construction equipment, construction worker vehicles, and material delivery trucks. Site grading, excavation, and backfilling activities associated with Option 1 would also generate fugitive PM dust emissions. Construction activities under Option 1 would commence in June 2014 and last approximately 30 months.

Option 2: Pinole-Only Flows at Existing Plant. Under Option 2, the Pinole-Hercules WPCP would upgrade its facilities with a 450,000-gallon concrete storage tank, diversion box, pumps, piping, and associated accessories. Exhaust emissions of criteria air pollutants would be generated by off-road construction equipment, construction worker vehicles, and material delivery trucks. Option 2 would also involve some soil disturbance (i.e., site grading, excavation) for the new storage tank that would generate fugitive PM dust emissions. However, the amount of soil disturbance under Option 2 would be substantially less than under Option 1 because substantially less construction would occur at the Pinole-Hercules WPCP, a new pipeline to RSD would not be installed under Option 2, and the corporation yard would not be relocated. Construction activities under Option 2 are anticipated to commence in June 2014 and last approximately 9 months.

Construction Emissions Impacts

According to BAAQMD, PM_{10} is the pollutant of greatest concern generated by construction activity. Although the operation of heavy-duty equipment, material transport trips, and employee commute trips result in emissions of criteria air pollutants (e.g., CO) and precursors (e.g., ROG and NO_X), these emissions are included in the regional emissions inventory, which serves as the basis for the air quality planning in the SFBAAB; therefore, these emissions are not expected to impede attainment of the ozone standard or maintenance of the CO standard in the SFBAAB (BAAQMD 1999). Consequently, BAAQMD has not currently adopted mass emissions thresholds for construction-related emissions of ROG, NO_X, or CO, and bases its determination of significance on implementation of fugitive PM_{10} dust control measures (BAAQMD 1999). BAAQMD's approach to CEQA analyses of construction-related fugitive PM_{10} dust emissions is to require implementation of effective and comprehensive control measures rather than a detailed quantification of construction emissions.

BAAQMD requires that all applicable and feasible dust control measures be implemented during project construction. The particular dust control measures should be determined based on the size of the construction area, nature of the activities involved, and proximity to sensitive receptors. According to BAAQMD's current CEQA guidelines, implementation of all feasible dust control measures would reduce construction emissions to a less-than-significant level. However, construction-generated fugitive dust emissions under both Option 1 and Option 2 could violate or contribute substantially to an exceedance of the AAQS for PM_{10} and $PM_{2.5}$, or expose sensitive receptors to substantial pollutant concentrations. As a result, this impact would be **significant** under both Option 1 and Option 2.

For disclosure purposes only, a quantitative analysis of construction-generated emissions under Option 1 and Option 2 is also provided to determine whether they would exceed BAAQMD's proposed thresholds of significance that are expected to be adopted in 2010 after the DEIR is circulated. However, as explained under "Analysis Methodology" above, this analysis is not used to support the significance conclusion of the project. Maximum daily construction emissions for the project were estimated using the URBEMIS 2007 Version 9.2.4 computer program (Rimpo and Associates 2008) and the Roadway Construction Emissions Model, which is suitable for any linear construction project, including pipeline installations. Modeling was performed in accordance with BAAQMD-recommended methodologies using project-specific information, when available. When project-specific information was not available, default settings and parameters contained in URBEMIS 2007 or the Roadway Construction Emissions Model and construction information from similar past projects were used to estimate construction emissions. Table 3.1-3 summarizes the maximum daily emissions of criteria air pollutant and precursors that would be generated during each construction phase under Option 1 and Option 2. Refer to Appendix C for detailed input parameters and modeling results.

Though not displayed in Table 3.1-3, nominal levels of SO_2 and CO would also be emitted during construction activities. The quantities of SO_2 generated during construction activities would be minimal because of the use of ultra-low-sulfur diesel fuel (15 ppm) by construction equipment. In 1998, the SFBAAB was redesignated as attainment for the CO NAAQS and is currently designed as attainment for the CAAQS. Because of newer emissions technology and vehicle fleet turnover, CO is not considered a pollutant of regional concern; rather, BAAQMD focuses on localized concentrations of CO. In addition, as discussed above, construction-related CO emissions are accounted for in the emissions inventory for regional air quality plans and would not impede attainment or maintenance of the CO standard (BAAQMD 1999). For these reasons and because control of SO_2 and CO emissions from construction activities is not required to achieve attainment, BAAQMD has not included thresholds of significance for SO_2 and CO in its proposed new CEQA guidelines, and emissions of CO and SO_2 are not shown in Table 3.1-3 (BAAQMD 2009).

Table 3.1-3 Summary of Modeled Maximum Daily Emissions of Criteria Air Pollutants and Precursors Generated by Construction Activities				
Source	Exhaust Emissions (lb/day) [1]			
	ROG	NO_X	PM_{10} [2]	$PM_{2.5}$ [2]
Option 1				
On-Site Upgrades	3.4	26.6	1.2	1.1
Pipeline Installation	1.7	11.3	0.6	0.5
Corporation Yard Relocation	2.4	19.1	0.9	0.8
Maximum Daily Emissions [3]	**5.1**	**37.9**	**1.8**	**1.6**
Option 2				
On-Site Upgrades	5.4	49.3	2.0	1.8
Maximum Daily Emissions	**5.4**	**49.3**	**2.0**	**1.8**
BAAQMD Significance Threshold [4]	54	54	82	54

Notes:
BAAQMD = Bay Area Air Quality Management District; lb/day = pounds per day; NO_X = oxides of nitrogen; $PM_{2.5}$ = respirable particulate matter with an aerodynamic diameter of 2.5 micrometers or less; PM_{10} = respirable particulate matter with an aerodynamic diameter of 10 micrometers or less; ROG = reactive organic gases

1 Emissions shown represent the maximum daily emissions that would occur during the construction periods for Option 1 and Option 2. BAAQMD's proposed thresholds of significance are average daily mass emission levels.

2 BAAQMD's proposed thresholds of significance for construction-generated emissions, including emissions of $PM_{2.5}$ and $PM_{10,}$ apply only to exhaust emissions. Therefore, $PM_{2.5}$ and PM_{10} emissions shown are only those generated by construction equipment, construction worker vehicles, and material delivery trucks.

3 Maximum daily emissions during construction under Option 1 would occur during the overlap of on-site upgrades and pipeline installation.

4 BAAQMD's proposed thresholds of significance are based on average daily emissions rather than maximum daily emissions.

Source: Modeling performed by AECOM in 2009

As shown in Table 3.1-3, construction-related emissions would not exceed any of BAAQMD's proposed new thresholds of significance for construction-generated emissions. BAAQMD's proposed new CEQA guidelines propose an average daily emissions threshold, while the emissions shown in Table 3.1-3 represent the maximum daily emissions that could occur on any day during the entire construction period for Options 1 and 2. As shown, the maximum daily construction emissions would not exceed any of BAAQMD's proposed thresholds of significance.

Mitigation Measure 3.1-1: Implement BAAQMD Dust Control Measures

Applies to: Options 1 and 2

The City shall require its contractors to implement all applicable control measures for minimizing fugitive PM dust emissions that are recommended by BAAQMD at the time construction is performed. Requirements to implement these measures shall be included in the contracts the City establishes with the contractor(s) it selects to work on the project. These measures may include but are not limited to the following:

- Water all active construction areas at least twice daily.
- Cover all trucks hauling soil, sand, and other loose materials or require all trucks to maintain at least 2 feet of freeboard.

- Pave, apply water three times daily, or apply (nontoxic) soil stabilizers on all unpaved access roads, parking areas, and staging areas at construction sites.
- Sweep daily (with water sweepers) all paved access roads, parking areas, and staging areas at construction sites.
- Sweep streets daily (with water sweepers) if visible soil material is carried into adjacent public streets.
- Hydroseed or apply (nontoxic) soil stabilizers to inactive construction areas (previously graded areas inactive for 10 days or more).
- Enclose, cover, water twice daily or apply (nontoxic) soil binders to exposed stockpiles (e.g., dirt, sand).
- Limit traffic speeds on unpaved roads to 15 mph.
- Install sandbags or other erosion control measures to prevent silt runoff to public roadways.
- Replant vegetation in disturbed areas as quickly as possible.
- Install wheel washers for all exiting trucks, or wash off the tires or tracks of all trucks and equipment leaving unpaved areas of the WPCP site and unpaved areas of new corporation yard.
- Install wind breaks (if they do not already exist), or plant trees/vegetative wind breaks at windward sides of construction areas at the WPCP site and the site of the new corporation yard.
- Suspend all excavation and grading activity when wind speeds (as instantaneous gusts measured by an on-site anemometer) exceed 25 mph and dust has the potential to adversely affect adjacent residential properties. Wind speeds shall be measured with an anemometer on site a minimum of one time per day. Additional hourly anemometer measurements shall be conducted if wind conditions noticeably increase or are forecast to be greater than 15 mph.
- Limit the area subject to excavation, grading, and other construction activity at any one time.

Implementation of Mitigation Measure 3.1-1 would reduce fugitive PM dust emissions levels by approximately 75% through implementation of BAAQMD-recommended fugitive PM dust control measures. BAAQMD considers implementation of all feasible dust control measures, such as those listed above, to reduce construction-related emissions of fugitive PM_{10} dust (including fugitive $PM_{2.5}$ dust) to a **less-than-significant** level (BAAQMD 1999).

IMPACT 3.1-2 Generation of Long-Term Operational Emissions of Criteria Air Pollutants and Precursors. *The net project increase in operational emissions of criteria air pollutants and ozone precursors would not exceed BAAQMD's currently adopted thresholds of significance. Therefore, operational emissions would not result in or substantially contribute to emissions concentrations that exceed the NAAQS or CAAQS and would not conflict with air quality planning efforts in the SFBAAB.*

Option 1: New Larger Effluent Pipeline to RSD and Option 2: Pinole-Only Flows at Existing Plant

Proposed Changes to Operational Activities

Following buildout of the project, the change in operations at the Pinole-Hercules WPCP would result in a long-term net increase in operational emissions of criteria air pollutants and precursors. Project-specific information detailing how the Pinole-Hercules WPCP operations would change under Option 1 and Option 2 was provided by the City of Pinole Public Works Department. The following changes to operational activities would occur under Option 1 and Option 2:

Option 1: New Larger Effluent Pipeline to RSD. Under Option 1, the wet-weather instantaneous flow capacity (i.e., the rate at which the Pinole-Hercules WPCP could treat incoming wastewater) would increase. The increased wet-weather treatment capacity would produce additional biosolids and sludge in the digesters, which would require additional combustion of natural gas to maintain the proper temperature of the digesters. The increased wet-weather capacity would also result in a net increase in methane emissions produced by the digesters. Because the cogeneration plant can burn only a fixed amount of methane per day, the excess methane would be flared, resulting in increased emissions of ROG, NO_X, PM_{10}, and $PM_{2.5}$. The net change in emissions of criteria air pollutants and precursors was estimated using EPA's AP-42 emission factors.

Option 2: Pinole-Only Flows at Existing Plant. Under Option 2, less wastewater would be handled by the WPCP because the plant would treat only flows from the city of Pinole. Therefore, the WPCP would consume less natural gas to maintain proper heat levels in the digesters. This would result in a net reduction in emissions of criteria air pollutants.

Operational Emissions Impacts

Table 3.1-4 presents the daily operational emissions of the Pinole-Hercules WPCP under existing conditions, Option 1, and Option 2, and the net change in emissions associated with implementation of each option. Refer to Appendix C for detailed input parameters and calculations.

Table 3.1-4
Summary of Modeled Daily Emissions of Criteria Air Pollutants and Precursors Associated with Operations under Existing Conditions, Option 1, and Option 2

Source	Emissions (lb/day)			
	ROG	NO_X	PM_{10}	$PM_{2.5}$
Existing Operations	6.8	49.2	0.2	0.2
Option 1				
Gross Emissions	6.8	50.0	0.5	0.5
Net Increase	0.0	0.8	0.3	0.3
Option 2				
Gross Emissions	6.6	47.5	0.2	0.2
Net Increase	(0.2)	(1.7)	0.0	0.0
Current BAAQMD Significance Thresholds	80	80	80	–
Proposed BAAQMD Significance Thresholds	54	54	82	54

Notes: BAAQMD = Bay Area Air Quality Management District; lb/day = pounds per day; NO_X = oxides of nitrogen; $PM_{2.5}$ = respirable particulate matter with an aerodynamic diameter of 2.5 micrometers or less; PM_{10} = respirable particulate matter with an aerodynamic diameter of 10 micrometers or less; ROG = reactive organic gases; ( ) = negative value; – = no threshold established
Source: Modeling performed by AECOM in 2009

As shown in Table 3.1-4, the gross and net change in emissions associated with Option 1 and Option 2 would not exceed the current BAAQMD operational thresholds of significance. Therefore, operational emissions of criteria air pollutants and precursors would not violate or contribute substantially to an existing air quality violation or conflict with air quality planning in the SFBAAB. Thus, the impact associated with the project's operational emissions would be **less than significant** under both Option 1 and Option 2.

In anticipation of the future adoption of BAAQMD's proposed new mass emission thresholds for operational emissions, these thresholds of significance are also displayed in Table 3.1-4. As shown in Table 3.1-4, neither the net change nor the gross operational emissions associated with Option 1 or Option 2 would exceed BAAQMD's proposed new thresholds of significance.

Mitigation Measure: No mitigation measures are required.

IMPACT 3.1-3	Generation of Local, Mobile-Source CO Emissions. *Project implementation would not generate additional vehicle trips on the local roadway network; therefore, the project would not substantially contribute to the degradation of nearby intersections or local CO concentrations that exceed the 1-hour or 8-hour CO NAAQS or CAAQS.*

Option 1: New Larger Effluent Pipeline to RSD and Option 2: Pinole-Only Flows at Existing Plant

The primary mobile-source pollutant of localized concern is CO. Local mobile-source CO emissions near roadway intersections are a direct function of motor vehicle activity, particularly during peak commute hours, including traffic volume, speed, and delay. Transport of CO is extremely limited because it disperses rapidly with distance from the source under normal meteorological conditions. Under certain specific meteorological conditions, CO concentrations near roadways and/or intersections may reach unhealthy levels with respect to local sensitive land uses, such as residential areas, schools, playgrounds, child care facilities, and hospitals. As a result, BAAQMD recommends analysis of CO emissions at a local rather than a regional level. Because increased CO concentrations are usually associated with roadways that are congested and with heavy traffic volume, BAAQMD has established preliminary screening criteria to determine with fair certainty that, if not exceeded, project-generated, long-term operational local mobile-source emissions of CO would not result in or substantially contribute to emissions concentrations that exceed the 1-hour ambient air quality standard of 20 ppm or the 8-hour standard of 9 ppm, respectively. The screening-level analysis is based on project's total daily CO emissions and the project's effect on the delay times and level of service of local intersections.

Implementation of either Option 1 or Option 2 would not cause an increase in employees or service vehicles traveling to or from the project site. Therefore, project operation would not cause a net increase in vehicles at local intersections that would degrade delay times or levels of service. Accordingly, CO emissions generated by project-related vehicle trips would not exceed or substantially contribute to an exceedance of the CO NAAQS or CAAQS at local intersections. Thus, this impact would be **less than significant** under both Option 1 and Option 2.

Mitigation Measure: No mitigation measures are required.

IMPACT 3.1-4	Exposure of Sensitive Receptors to Short- and Long-Term Emissions of Toxic Air Contaminants. *Project implementation would not result in a substantial increase in the exposure of receptors to emissions of TACs from construction activities, on-site stationary, and/or increased motor vehicle trips generated by the project.*

As described above, the closest sensitive receptors to the Pinole-Hercules WPCP are the single-family homes located approximately 500 feet south of the site across the railroad tracks, and a residential neighborhood located approximately 500 feet east of the WPCP and adjacent to Pinole Creek. People recreating in Bayfront Park, which is located southwest of the WPCP, may also be considered sensitive receptors. The new effluent pipeline to the RSD, which would be developed under Option 1, would also be near homes located in the cities of Pinole and Hercules. The proposed corporation yard site would be located as close as 250 feet south of a residential neighborhood.

The exposure of sensitive receptors to emissions of TACs from on-site sources during construction and operation of the project are discussed separately below.

Temporary, Short-Term Exhaust Emissions from Construction Equipment

Option 1: New Larger Effluent Pipeline to RSD and Option 2: Pinole-Only Flows at Existing Plant

Project construction activities would result in temporary emissions of diesel PM exhaust from off-road, heavy-duty diesel equipment for demolition of the existing on-site structures, soil excavation and site preparation, and on-site upgrades. The potential cancer risk from the inhalation of diesel PM, as discussed below, outweighs the potential for all other health impacts (ARB 2003). At this time, BAAQMD has not adopted a methodology for analyzing health risks from construction-generated diesel PM exhaust.

The dose to which receptors are exposed is the primary factor used to determine health risk (i.e., potential exposure to TAC emission levels that exceed applicable standards). Dose is a function of the concentration of a substance or substances in the environment and the duration of exposure to the substance. Dose is positively correlated with time, meaning that a longer exposure period would result in a higher exposure level for an exposed receptor. Thus, the risks estimated for an exposed receptor are higher if a fixed exposure occurs over a longer period of time. According to the state Office of Environmental Health Hazard Assessment, a health risk assessment, which determines the exposure of sensitive receptors to TAC emissions, should be based on a 70-year exposure period for residential receptors (OEHHA 2003). However, such assessments should be limited to the period/duration of activities (e.g., construction or operations) associated with the project (Salinas 2004).

The construction period would last 30 months under Option 1 and 9 months under Option 2, which is 3.6% and 1.1% of the minimum exposure period for health risk assessments (i.e., 70 years), respectively. Under both options, heavy-duty construction equipment would not operate in the immediate proximity of any single sensitive receptor for an extended period of time. Construction of the new pipeline would occur in proximity to sensitive receptors (i.e., single-family residents); however, construction activities and associated TAC emissions would continue to move as the pipeline is constructed. Therefore, residents along the pipeline would not be exposed to a constant source of construction-related TAC emissions for the entire construction period and their total exposure period for a health risk assessment would be even less than the 3.6% described above. The most intense use of heavy equipment would occur during the demolition and grading phases, which would not last the entire construction period. Thus, because the use of off-road, heavy-duty equipment would be temporary and intermittent (and not be used in one single location for any extended period of time) under both Options 1 and 2, and because of the highly dispersive properties of diesel PM (Zhu and Hinds 2002, ARB 2005), construction-related TAC emissions would not be anticipated to expose sensitive receptors to substantial concentrations of TACs. As a result, this impact would be **less than significant** under both Option 1 and Option 2.

Long-Term Operational Emissions

Option 1: New Larger Effluent Pipeline to RSD

Implementing Option 1 would increase the wet-weather flow capacity of the existing Pinole-Hercules WPCP. The incremental increase in natural gas consumption and combustion by the cogeneration plant at the WPCP could result in additional emissions of TACs such as acetaldehyde, acrolein, formaldehyde, and benzene.

However, as a stationary source, the cogeneration plant would be subject to Rule 5 under BAAQMD's Regulation 2 (New Source Review of Toxic Air Contaminants). Rule 5 requires that any new or modified source that would cause an increase in cancer risk greater than 1.0 in 1 million and/or a chronic-hazard index greater than 0.20 to implement T-BACT. Therefore, it is anticipated that compliance with Rule 5 would ensure that any incremental increase in TAC emissions associated with the project would not cause a substantial increase in cancer health risk or the chronic hazard index at nearby sensitive receptors. In addition, as discussed under Impact 3.1-3, the project would not result in increased employee or service vehicle trips to the WPCP that would introduce additional mobile-source TAC emissions to the area. Thus, this impact would be **less than significant**.

Option 2: Pinole-Only Flows at Existing Plant

Option 2 would not result in additional combustion of natural gas at the WPCP or additional motor vehicle trips to and from the site. Therefore, implementing Option 2 would not result in an increase in TAC emissions from natural gas combustion or mobile sources that would expose sensitive receptors to increased health risks. This impact would be **less than significant**.

Mitigation Measure: No mitigation measures are required.

IMPACT 3.1-5 Possible Exposure of a Substantial Number of People to Objectionable Odors. *Temporary, short-term construction and long-term operation of the project would not result in an increase in the frequency with which sensitive receptors would be exposed to objectionable odorous emissions.*

Short-Term Use of Construction Equipment

Option 1: New Larger Effluent Pipeline to RSD and Option 2: Pinole-Only Flows at Existing Plant

Construction activities under both Option 1 and Option 2 could result in odorous emissions from diesel exhaust generated by construction equipment during demolition, grading, paving, and other miscellaneous activities. As discussed above under Impacts 3.1-1 and 3.1-4, diesel exhaust emissions would be intermittent and temporary and would dissipate rapidly from the source with an increase in distance. Furthermore, compliance with BAAQMD Rule 15 (Emulsified Asphalt) (BAAQMD 1994) would ensure that odors generated by paving activity would be minimized. Thus, project construction would not create objectionable odors that would affect a substantial number of people. As a result, this impact would be **less than significant**.

Long-Term Operational Activities

According to BAAQMD, wastewater treatment facilities are among the many facilities known to potentially produce offensive odors (BAAQMD 1999). BAAQMD's current CEQA guidelines include recommended distances that serve as screening levels for how far away projects should be located from these types of odor-generating facilities. For projects located within these recommended screening distances to potentially significant odor sources, BAAQMD has established qualitative thresholds to determine odor impacts. The existing Pinole-Hercules WPCP is located approximately 500 feet from the nearest residential receptors, which are closer than the screening distance of 1 mile recommended by BAAQMD. Therefore, the existing WPCP is regarded as a potentially significant odor source with or without implementation of the project.

To further assess the potential for odor impacts from a facility located closer to receptors than the recommended screening distance, BAAQMD recommends that lead agencies examine the number of odor complaints generated by the facility. In particular, BAAQMD considers a facility to cause an odor problem if it has generated more than one confirmed complaint per year averaged over a 3-year period, or three unconfirmed complaints per year averaged over a 3-year period.

According to BAAQMD's odor complaint history, the existing Pinole-Hercules WPCP triggered four confirmed complaints in 2008, 11 complaints in 2007, and 40 complaints in 2006 (Tholen, pers. comm., 2008). Therefore, the existing WPCP is considered to have a significant odor impact according to BAAQMD's current CEQA guidelines.

The project would upgrade on-site facilities under both Option 1 and Option 2. Because the existing WPCP is already a significant odor source, this analysis evaluates whether the project would exacerbate the current odor impact and increase the intensity or frequency of odorous emissions. In other words, if the project would change the WPCP operations such that it would result in an increased number of odor complaints, then the impact would be significant.

Option 1: New Larger Effluent Pipeline to RSD

The proposed pipeline that would carry wastewater under Option 1 would not be a potential source of odors because only wastewater that has undergone secondary treatment and disinfection would be pumped to RSD through this pipeline. However, implementing Option 1 would add expanded aeration tanks, secondary clarifiers, a new influent pump station, a new odor control facility, and other process support infrastructure on-site. Odiferous compounds such as hydrogen sulfide and methane can be generated during many wastewater treatment processes as a result of anaerobic conditions (i.e., lack of dissolved oxygen in wastewater).

The Pinole-Hercules WPCP would continue to add ferrous chloride to newly received wastewater control odors and reduce generation of hydrogen sulfide gas. The expanded aeration tanks could potentially increase odor emissions from the WPCP because of the increased surface-area exposure between wastewater and the ambient air. However, the generation of odors from wastewater treatment can be minimized through regular maintenance and cleaning of aeration tanks and secondary clarifiers to avoid accumulation of biosolids under anaerobic conditions. In addition, proper operation of the aeration tanks would ensure that minimal amounts of methane, if any, are generated during the treatment process.

The City would properly maintain wastewater treatment facilities to minimize the generation of odors. Also, similar to existing operations, the new odor control facility would capture air vented from the sludge and biosolids processing area to avoid the direct release of odors into the atmosphere. Captured air would be treated with biological, chemical, and carbon odor scrubbers to remove the maximum amount of odiferous compounds before release to the atmosphere. For these reasons, it is anticipated that the new odor control facilities would reduce odor emissions from the WPCP more effectively than the older, current odor control facility. Thus, it is not anticipated that the WPCP would result in a substantial increase in emissions of odiferous compounds or the number of odor complaints under Option 1 as compared to existing conditions. As a result, this impact would be **less than significant**.

Option 2: Pinole-Only Flows at Existing Plant

Under Option 2, a storage tank, a diversion box (used to divert excess flows to the storage tank), and associated piping and accessories would be installed. The storage tank, diversion box, and associated piping would be fully enclosed to avoid release of odor emissions during diversion processes. Option 2 would not increase the treatment capacity of the plant; as a result, it is not expected that Option 2 would result in an increase in odors above the current levels, in intensity or frequency. Therefore, Option 2 would not substantially increase the amount of odiferous compounds generated by the WPCP or the number of odor complaints. Thus, this impact would be **less than significant**.

Mitigation Measure: No mitigation measures are required.

IMPACT 3.1-6 **Generation of Criteria Air Pollutants for which the SFBAAB is Nonattainment with Respect to the NAAQS.** *Construction and operational activities associated with the project would not generate emissions of criteria air pollutants or precursors, for which the SFBAAB is designated as nonattainment, that exceed the de minimis thresholds for applicability to general conformity. As a result, the project would not conflict or obstruct with implementation of the SIP.*

Option 1: New Larger Effluent Pipeline to RSD and Option 2: Pinole-Only Flows at Existing Plant

Projects that would receive funding from the State Revolving Fund, which is partially funded by a federal agency, are subject to Tier I CEQA-Plus requirements. As part of the Tier I CEQA-Plus requirements, the project is subject to Section 176(c)(1) of the CAA, also known as the General Conformity Rule. The General Conformity Rule requires that a federal action (or federally funded action) demonstrate that it would conform to the approved SIP in the geographical area before the action is taken. The first step in determining whether a conformity analysis is required is to evaluate whether the federal action (or federally funded action) would occur within a region designated as a nonattainment or maintenance area under the NAAQS. If so, the project's direct and indirect emissions should be compared to EPA-established *de minimis* thresholds, which vary according to the nonattainment status of the region. If the project's direct and indirect emissions are determined to be less than the *de minimis* thresholds, the project's emissions are considered to conform to the approved SIP and the federal action would not hamper implementation of the plan. If the project's emissions would exceed the *de minimis* level thresholds, a federal agency must conduct a full conformity determination for the project before commencement of the federal action.

The SFBAAB is designated as a marginal nonattainment area for ozone and a nonattainment area for $PM_{2.5}$. Although EPA has lowered the national 8-hour ozone standard from 0.80 ppm to 0.75 ppm, for which EPA will issue final designations for in March 2010, the *de minimis* threshold used for this analysis is based on the marginal nonattainment status. In December 2008, the SFBAAB was designated as a nonattainment area for the new 24-hour standard of 35 $\mu g/m^3$ for $PM_{2.5}$, which replaced the previous 24-hour standard of 65 $\mu g/m^3$ in September 2006. Before the December 2008 designation, the SFBAAB was designated as a $PM_{2.5}$ attainment area for the 65-$\mu g/m^3$ 24-hour $PM_{2.5}$ standard. On October 9, 2009, EPA published a final ruling that designated the SFBAAB as nonattainment for the 2006 24-hour $PM_{2.5}$ standard. Therefore, the total direct and indirect emissions of ROG and NO_X (i.e., ozone precursors) and $PM_{2.5}$ from any federal action should be compared with the applicable *de minimis* thresholds.

The second component of an emissions-rate threshold concerns whether the project would be considered a "regionally significant action." Section 51.853(i) of the Code of Federal Regulations states that if the total of direct and indirect emissions of any pollutant from a federal action represents 10% or more of a nonattainment or maintenance area's total emissions of that pollutant, the action is defined as a regionally significant action and additional requirements apply (Section 51.850 and Sections 51.855–860). The most recent emissions budget for Contra Costa County (year 2008) indicates a total emissions budget for ROG, NO_X, and $PM_{2.5}$ of 61.09 tons per day (TPD), 81.16 TPD, and 16.90 TPD, respectively (ARB 2009d). These estimates are equivalent to 22,298 TPY of ROG, 29,623 TPY of NO_X, and 6,169 TPY of $PM_{2.5}$. Therefore, a project in Contra Costa County would be considered a regionally significant action if its emission levels would exceed 10% of these annual budgets, which are equivalent to 2,230 TPY of ROG, 2,962 TPY of NO_X, and 617 TPY of $PM_{2.5}$.

The project's maximum daily short-term construction and long-term operational emissions of ROG, NO_X, and PM_{10} generated by stationary, area, and mobile sources were assessed using the methods described above. To compare the project's emissions with the *de minimis* thresholds and regionally significant levels, the maximum daily emissions for construction and operation were multiplied by 365 to calculate annual emissions, resulting in a conservative estimate of the project's annual construction and operational emissions. Table 3.1-5 summarizes worst-case annual construction and operational emissions.

As shown in Table 3.1-5, worst-case estimates of project-generated construction and operational air pollutant emissions of ROG, NO_X, and $PM_{2.5}$ would not exceed the conformity thresholds. Also, because the emission levels of ROG, NO_X, and $PM_{2.5}$ would not exceed 10% of the respective annual budgets for Contra Costa County, the project would not be considered a regionally significant action. Therefore, all phases of the project would conform to the SIP that was approved and promulgated under Section 110 of the CAA; consequently, the project would not conflict with or obstruct implementation of the SIP. Thus, this impact would be **less than significant** under both Option 1 and Option 2, and a CAA conformity analysis is not required.

Mitigation Measure: No mitigation measures are required.

Table 3.1-5
Summary of Predicted Annual Emissions of ROG, NO_X, and $PM_{2.5}$

Source	Emissions (tons per year) [1]		
	ROG	NO_X	$PM_{2.5}$
Option 1			
Construction Emissions [1]	0.9	6.9	0.6
Operational Emissions [2]	1.1	8.3	0.1
Option 2			
Construction Emissions [1]	1.0	9.0	0.3
Operational Emissions [2]	1.1	7.9	0.1
Federal Conformity *De Minimis* Thresholds	**50**	**100**	**100**
Regional Significance Thresholds	**2,230**	**2,962**	**617**

Notes:

NO_X = oxides of nitrogen; $PM_{2.5}$ = respirable particulate matter with an aerodynamic diameter of 2.5 micrometers or less; ROG = reactive organic gases

[1] Annual emissions shown represent the maximum daily emissions that would occur throughout the entire construction period multiplied by 365 days. In reality, the maximum daily construction emissions would not occur every day and construction activities would occur for approximately 220 days per year.

[2] Annual emissions shown represent the maximum daily emissions multiplied by 365 days.

Source: Modeling performed by AECOM in 2009

3.2 CULTURAL RESOURCES

3.2.1 ENVIRONMENTAL SETTING

PREHISTORY

Fredrickson (1973, 1974) proposed a sequence of cultural patterns for the central districts of the North Coast Ranges, placing them in a framework of cultural periods that he believed were applicable to California as a whole. He proposed and used the concept of the cultural pattern as an adaptive mode shared in general outline by a number of analytically separable cultures. These different cultural modes could be characterized by similar technological skills and devices; similar economic modes, including participation in trade networks and practices surrounding wealth; and similar mortuary and ceremonial practices. Fredrickson argued that the dating and definition of particular patterns should be kept separate from temporal periods, given the coexistence of more than one cultural pattern operating at any particular time. Thus, his framework of prehistoric periods is based on general technological and cultural horizons in operation throughout California over appreciable lengths of time. The general elements of this framework are outlined below.

The Paleo-Indian Period (12,000–8000 years Before Present [B.P.]) saw the first demonstrated entry and spread of humans into California. Known sites are situated along lakeshores, and a developed milling tool technology may exist at this time depth. The social units were not heavily dependent on exchange of resources. Exchange activities occurred on an ad hoc, individual basis. Characteristic artifacts include fluted projectile points and flaked stone crescents. Traditionally, Paleo-Indians were viewed as exclusive big-game hunters. However, more recent research suggests that they pursued much more varied subsistence and economic systems than previously thought.

The beginning of the **Lower Archaic Period** (8000–5000 B.P.) coincides with the middle Holocene climatic change to generally drier conditions and the disappearance of the pluvial lakes that likely influenced earlier land use patterns. Subsistence appears to have been focused on the consumption of plant foods as opposed to those obtained by hunting or trapping. Settlement appears to have been semisedentary, with little emphasis on wealth. Most tools were manufactured of local materials, and exchange remained on an ad hoc basis. Distinctive artifact types included large dart points, milling slabs and hand stones.

The **Middle Archaic Period** (5000–3000 B.P.) begins at the end of mid-Holocene climatic conditions, when the climate became similar to the present-day climate. Cultural change likely was, in part, a response to changing environmental conditions. Economies were more diversified, and possibly included the introduction of acorn-processing technology. Hunting remained an important source of food, as evidenced by faunal remains recovered from sites from this period. Sedentism appears to have been more developed and a general population growth and expansion occurred. Little evidence is present for development of regularized exchange relations. Artifacts indicating this period include the bowl mortar and pestle, which first appear in the archaeological record during this time, and the continued use of large projectile points.

The **Upper Archaic Period** (3000–1500 B.P.) marks the growth of sociopolitical complexity. The development of status distinctions based on wealth is well documented and group-oriented religions emerge. Some indications suggest that these may represent the origins of the Kuksu religious system at the end of the period. Exchange systems grew more complex with evidence of regular, sustained exchanges between groups. Shell beads gained in significance as possible indicators of personal status and as important trade items. During this period, large projectile points are still found in lithic assemblages, and the bowl mortar and pestle replace the milling stone and hand stone throughout most of the state.

The **Emergent Period** (500–200 B.P.) is distinguished by several technological and social changes. The bow and arrow were introduced during this period and ultimately replaced the dart and atlatl used by earlier cultures. Territorial boundaries between groups became well established and closely resemble those documented in the ethnographic literature. Distinctions in individual social status became increasingly linked to acquired material wealth. Exchange of goods between groups becomes more regularized with more material, including raw materials, entering into the exchange networks. In the latter portion of this period, exchange relations become highly regularized and sophisticated. The clam disk bead became a monetary unit for exchange, and increasing quantities of goods were moved greater distances. Craft specialization arose and individuals or groups of artificers governed various aspects of production and exchange of trade goods in particular.

The Middle and Upper Archaic and Emergent Periods are further broken down under the Central California Taxonomic System. These three time periods are well represented in archaeological assemblages in the general vicinity of the project area. The assemblages are discussed in detail in Bennyhoff and Fredrickson (1969) and Moratto (1984) and summarized here.

Windmiller Pattern (5000–2500 B.P.) peoples placed an increased emphasis on acorn use as well as a continuation of hunting and fishing activities. Ground and polished charmstones, twined basketry, baked-clay artifacts, and worked shell and bone were hallmarks of Windmiller culture. Widely ranging trade patterns brought goods in from the Coast Ranges and trans-Sierran sources as well as closer trading partners. Distinctive burial practices (ventrally extended, oriented westward) identified with the Windmiller Pattern also appeared in the Sierra Nevada foothills, indicating possible seasonal migration into the Sierra. Perforated charmstones were associated with some burials; manos and metates and small mortars were used, but only rarely.

The Berkeley Pattern (2200–1300 B.P.) exhibited greater use of acorns as a food source than was seen previously in the archaeological record. Distinctive stone and shell artifacts differentiated it from earlier or later cultural expressions. Burials were primarily placed in a tightly flexed position, and frequently included red ochre. Minimally shaped mortars and pestles were much more prevalent than manos and metates, and nonstemmed projectile points became more common. Dating of the Berkeley Pattern varies across central California; in the Stockton region, the Windmiller Pattern continued longer than in other areas, gradually giving way to the changes that marked the Berkeley Pattern (Bennyhoff 1982). These people combined Windmiller and Berkeley pattern traits, as seen in mortuary practices and the stone tool industry.

The Augustine Pattern (1300–200 B.P.) reflected increasing populations resulting from more intensive food procurement strategies, as well as a marked change in burial practices and increased trade activities. Intensive fishing, hunting and gathering, complex exchange systems, and a wider variety in mortuary patterns were all hallmarks of this period. Mortars and pestles were more carefully shaped; bow-and-arrow technology was present. Fishing implements became more common, trade increased, and cremation was used for some higher status individuals.

Bay Area archaeological investigations have occurred in three major waves. The first, early in the 20th century, focused on examining the most visible types of prehistoric sites: shell mounds, sometimes hundreds of feet in diameter, that lined the bayshore; as well as large earthen mounds found near stream outlets and banks running inland. Early archaeologists assumed that the shell mounds were the remains of large Native American villages that subsisted solely on bay and estuary resources. The second wave of investigations took place after World War II, when mounds and other sites were investigated by archaeologists working through the various local universities, particularly the University of California, Berkeley; San Jose State University; and Stanford University. By this period, research questions being asked had broadened to a wider interpretation of the region’s prehistory and the connection to different geographic areas. The third push in archaeological exploration, in the last 30 years or so, has been largely the result of compliance with new cultural resources regulations. The most recent research has been able to take advantage of new technology and paradigms that have evolved over the course of the 20th century.

Thoughts regarding the development and use of these shell mounds have changed as investigations have expanded. Nelson (1909) regarded the Bay Area as an archaeological unit and recorded 425 shell mounds along San Francisco Bay, San Pablo Bay, and the Carquinez Strait, and along the East Bay shoreline, as well as numerous earthen mounds up and down the various drainages. He noted that, even by then, no mound sites remained undisturbed, because they were being destroyed by agriculture and urban development or mined for fertilizer. Gifford (1916) analyzed materials from 11 of the mound sites and concluded that they were created by refuse from village sites that had accumulated over hundreds or thousands of years.

Schenck (1926) assumed that the principal use of the shell mounds was for occupation rather than for mortuary complexes. Gifford (1940) suggested that the Bay Area be separated into two areas, northern and southern, based on preferences for cremation or inhumation of burials. These analyses were focused mainly on the bayshore zone, with little consideration of inland sites as contributing cultural elements. Recent archaeology—exploration of the deepest levels of the shell mounds, more detailed analysis of mound constituents, identification of dozens of sites unassociated with mounds, and development of a more accurate chronology and assessment of occupation in the bay region—has led to a more detailed picture of the true complexity of prehistoric lifeways in the Bay Area. The rich and abundant artifact collections recovered from sites on and near the bayshore demonstrate the affluence of Native American communities living there. Shells and shell beads extracted from the bay region were exchanged for exotic raw materials obtained from as far away as the Napa Valley and the eastern Sierra Nevada, such as obsidian, quartz crystals, schist, chert, shell, cinnabar, and ocher, clearly indicating an extensive trading network (Hope et al. 1996).

The current body of archaeological evidence indicates that the mounds served multiple purposes as residential places, ceremonial locations, and burial sites with many diverse and complex aspects. Other types of prehistoric sites recorded in the project region include lithic scatters, quarries, bedrock mortars or other milling sites, petroglyphs, and isolated burial sites. Together these sites form part of a larger pattern of subsistence and interaction in the prehistoric San Francisco Bay region that is being explored in an ever-expanding series of investigations.

ETHNOGRAPHY

The project site was most recently occupied by Costanoan peoples, a member of the Penutian linguistic family. The word “Costanoan” was derived from a Spanish word meaning “coast people” or “coastal dwellers,” who occupied the area roughly from the Carquinez Strait and the northern tip of the San Francisco peninsula to the region south of Monterey Bay and east to the Diablo Range (Levy 1978). The Costanoans, also known as the Ohlone, entered the Bay Area approximately 1,500 years ago, coming in from the Sacramento–San Joaquin Delta region and displacing earlier Hokan speakers living there. Archaeologically, this coincides with the Lower Emergent period. Linguistic and archaeological data seem to suggest that Plains Miwok bands held the northern San Joaquin Valley area until sometime during the Late Horizon (Wallace 1978). Migration of the Monache caused tribes on the upper portions of the San Joaquin River to spread northward along the valley floor, resulting in displacement of the Costanoans by the Yokuts, pushing them westward (Kroeber 1959).

Positioned near the edge of San Pablo Bay in the vicinity of a complex of marshes, sloughs, and mudflats, the project site probably served an important role in the economy of the local Ohlone. Waterfowl and small schooling fish would have been available in the sloughs and marshes, and bayward mudflats probably served as important localities for gathering shellfish. Tules, sedges, and other marsh plants that grew along the freshwater and brackish-water streams and sloughs were probably used for house construction, basketry material, and a variety of other purposes. The region was also important to the Ohlone as a place for collecting rock salt that formed as the natural tidal ponds evaporated in the spring and summer. Not only was salt used by the Ohlone to flavor foods, but it also served as an important commodity for exchange with interior peoples.

Among the better documented Ohlone-speaking groups, the principal village was known to be the home of the triblet’s chief, who attained his or her position through patrilineal inheritance. Typically, the office was passed from father to son, but when no male heir existed, the position was given to a man’s sister or daughter (Levy 1978). Accession to chief typically required approval of the entire community. Acting as the leader of a council of elders, it was the chief's responsibility to provide for visitors and the impoverished, direct ceremonial activities, and to arrange hunting, fishing, gathering, and warfare expeditions (Levy 1978).

The Ohlone were organized as clans, divided into deer and bear moieties. Households consisted of patrilineally extended families ranging from 10 to 15 members. The most common type of house described ethnographically was a dome-shaped structure constructed of willow poles and thatched with tule, grasses, ferns, or wild alfalfa (Levy 1978). Tule was also employed in making clothing and to construct the balsas used to cross San Francisco Bay and maneuver among the marshes and streams surrounding the bay. The balsas were propelled by a double-bladed paddle and were used as transportation and for hunting waterfowl and perhaps sea mammals. Sinew-backed bows were made by the Ohlone and used with arrows tipped by either stone or bone points. Nets were employed to hunt a variety of ducks, quail, rabbits, and, along with basketry traps, to capture the small schooling fish common to the bay-estuary (Levy 1978).

Like most California groups, acorns were probably an important part of the Ohlone diet, as were numerous other nut and seed crops that occur on the bay plain and in the surrounding foothills and canyons. Seasonal burning of the grassland helped to promote the growth of annual seeds and forbs and increased the grazing area for deer, elk, and pronghorn. These large animals were hunted communally or in small groups. Waterfowl were an important part of the diet, often attracted by the use of tule- or feather-clad decoys.

Spain claimed California in 1542 but made no attempt to occupy any of the territory. However, the Spanish attitude changed when the Russians and English began showing interest in the region. Spanish explorers came into increasing contact with the Native Americans in the first half of the 1770s as Portola, Fages, Rivera, and Anza led expeditions through the region. Although these expeditions were largely exploratory, their main purpose was to scout for new mission sites and solidify Spanish control over the California territory, and they led to the establishment of missions in nearby San Francisco, San Jose, and Santa Clara. Many Ohlone, by force or otherwise, moved to the new missions and their vicinities. After moving to a mission, the Ohlone found that their traditional lifeways changed dramatically to regimented days spent in the fields, mixing with people from other tribes, isolation from family members of the opposite sex, diseases, and a complete inability to change their situation. Runaways were brought back by the military. In spite of these factors, increasing numbers of Indians came to the missions, particularly in the 1790s. Toward the turn of the century, some of the more distant tribes tried to organize resistance to the missionization effort, but these efforts were defeated by the Spanish soldiers. The defeat of warriors and/or spiritual leaders and the intimidation of the tribes led to ever-greater stresses on the Ohlone people. The lingering effects of this stress included disease and social marginalization of those who tried to rely on traditional ways of life that no longer worked. After nearly two centuries of isolation and marginalization, however, the Ohlone people, through newfound political, social, and economic influence, are reinvesting in their traditional culture and now constitute a revitalized cultural group in California.

HISTORY

Contra Costa County

Contra Costa County "history" essentially began with the arrival of the Fages-Crespí expedition in 1772, which expanded the exploration of the Bay Area initiated by the Spanish in 1769. The Mission and Presidio of San Francisco were both established in 1776, but the Spanish showed little interest in the Contra Costa ("other shore") and established neither settlements nor outposts there. Records indicate that 152 Carquin Native Americans (a subgroup of the Costanoans) were baptized at Mission San Francisco during the period from 1809 to 1810. Many Costanoan linguist groups were "missionized" early on, and by 1827 virtually all had been absorbed into either the mission in either San Francisco or San Jose.

After Mexico gained its independence from Spain in 1821, tracts of land called ranchos were granted to citizens in Mexican California. The project site is within a portion of the *Rancho El Pinole* initially awarded to Ygnacio Martinez. Ygnacio Martinez (for whom the nearby city of Martinez is named) was born in Mexico City in 1774 and entered military service in 1799 in Santa Barbara. In 1823, in recognition of his military service, Martinez was given possessory rights to the 17,000-acre Rancho el Pinole. Martinez built his first adobe hacienda in Pinole Valley about 3 miles from San Pablo Bay on what is now Pinole Valley Park. He spent his last 4 years of service as *comandante* at the Presidio of San Francisco, finally retiring in 1831. He was *regidor* at San Jose from 1834 to 1835, after which he settled on Rancho El Pinole, and was formally granted the property in 1842. A second grant to Martinez for *Boca de la Cañada del Pinole* was dated June 21, 1842. Despite the name differences, these land grants are the same property.

As Contra Costa County's population grew, several local valleys produced impressive orchard and row crops, including wheat, apricots, cherries, pears, figs, walnuts, and peaches. These crops flourished on the valley hillsides, and found a ready market in San Francisco. One of the more prominent agriculturalists in the area was Dr. John T. Strentzel, father-in-law of John Muir, who developed vineyards and fruit and nut orchards. In 1869, Strentzel began packing fruit into containers with carbonized bran to overcome the difficulties of shipping agricultural products. This technique allowed the fruit to remain fresh during transportation. After Dr. Strentzel's death, John Muir and his wife, Louie Strentzel, assumed control of the farm. Today, the Muir home is preserved as a national historic site.

Transportation of agricultural goods and other products to and from Contra Costa County was greatly enhanced when the Central Pacific (later the Southern Pacific) Railroad began freight service between Oakland and Martinez in 1877. By 1899, the Atchison, Topeka and Santa Fe Railway also reached Pinole and Hercules. Rail transportation quickly led to the development of new industry in Contra Costa County and in Pinole and Hercules, which soon became important commercial and residential towns.

Pinole

One of Pinole's earliest settlers, Bernardo Fernandez, established a trading company on the shores of San Pablo Bay and built the historic Fernandez Mansion. The mansion still stands today at the end of Tennent Avenue, which is named for Dr. Samuel J. Tennent, who married Rafaela, the daughter of Ignacio Martinez. The location of Fernandez's trading company may be depicted on an 1865 General Land Office plat map that shows an "Embarcadero" and "Fernandez Store" on the shores of San Pablo Bay adjacent to and to immediately southwest of where Pinole Creek flows into the bay. This is also the approximate location of the Pinole-Hercules Water Pollution Control Plant (WPCP). In 1851, the Tennents built their home on present-day Pinole Valley Road near the Tennent Avenue Creek bridge. Their residence and the facility established by Fernandez formed the core of what would become an important Bay Area commercial and residential center.

Once the Central Pacific Railroad established a line to the Pinole waterfront in 1878, the California Powder Works constructed a new facility in Pinole. The powder works built both the plant and a large number of workers' houses and became the largest producer of dynamite in the world by the turn of the century. During World War II it manufactured more TNT than any other plant in the country. The town of Pinole became the service center for the plant, and the success of the company had a direct relationship with the development of Pinole. Twenty of the homes built by the company have been rehabilitated and were relocated to a historic district adjacent to the Pinole city limits. The company ceased operations in Pinole in the 1970s, by which time the economic base of the city had already greatly diversified, a trend that continues to the present day.

The town was only officially incorporated in 1903 and boasted not only the California Powder Works but also a busy shipping wharf, a post office, a newspaper (the *Pinole Weekly Times*), a school, several hotels, saloons, various stores, and two churches. By 1915 it boasted the Pinole Opera House, the Pinole Theatre, the Bank of Pinole, and numerous other commercial enterprises such as a bakery and butcher shop. Several of these buildings, such as the Bank of Pinole building, are still standing today in the Old Town section of the city.

Hercules

The history of the city of Hercules largely parallels that of the nearby city of Pinole in that its most dramatic period of development was tied to explosives manufacturing. The California Powder Works opened its first plant near Santa Cruz in 1861 and a second factory near Golden Gate Park in San Francisco in 1869. With the growing population of San Francisco and the explosive nature of its product, the company was forced to find a more rural location, and by 1881 the company moved its operations to Pinole and Hercules. Company managers incorporated the city on December 14, 1900, after experiencing increased difficulty getting laws passed by the Contra Costa County Board of Supervisors to support the plant. The first Hercules City Council consisted of plant managers and ordinances were passed primarily to ensure the success of their products.

The California Powder Works was acquired by the Du Pont Corporation in the 1880s but was forced to sell off some of its companies because of the Sherman Antitrust Act. In 1912, as a part of the breakup, the Hercules Powder Company (later Hercules, Inc.) was incorporated. The dangerous nature of the business was clear: In the first 38 years of the California Power Works' operations in Hercules, 59 lives were taken by explosions. The nitroglycerine house and the building in which the dynamite was produced were the primary locations of the blasts. In February 1908, 24 men were killed in a single explosion. Dynamite and gunpowder production was slowly phased out at the Hercules location, and by 1964 TNT production was halted altogether in favor of anhydrous ammonia (an explosive material found in chemical fertilizer), which was far safer to manufacture, store, and ship.

By the early 1970s, however, company operations ceased altogether. By 1976, Centex Homes of California had purchased a large portion of the company lands, and a large residential area soon developed near modern-day Lupine Road. This shift in land use began a trend that only accelerated in the Hercules area during the 1980s and 1990s, eventually leading to Hercules (and Pinole) becoming important transit-oriented "bedroom communities" in the Bay Area.

CULTURAL RESOURCES IN THE PROJECT SITE AND VICINITY

As discussed below under "Analysis Methodology," archival research conducted for the proposed project included an information request submitted by AECOM to the Northwest Information Center (NWIC) of the California Historical Resources Information System. The NWIC files indicated that 26 cultural resources investigations have been conducted within and in the immediate vicinity of the force main portion of the project site (see confidential Appendix D). An additional five cultural resources overview studies also included the proposed pipeline alignment and location of the new corporation yard. One archaeological field survey studied an area within which the proposed new corporation yard site is planned.

Previous investigations resulted in the documentation of six cultural resources within or in the immediate vicinity of the proposed force main and the corporation yard site (Table 3.2-1). These include four noted along the proposed force main route (P-07-139, P-07-459, P-07-794, and P-07-2719). Site P-07-139 was recorded in 1907 by N. C. Nelson and was noted as having been a shell mound measuring approximately 280 feet by 180 feet, and was noted as having contained human remains and probably burial-associated materials. As early as 1907, however, the mound was heavily affected by residential development.

Site P-07-459 (CA-CCo-474/H) was documented in 1983 by J. G. Maniery and M. L. Maniery. This site consists of a prehistoric occupation site and historic-era remains likely associated with the California Powder Works or the later Hercules Powder Company. The southeasternmost extent of this site has been documented by Maniery and Maniery immediately adjacent to the proposed force main.

Located adjacent and just to the east of the proposed force main, site P-07-794 is a historic-era refuse scatter and the remains of a concrete building foundation. Based on the range of artifacts recovered (e.g., bottle glass, terra-cotta roof tile, ceramic bowl fragments), the deposit and possibly the associated building remains appear to date to no earlier than about 1900. Another historic-era resource, P-07-2719, is also located adjacent to the proposed force main route and consists of a commercial building constructed in 1921.

Two cultural resources (P-07-142, P-07-222) have also been identified in the immediate vicinity of the proposed corporation yard site. Site P-07-142 consists of the remains of a shell/midden mound originally documented by N. C. Nelson in 1907. In the 1907 documentation, Nelson already notes that development has already heavily affected the site. However, surface traces of the site appear to have been destroyed by heavy development. Traces of midden deposits (noted as being mostly destroyed by present-day development) at P-07-222. This site was located near the intersection of Sunnyview Drive and Bayview Farm Road, east of the proposed site of the new corporation yard.

Table 3.2-1
Documented Cultural Resources at the Project Facilities and Vicinity

NWIC Site No.	Association	Site Type	Project Component	NRHP/CRHR Eligibility
P-07-139	Prehistoric	Shell mound, human burials	Pipeline	Unevaluated
P-07-142	Prehistoric	Shell mound	Corporation yard	Unevaluated
P-07-222 CA-CCo-439	Prehistoric	Midden	Corporation yard	Unevaluated
P-07-459 CA-CCo-474/H	Prehistoric–historic era	Midden, industrial remains	Pipeline	Unevaluated
P-07-794 CA-CCo-728H	Historic era	Refuse scatter, building remains	Pipeline	Not eligible
P-07-2719	Historic era (1921)	Commercial building	Pipeline	Not eligible

Note: CRHR = California Register of Historical Resources; NRHP = National Register of Historic Places; NWIC = Northwest Information Center
Sources: Appendix D; data compiled by AECOM in 2009

3.2.2 REGULATORY FRAMEWORK

The City of Pinole plans to apply for partial funding through the State Revolving Fund (SRF). Use of dollars from the SRF requires adherence to the requirements of Section 106 of the National Historic Preservation Act (NHPA) as well as CEQA. Therefore, the regulatory framework pertaining to both Section 106 and CEQA is discussed below.

FEDERAL PLANS, POLICIES, REGULATIONS, AND LAWS

The regulations in Title 36, Section 800 of the Code of Federal Regulations (36 CFR 800), which implement Section 106 of the NHPA, call for consultation with the State Historic Preservation Officer (SHPO), Indian tribes, and interested members of the public throughout the Section 106 compliance process. The four principal steps are:

1. Initiate the Section 106 process (36 CFR 800.3).

2. Identify historic properties and cultural resources that are eligible for inclusion in the National Register of Historic Places (NRHP) (36 CFR 800.4).

3. Assess the effects of the undertaking on historic properties within the area of potential effects (APE) (36 CFR 800.5).

4. Resolve adverse effects (36 CFR 800.6).

Adverse effects on historic properties are often resolved through preparation of a memorandum of agreement developed in consultation with the lead agency, the SHPO, Indian tribes, the Advisory Council on Historic Preservation, and interested members of the public. The memorandum of agreement stipulates procedures that treat historic properties to mitigate adverse effects (36 CFR 800.14[b]).

The NRHP is a register of districts, sites, buildings, structures, and objects of significance in American history, architecture, archaeology, engineering, and culture. The regulations provided in 36 CFR 60.4 describe the criteria for evaluating cultural resources for inclusion in the NRHP. Cultural resources can be significant on the national, state, or local level. Properties may be listed in the NRHP if they possess integrity of location, design, setting, materials, workmanship, feeling, and association, and:

(a) are associated with events that have made a significant contribution to the broad patterns of our history;

(b) are associated with the lives of persons significant in our past;

(c) embody the distinctive characteristics of a type, period, or method of construction, or represent the work of a master, or possess an artistic value, or represent a significant and distinguishable entity whose components may lack individual distinction; or

(d) have yielded, or may be likely to yield, information important in prehistory or history.

Most prehistoric archaeological sites are evaluated with regard to Criterion d of the NRHP, which refers to site data potential. Such sites typically lack historical documentation that might otherwise adequately describe their important characteristics. Archaeological methods and techniques are applied to gain an understanding of the types of information that may be recovered from the deposits. Data sought are those recognized to be applicable to scientific research questions or to other cultural values.

Site integrity is also a consideration for the NRHP eligibility of an archaeological locale. The aspects of integrity are location, setting, design, workmanship, feeling, and association. These may be compromised to some extent by cultural and postdepositional factors (e.g., highway construction, erosion, bioturbation), yet the resource may still retain its integrity for satisfying Criterion d if the important information residing in the site survives.

STATE PLANS, POLICIES, REGULATIONS, AND LAWS

Before the approval of discretionary projects and the commencement of agency undertakings in California, the potential impacts of the project on archaeological and historical resources must be considered under CEQA (Public Resources Code Sections 21083.2 and 21084.1) and the State CEQA Guidelines (California Code of Regulations Title 14, Section 15064.5 [14 CCR Section 15064.5]).

CEQA uses a broad definition of what constitutes a cultural resource which is outlined in 14 CCR Section 4852. Cultural resources can include traces of prehistoric habitation and activities, historic-era sites and materials, and places used for traditional Native American observances or places with special cultural significance. In general, any trace of human activity more than 50 years in age is required to be treated as a potential cultural resource. However, because projects can extend over a period of years from planning to implementation stages, the minimum age generally accepted for resources to be considered historic for the purposes of CEQA is 45 years.

CEQA also provides for a measure of protection for Native American human remains (State CEQA Guidelines, Section 15064.5[d]) and for the accidental discovery of cultural resources (State CEQA Guidelines, Section 15064.5[e]). These are particularly important provisions in that they take into account the possibility that significant resources not noted as a result of previous research efforts may be present within a project area and need to be treated in a way commensurate with CEQA standards.

Section 21083.2 of CEQA defines "unique archaeological resource" as an archaeological artifact, object, or site about which it can be clearly demonstrated, without merely adding to the current body of knowledge, that there is a high probability that it:

- contains information needed to answer important scientific research questions and there is a demonstrable public interest in that information;
- has a special and particular quality, such as being the oldest of its type or the best available example of its type; or
- is directly associated with a scientifically recognized important prehistoric or historic event or person.

Section 15064.5 of the State CEQA Guidelines defines "historical resource" as a resource:

- listed in, or determined to be eligible by the State Historical Resources Commission for listing in, the California Register of Historical Resources (CRHR);
- listed in a local register of historic resources or as a significant resource in a historical resource survey; or
- considered to be "historically significant" by a lead agency as supported by substantial evidence in the record.

Generally, a resource shall be considered by the lead agency to be "historically significant" if it meets any of the following criteria for listing on the CRHR:

1. Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;
2. Is associated with the lives of persons important in our past;
3. Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic value; or
4. Has yielded, or may be likely to yield, information important in prehistory or history.

To be eligible for listing in the CRHR, a property must have both historic significance and integrity. Integrity is judged by considering the property's retention of location, design, setting, workmanship, materials, feeling, or association.

REGIONAL AND LOCAL PLANS, POLICIES, REGULATIONS, AND LAWS

CONTRA COSTA COUNTY GENERAL PLAN 2005–2020

The *Contra Costa County General Plan 2005–2020* (Contra Costa County 1005) provides guidance for the treatment of prehistoric and historic-era cultural resources. The following goal, policies, and implementation measures are applicable to the project:

Open Space Element

- **Goal 9-31:** To identify and preserve important archaeological and historic resources within the County.
  - **Policy 9-32:** Areas which have identifiable and important archaeological or historic significance shall be preserved for such uses, preferably in public ownership.
  - **Policy 9-33:** Buildings or structures that have visual merit and historic value shall be protected.
  - **Policy 9-34:** Development surrounding areas of historic significance shall have compatible and high quality design in order to protect and enhance the historic quality of the area.

Historic and Cultural Resource Implementation Measures

Development Review Process

- **Implementation Measure 9-i:** Develop an archaeological sensitivity map to be used by staff in the environmental review process for discretionary permits to determine potential impacts upon cultural resources.
- **Implementation Measure 9-j:** As a condition of approval of discretionary permits, include a procedure to be followed in the event that archaeological resources are encountered during development or construction.

Ordinance Revisions

- **Implementation Measure 9-k:** Review existing County ordinances and guidelines and make amendments as necessary to ensure that they provide adequate safeguards for archaeological and historic resources.
- **Implementation Measure 9-l:** Develop design guidelines for areas adjacent to or within scenic corridors or historic sites.

Other Programs

- **Implementation Measure 9-m:** Promote the use of the State of California Historic Building Code to protect historic sites in the County.
- **Implementation Measure 9-n:** Encourage owners of eligible historic properties to apply for state and federal registration of these sites and to participate in tax incentive programs for historic restoration.
- **Implementation Measure 9-o:** Seek coordination and cooperation with federal, state, and local governments, and with private and non-profit organizations to establish funding sources to preserve, restore, and enhance unique historic sites. Such funding sources may be used to acquire and preserve sites or to acquire easements over sites and building facades.
- **Implementation Measure 9-p:** Identify funding mechanisms, including funding from the County to the extent possible, to support programs to preserve, restore, and enhance unique historic sites.

CITY OF PINOLE GENERAL PLAN

The *City of Pinole General Plan* contains a number of goals and policies designed to guide future development within the city in such a way that the preservation of archaeological, historic-era, and historic architectural resources is encouraged. The following goals of the *City of Pinole General Plan* (City of Pinole 1995) are applicable to the project:

Land Use and Economic Development Element

- **Goal LU3: Historic Preservation and Community Design:** Preserve the historic resources and ensure high quality site planning and design.

- **Goal LUW-15: Historic Preservation Ordinance:** Consider adopting a Historic Preservation Ordinance to protect historic resources and to ensure that new buildings and remodeling of existing buildings are compatible with City goals for preserving the City's historic resources and character. The City should also examine financial assistance options for eligible historic properties. The ordinance would:

  a. Review the 1985 Historic Resources Survey as a basis for establishing standards for determining the historic value of potentially historic properties.

  b. Define historic areas where new development will be required to complement the character of the surrounding historic structures.

  c. Focus attention on preserving "Old Town's" character.

  d. Establish historic design guidelines that could be used to allow the adaptive re-use of historic buildings and facade improvements, and include guidelines and standards covering specific historical/architectural features, materials, colors, etc. for all new construction.

  e. Address Unreinforced Masonry Building safety.

  f. Establish exceptions from parking, lot coverage and setback requirements for historic buildings.

- **Goal LUIP-16: Historic Building Receiving Area:** Consider establishing an historic building receiving area to collect and renovate historic buildings, and, as appropriate to provide additional housing.

- **Goal LUIP-17: Archaeological Resources:** Where possible, archaeological sites or fragile historic sites will be placed within open space areas as defined during the specific project review process.

CITY OF HERCULES GENERAL PLAN

The following objective, policy, and program of the *Hercules General Plan* (City of Hercules 1998) intended to protect cultural resources are applicable to the project:

Open Space and Conservation Element

Objective 12: Protect and preserve important historic and prehistoric resources.

- **Policy 12a:** Prehistoric resources shall be identified and preserved to the extent feasible. If previously unknown subsurface cultural resources are discovered during excavation activities on the identified parcels or elsewhere in the study area, excavation would be temporarily halted and an archaeologist consulted as to the importance of the resources. Should the archaeologist determine that the resources are important, the project sponsor would allow the procedure described in Program 12a.2.

  - **Program 12a.1:** Prior to development on parcels in archaeological sensitive areas identified within the General Plan EIR, an attempt shall be made through a combination of archival research and in-field testing to identify areas that may have been used by Native American populations. Areas containing prehistoric deposits will be mapped; evaluation of their significance will follow only in those areas where future development might affect the resources.

3.2.3 ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

THRESHOLDS OF SIGNIFICANCE

The thresholds for determining the significance of impacts for this analysis are based on the environmental checklist in Appendix G of the State CEQA Guidelines. Because the City of Pinole would apply for SRF funding, the thresholds for determining the significance of impacts for this analysis are also based on Section 106 of the NHPA. The project was determined to result in a significant impact related to cultural resources if it would do any of the following:

- cause a substantial adverse change in the significance of a unique archaeological resource or a historical resource as defined in Section 21083.2 of CEQA and Section 15064.5 of the State CEQA Guidelines, respectively;

- disturb any human remains, including those interred outside of formal cemeteries; or

- result in adverse effects on a historic property as defined per the Section 106 regulations

As defined in the State CEQA Guidelines, a “substantial adverse change” in the significance of a historical resource means physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of the historical resource would be materially impaired. Under Section 106, adverse effects are effects that damage the qualities that make an historic property eligible for the NRHP, or the ability of that property to convey the significance that makes it eligible. (That is, if a federal action would “alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property’s location, design, setting, materials, workmanship, feeling, or association” [36 CFR 800.5(a)(1)], a significant impact would result.)

ANALYSIS METHODOLOGY

Cultural resources investigations for the proposed project consisted of a phased approach that included prefield research, field surveys, and Native American consultation. All aspects of the cultural resource study were conducted in accordance with the *Secretary of the Interior’s Guidelines for Identification of Cultural Resources* (48 CFR 44720–44723).

Archival research included an information request submitted by AECOM to the Northwest Information Center of the California Historical Resources Information System. The records search included reviews of sites listed in the National Register of Historic Places, *California Historical Landmarks*, and applicable local registers, as well as a review of NWIC maps and files associated with relevant previous cultural resources surveys conducted in and near the project site. AECOM Sacramento’s in-house cultural resources library was also consulted in an effort to further identify cultural resources or potentially sensitive areas within the project site.

Field investigations consisted of a pedestrian survey of the project site, including the proposed new corporation yard. In general, much of the project site is paved or otherwise developed and not suited to standard archaeological survey techniques. Along roadsides and in heavily developed areas, the survey was largely cursory and reconnaissance in nature. However, less-developed portions of the project site, such as the proposed pipeline route along Pinole Creek, were surveyed using regularly spaced pedestrian transects. No subsurface investigative techniques were employed.

To satisfy the consultation provisions of Section 106, AECOM sent a letter to the Native American Heritage Commission (NAHC) requesting a search of the NAHC Sacred Lands File and a contact list of appropriate Native American tribal organizations and representatives. NAHC did not identify any culturally sensitive properties within or in the immediate vicinity of any of the proposed facilities. AECOM contacted each individual on the NAHC list (see confidential Appendix D). No responses were received.

IMPACT ANALYSIS

Please note that impacts to paleontological resources are discussed in Section 3.5, "Geology, Soils, and Paleontological Resources."

IMPACT 3.2-1	Damage to or Destruction of Documented CRHR/NRHP–Eligible Cultural Resources. *Three prehistoric cultural resources have been documented adjacent to or in the immediate vicinity of the proposed effluent pipeline route and corporation yard site. Previously undocumented portions of these resources could be encountered and disturbed during project-related ground-disturbing activities.*

OPTION 1: NEW LARGER EFFLUENT PIPELINE TO RSD

Three early Native American sites (P-07-142, P-07-222, and P-07-459) have been documented immediately adjacent to the facilities that would be constructed under Option 1. Two of these resources (P-07-142 and P-07-222) were noted in the area of the proposed corporation yard and one of the sites was noted in the area of the pipeline alignment (P-07-459). Each of these sites has been documented as having once contained human remains and/or potentially interment-associated artifacts, or retains the types of soils and artifactual materials within which human remains are often noted in the Bay Area. Although presently unevaluated for CRHR/NRHP eligibility, existing documentation suggests that they could still retain important scientific data. Development in the 20th century heavily affected the surface manifestations of these sites, but significant archaeological deposits and intact human interments may still be present in subsurface contexts. In addition, because some of these sites were documented more than a century ago and subsequent documentation efforts may have been hindered by the presence of present-day roadways, buildings, and structures, the horizontal extent of these sites cannot be accurately determined. Consequently, and given the proximity of these sites to the proposed effluent pipeline route and corporation yard site, ground-disturbing activities on both of these project components could encounter and disturb intact archaeological deposits and/or human interments. Because of the potential for such disturbances, this impact would be **potentially significant**.

OPTION 2: PINOLE-ONLY FLOWS AT EXISTING PLANT

Numerous intensive archaeological surveys and inventories have been conducted within and immediately adjacent to the Pinole-Hercules WPCP, and AECOM archaeologists again surveyed this area in 2009. No documented cultural sites, features, artifacts or other properties that could be eligible for listing in the CRHR or NRHP have been identified within the Pinole-Hercules WPCP. Consequently, **no impact** on documented CRHR/NHRP-eligible cultural resources would occur under Option 2.

Mitigation Measure 3.2-1: Provide Construction Personnel Training in the Recognition of Cultural Materials, Stop Work If Materials are Encountered, and Implement Procedures Necessary for Resource Protection and Treatment.

Applies to: Option 1 (Pipeline Alignment and Corporation Yard Only)

Before the start of project ground-disturbing activities at the corporation yard or within 500 feet of the P-07-459 near the pipeline alignment, a qualified professional archaeologist shall provide a brief training session to all construction personnel. This training shall provide basic information on recognizing the kinds of cultural resources that could be encountered as a result of project ground-disturbing activities; briefly review applicable cultural resources regulations; and outline procedures that must be followed upon the discovery of cultural materials or possible human remains. If traces of prehistoric occupation (e.g., midden soils, unusual amounts of shell, artifacts, bone) or historic-era remains (e.g., building or structure traces, concentrations of early-historic-era refuse) are encountered, ground-disturbing activities in the vicinity of the find shall cease until the archaeologist can determine the nature and potential significance of the find and recommend a treatment plan. The treatment plan could include but is not necessarily limited to avoidance through construction rerouting or revisions, additional archival research, and subsurface excavations for archaeological testing and/or data recovery.

Implementation of Mitigation Measure 3.2-1 would reduce potentially significant impacts on documented cultural resources to a **less-than-significant** level because construction worker personnel training would be provided, work would be halted should a cultural resource be discovered, and a qualified archaeologist would prepare a treatment plan.

IMPACT 3.2-2 Damage to or Destruction of Undocumented Cultural Resources. *Subsurface disturbances could potentially destroy or damage as-yet-undiscovered prehistoric or historic-era cultural resources.*

OPTION 1: NEW LARGER EFFLUENT PIPELINE TO RSD AND OPTION 2: PINOLE-ONLY FLOWS AT EXISTING PLANT

No CRHR/NRHP–eligible cultural resources have been documented directly within areas subject to ground disturbances under either Option 1 or Option 2; however, documentary research indicates that several areas within or immediately adjacent to the facilities that would be constructed under both options may retain important subsurface prehistoric and historic-ea archaeological materials. These areas consist of:

- the south bank of present-day Pinole Creek in the vicinity of the existing Pinole-Hercules WPCP,
- the Pinole-Hercules WPCP,
- the proposed corporation yard site, and
- San Pablo Avenue between Victoria Crescent Way and Alfred Nobel Drive.

The south bank of Pinole Creek in the vicinity of the Pinole-Hercules WPCP and the WPCP site itself may retain subsurface remains associated with Bernardo Fernandez’s trading company and store, which was constructed at or near this location in the early 1850s. Such early-historic-era sites could retain information important to our understanding of early historic settlement and commerce in the Bay Area and could constitute significant cultural resources. The proposed corporation yard site is sensitive because of the presence of two potentially significant prehistoric sites in the immediate area. The stretch of San Pablo Avenue between Victoria Crescent Way and Alfred Nobel Drive is sensitive because the potentially significant prehistoric site P-07-459 is located immediately to the north-northwest.

Although the project site and surrounding vicinity have been subjected to numerous archaeological and historical investigations, most of them only examined the ground surface of the respective project areas and consequently could not identify buried prehistoric or historic-era archaeological materials. Consequently, the possibility exists for unrecorded prehistoric and historic-era cultural resources to be discovered or disturbed during project-related ground-disturbing activities. Because of the potential for such resources to be determined to be eligible for listing in the CRHR or NRHP, this impact would be **significant**.

Mitigation Measure: Implement Mitigation Measure 3.2-1.

Applies to: Options 1 and 2

Mitigation Measure 3.2-2: Monitor Ground-Disturbing Activities in Areas Determined to Be Highly Sensitive for Containing Prehistoric and/or Historic-Era Cultural Materials and Human Remains.

Applies to: Options 1 and 2

A qualified professional archaeologist shall monitor all ground-disturbing activities at the Pinole-Hercules WPCP, effluent pipeline trenching on the south bank of present-day Pinole Creek and along San Pablo Avenue as noted above, and initial grading and utility trenching at the site of the proposed corporation yard. If traces of prehistoric occupation (e.g., midden soils, unusual amounts of shell, artifacts, bone) or historic-era remains (e.g., building or structure traces, concentrations of early-historic-era refuse) are encountered, ground-disturbing activities in the vicinity of the find shall cease until the archaeologist can determine the nature and potential significance of the find and recommend a treatment plan. The treatment plan could include but is not necessarily limited to avoidance through construction rerouting or revisions, additional archival research, and subsurface excavations for archaeological testing and/or data recovery.

Implementation of Mitigation Measures 3.2-1 and 3.2-2 would reduce potentially significant impacts resulting from inadvertent damage or destruction of unknown cultural resources during construction to a **less-than-significant** level because a professional archaeological monitor would be present during ground-disturbing activities in sensitive areas, and if any resources were discovered, potentially important scientific data would be recovered and/or CRHR/NRHP–eligible cultural resources would be preserved in place.

IMPACT 3.2-3	Damage to or Destruction of Undocumented Human Remains. *Subsurface disturbances could potentially uncover unmarked historic-era or prehistoric burials.*

Option 1: New Larger Effluent Pipeline to RSD and Option 2: Pinole-Only Flows at Existing Plant

No human remains have been documented from directly within the footprint where facilities associated with Option 1 and Option 2 would be constructed; however, the discovery of human interments and possibly burial-related materials from sites immediately adjacent to the proposed facilities indicates that further discoveries of human remains could occur. California law recognizes the need to protect historic-era and Native American human burials, skeletal remains, and items associated with Native American interments from vandalism and inadvertent destruction. The procedures for the treatment of Native American human remains are contained in Sections 7050.5 and 7052 of the California Health and Safety Code and Section 5097 of the California Public Resources Code. Because of the potential for human remains to be unearthed during project construction, this impact would be **potentially significant**.

No human remains have been documented from within the Pinole-Hercules WPCP site; however, the discovery of human interments and possibly burial-related materials from sites in the general area indicates that further discoveries of human remains could occur. California law recognizes the need to protect historic-era and Native American human burials, skeletal remains, and items associated with Native American interments from vandalism and inadvertent destruction. The procedures for the treatment of Native American human remains are contained in Sections 7050.5 and 7052 of the California Health and Safety Code and Section 5097 of the California Public Resources Code. Because of the potential for human remains to be unearthed during project construction, this impact would be **potentially significant**.

Mitigation Measure 3.2-3: If Human Remains are Uncovered During Ground-Disturbing Activities, Halt Potentially Damaging Excavation in the Area of the Burial and Contact the Contra Costa County Coroner and a Professional Archaeologist to Determine the Nature and Extent of the Remains.

Applies to: Options 1 and 2

The coroner is required to examine all discoveries of human remains within 48 hours of receiving notice of a discovery on private or state lands (California Health and Safety Code, Section 7050.5[b]). If the coroner determines that the remains are those of a Native American, he or she must contact the Native American Heritage Commission by phone within 24 hours of making that determination (Health and Safety Code, Section 7050[c]).

Following the coroner's findings, the property owner, the City of Pinole or its construction contractor, an archaeologist, and the NAHC-designated most likely descendant (MLD) shall determine the ultimate treatment and disposition of the remains and take appropriate steps to ensure that additional human interments are not disturbed. The responsibilities for acting upon notification of a discovery of Native American human remains are identified in Section 5097.9 of the California Public Resources Code.

The landowner shall ensure that the immediate vicinity (according to generally accepted cultural or archaeological standards and practices) is not damaged or disturbed by further development activity until consultation with the MLD has taken place. The MLD shall have 48 hours to complete a site inspection and make recommendations after being granted access to the site. A range of possible treatments for the remains, including nondestructive removal and analysis, preservation in place, relinquishment of the remains and associated items to the descendants, or other culturally appropriate treatment may be discussed. Assembly Bill (AB) 2641 (Chapter 863, Statutes of 2006), which amended Section 5097.98 of the California Public Resources Code, suggests that the concerned parties may extend discussions beyond the initial 48 hours to allow for the discovery of additional remains. AB 2641(e) (i.e., Public Resources Code, Section 5097.98[e]) includes a list of site protection measures and states that the landowner shall do one or more of the following:

- Record the site with the NAHC or the appropriate Information Center.
- Utilize an open-space or conservation zoning designation or easement.
- Record a document with the county in which the property is located.

The landowner or an authorized representative must rebury the Native American human remains and associated grave goods with appropriate dignity on the property in a location not subject to further subsurface disturbance if the NAHC is unable to identify a MLD or if the MLD fails to make a recommendation within 48 hours after being granted access to the site. The landowner or authorized representative may also reinter the remains in a location not subject to further disturbance if they reject the recommendation of the MLD, and mediation by the NAHC fails to provide measures acceptable to the landowner.

Implementation of Mitigation Measure 3.2-3 would reduce potential impacts on human remains to a **less-than-significant** level by immediately suspending work in the vicinity of the discovery and complying with state laws requiring contact with the applicable county coroner and a professional archaeologist to determine the nature of the find, and subsequent contact with the NAHC and appropriate treatment if the remains are determined to be those of a Native American.

3.3 CLIMATE CHANGE

3.3.1 ENVIRONMENTAL SETTING

GREENHOUSE GASES AND THE PHYSICAL SCIENTIFIC BASIS FOR CLIMATE CHANGE

Certain gases in the earth's atmosphere, classified as greenhouse gases (GHGs), play a critical role in determining the earth's surface temperature. Solar radiation enters the earth's atmosphere from space. A portion of the radiation is absorbed by the earth's surface, and a smaller portion of this radiation is reflected back toward space. The absorbed radiation is then emitted from the earth, not as high-frequency solar radiation, but lower frequency infrared radiation. The frequencies at which bodies emit radiation are proportional to temperature. The earth has a much lower temperature than the sun; therefore, the earth emits lower frequency (longer wavelength) radiation. Most solar radiation passes through GHGs; however, infrared radiation is selectively absorbed by GHGs. As a result, infrared radiation released from the earth that otherwise would have escaped back into space is instead "trapped," resulting in a warming of the atmosphere. This phenomenon, known as the "greenhouse effect," is responsible for maintaining a habitable climate on Earth. Without the greenhouse effect, Earth would not be able to support life as we know it.

The accumulation of GHGs has been implicated as a driving force for global climate change. Definitions of climate change vary between and across regulatory authorities and the scientific community, but in general can be described as the changing of the earth's climate caused by natural fluctuations and anthropogenic activities that alter the composition of the global atmosphere.

Prominent GHGs contributing to the greenhouse effect are carbon dioxide (CO_2), methane, nitrous oxide (N_2O), and fluorinated compounds. Human-caused emissions of these GHGs in excess of natural ambient concentrations are responsible for intensifying the greenhouse effect and have led to a trend of unnatural warming of the earth's climate, known as global climate change or global warming. It is extremely unlikely that global climate change over the past 50 years can be explained without the contribution from human activities (IPCC 2007a:665).

Climate change is a global problem. GHGs are global pollutants, unlike criteria air pollutants and TACs, which are pollutants of regional and local concern. Whereas pollutants with localized air quality effects have relatively short atmospheric lifetimes (about 1 day), GHGs have long atmospheric lifetimes (1 year to several thousand years). GHGs persist in the atmosphere for long enough time periods to be dispersed around the globe. Although the exact lifetime of any particular GHG molecule is dependent on multiple variables and cannot be pinpointed, it is understood that more CO_2 is currently emitted into the atmosphere than is sequestered by ocean uptake, vegetation, and other forms of sequestration. Of the total annual human-caused CO_2 emissions, approximately 54% is sequestered through ocean uptake, uptake by northern hemisphere forest regrowth, and other terrestrial sinks within a year, whereas the remaining 46% of human-caused CO_2 emissions remains stored in the atmosphere (Seinfeld and Pandis 1998:1091).

Similarly, impacts of GHGs are borne globally, as opposed to localized air quality effects of criteria air pollutants and TACs. The quantity of GHGs that it takes to ultimately result in climate change is not precisely known; suffice it to say that the quantity is enormous, and no single project would be expected to measurably contribute to a noticeable incremental change in the global average temperature, or to global, local, or micro climate.

GREENHOUSE GAS EMISSION SOURCES

Emissions of GHGs contributing to global climate change are attributable in large part to human activities associated with the industrial/manufacturing, utility, transportation, residential, and agricultural sectors (ARB 2008a). In California, the transportation sector is the largest emitter of GHGs, followed by electricity generation (ARB 2008a). Emissions of CO_2 are by-products of fossil fuel combustion. Methane, a highly potent GHG, results from off-gassing (the release of chemicals from nonmetallic substances under ambient or greater pressure conditions) largely associated with agricultural practices and landfills. CO_2 sinks, or reservoirs, include vegetation and the ocean, which absorb CO_2 through photosynthesis and dissolution, respectively. These are two of the most common processes of CO_2 sequestration.

California is the 12th to 16th largest emitter of CO_2 in the world (CEC 2006a:17–20). California produced 480 million gross metric tons of CO_2e in 2004 (ARB 2008a). CO_2e is a measurement used to account for the fact that different GHGs have different potential to retain infrared radiation in the atmosphere and contribute to the greenhouse effect. This potential, known as the global warming potential (GWP) of a GHG, is dependent in large part on the lifetime, or persistence, of the gas molecule in the atmosphere and its ability to absorb and retain heat (i.e., infrared radiation) in the atmosphere.

Combustion of fossil fuel in the transportation sector was the single largest source of California's GHG emissions during 2002–2004, accounting for 38% of total GHG emissions in the state (ARB 2008b). This sector was followed by the electric power sector (including both in-state and out-of-state sources) (23%) and the industrial sector (20%) (ARB 2008a).

Individual projects contribute to the cumulative effects of climate change by emitting GHGs during demolition, construction, and operational phases. While the presence of the primary GHGs in the atmosphere are naturally occurring, CO_2, methane, and N_2O are largely emitted from human activities, accelerating the rate at which these compounds accumulate in the earth's atmosphere. CO_2 is the "reference gas" for GHG emissions, meaning that emissions of total GHGs are typically reported in "carbon dioxide-equivalent" (CO_2e). Emissions of CO_2 are largely by-products of fossil fuel combustion, whereas methane results from off-gassing associated with agricultural practices, landfills, and handling of biosolids. Other GHGs, with much greater heat-absorption potential than CO_2, include hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride, and are generated in certain industrial processes.

The California Energy Commission (CEC) estimated that California produced 500 gross million metric tons (MMT) (about 550 million U.S. tons) of CO_2e emissions in 2004. The CEC found that transportation is the source of 38% of the state's GHG emissions, followed by electricity generation (both in-state and out-of-state) at 23% and industrial sources at 13% (CEC 2006b). In the San Francisco Bay Area Air Basin (SFBAAB), fossil fuel consumption in the transportation sector (on-road motor vehicles, off-road mobile sources, and aircraft) is the single largest source of GHG emissions, accounting for approximately 41 % of SFBAAB's 103 MMT CO_2e emissions in 2007. Industrial and commercial sources were the second largest contributors of GHG emissions with about 34 of total emissions. Electricity and cogeneration plants accounted for approximately 15% of SFBAAB's GHG emissions, followed by domestic sources (e.g., home water heaters and furnaces) at 7%. Oil refining, which is part of the industrial sector, currently accounts for approximately 14% of the total SFBAAB GHG emissions (BAAQMD 2008).

ADAPTATION TO CLIMATE CHANGE

There is international scientific consensus that human-caused increases in GHGs have contributed and will continue to contribute to global warming, although there is uncertainty concerning the magnitude and rate of the warming. Potential global warming impacts in California may include, but are not limited to, a decrease in snow pack, sea level rise, more extreme heat days per year, more high ozone days, increased frequency and intensity of wildfires, and more drought years (California Resources Agency 2009). Secondary effects are likely to include impacts to agriculture, changes in disease vectors, and changes in habitat and biodiversity.

Climate change could affect environmental conditions in California through a variety of mechanisms. One is sea level rise. Sea levels along the California coast rose approximately 7 inches during the last century (CEC 2006a:12), and are predicted to rise an additional 7–22 inches by 2100, depending on the future levels of GHG emissions (IPCC 2007a:11). However, the Governor-appointed Delta Vision Blue Ribbon Task Force has recommended that the state plan for a scenario of 16 inches of sea level rise by 2050 and 55 inches by 2100

(California Resources Agency 2008). Resultant effects of sea level rise could include increased coastal flooding, saltwater intrusion (especially a concern in the low-lying Delta, where pumps delivering potable water could be threatened), and disruption of wetlands (CEC 2006a:12–13). Some low-lying populated areas throughout the Central Valley and Delta inundated by sea level rise could experience population displacement and economic disruption.

As the existing climate throughout California changes over time, the ranges of various plant and wildlife species could shift or be reduced, depending on the favored temperature and moisture regimes of each species. In the worst cases, some species would become extinct or be extirpated from the state if suitable conditions are no longer available. Additional concerns associated with climate change are a reduction in the snowpack, leading to less overall water storage in the mountains (the largest "reservoir" in the state), and increased risk of wildfire caused by changes in rainfall patterns and plant communities.

ON-SITE PROJECT DESIGN FEATURES

The existing Pinole-Hercules WPCP operates a co-generation plant that uses methane produced from on-site processes (i.e., digesters used to break down organic materials in sludge [or biosolids]). The methane emissions are combusted on-site to produce electricity for the WPCP, which thereby reduces the amount of electricity consumption and associated GHG emissions associated with the WPCP's operation. In order to remain effective, the digesters used to break down sludge and biosolids must be kept at a temperature ranging from 98–100°F. The heat generated by the methane combustion (for electricity production) is used to maintain the temperature of the digesters. By using the heat from the methane combustion, the WPCP reduces the amount of natural gas consumed, which is typically used as the fuel to heat the digesters. Therefore, the existing Pinole-Hercules WPCP reduces its consumption of electricity and natural gas, thereby forgoing additional GHG emissions, through operation of the co-generation plant.

3.3.2 REGULATORY FRAMEWORK

FEDERAL PLANS, POLICIES, REGULATIONS, AND LAWS

Supreme Court Ruling

The U.S. Environmental Protection Agency (EPA) is the federal agency responsible for implementing the federal Clean Air Act (CAA). The Supreme Court of the United States ruled on April 2, 2007, that CO_2 is an air pollutant as defined under the CAA, and that EPA has the authority to regulate emissions of GHGs. However, there are no federal regulations or policies regarding GHG emissions applicable to the project.

U.S. Environmental Protection Agency Actions

In response to the mounting issue of climate change, EPA has taken actions to regulate, monitor, and potentially reduce GHG emissions.

Mandatory Greenhouse Gas Reporting Rule

On September 22, 2009, EPA issued a final rule for mandatory reporting of GHGs from large GHG emissions sources in the United States. In general, this national reporting requirement will provide EPA with accurate and timely GHG emissions data from facilities that emit 25,000 metric tons (MT) or more of CO_2 per year. This publically available data will allow the reporters to track their own emissions, compare them to similar facilities, and aid in identifying cost effective opportunities to reduce emissions in the future. Reporting is at the facility level, except that certain suppliers of fossil fuels and industrial greenhouse gases along with vehicle and engine manufacturers will report at the corporate level. An estimated 85% of the total U.S. GHG emissions, from approximately 10,000 facilities, are covered by this final rule.

Endangerment and Cause or Contribute Findings for Greenhouse Gases under the Clean Air Act

On December 7, 2009, EPA adopted its Proposed Endangerment and Cause or Contribute Findings for Greenhouse Gases under the CCA (Endangerment Finding). The Endangerment Finding is based on Section 202(a) of the CAA, which states that the Administrator (of EPA) should regulate and develop standards for "emission[s] of air pollution from any class of classes of new motor vehicles or new motor vehicle engines, which in [its] judgment cause, or contribute to, air pollution which may reasonably be anticipated to endanger public health or welfare." The rule addresses Section 202(a) in two distinct findings. The first addresses whether or not the concentrations of the six key GHGs (i.e., CO_2, methane, N_2O, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride) in the atmosphere threaten the public health and welfare of current and future generations. The second addresses whether or not the combined emissions of GHGs from new motor vehicles and motor vehicle engines contribute to atmospheric concentrations of GHGs and therefore the threat of climate change.

The Administrator found that atmospheric concentrations of GHGs endanger the public health and welfare within the meaning of Section 202(a) of the CAA. The evidence supporting this finding consists of human activity resulting in "high atmospheric levels" of GHG emissions, which are very likely responsible for increases in average temperatures and other climatic changes. Furthermore, the observed and projected results of climate change (e.g., higher likelihood of heat waves, wild fires, droughts, sea level rise, higher intensity storms) are a threat to the public health and welfare. Therefore, GHGs were found to endanger the public health and welfare of current and future generations.

The Administrator also found that GHG emissions from new motor vehicles and motor vehicle engines are contributing to air pollution, which is endangering public health and welfare. EPA's final findings respond to the 2007 U.S. Supreme Court decision that GHGs fit within the CAA definition of air pollutants. The findings do not in and of themselves impose any emission reduction requirements but rather allow EPA to finalize the GHG standards proposed earlier in 2009 for new light-duty vehicles as part of the joint rulemaking with the U.S. Department of Transportation.

STATE PLANS, POLICIES, REGULATIONS, AND LAWS

Various statewide and local initiatives to reduce the state's contribution to GHG emissions have raised awareness that, even though the various contributors to, and consequences of, global climate change are not yet fully understood, global climate change is under way, and there is a real potential for severe, adverse environmental, social, and economic effects in the long term. Because every nation emits GHGs and therefore makes an incremental cumulative contribution to global climate change, cooperation on a global scale will be required to reduce the rate of GHG emissions to a level that can help to slow or stop the human-caused increase in average global temperatures and associated changes in climatic conditions.

Assembly Bill 1493

In 2002, then-Governor Gray Davis signed Assembly Bill (AB) 1493, which required that the California Air Resources Board (ARB) develop and adopt, by January 1, 2005, regulations that achieve "the maximum feasible reduction of greenhouse gases emitted by passenger vehicles and light-duty trucks and other vehicles determined by ARB to be vehicles whose primary use is noncommercial personal transportation in the state."

To meet the requirements of AB 1493, in 2004 ARB approved amendments to the California Code of Regulations (CCR) adding GHG emissions standards to California's existing standards for motor vehicle emissions. Amendments to CCR Title 13, Sections 1900 and 1961 (13 CCR 1900, 1961), and adoption of Section 1961.1 (13 CCR 1961.1) require automobile manufacturers to meet fleet-average GHG emissions limits for all passenger cars, light-duty trucks within various weight criteria, and medium-duty passenger vehicle weight classes (i.e., any medium-duty vehicle with a gross vehicle weight (GVW) rating less than 10,000 pounds (lbs) that is designed primarily for the transportation of persons), beginning with the 2009 model year. For passenger cars and light-duty trucks with a loaded vehicle weight (LVW) of 3,750 lbs or less, the GHG emission limits for the 2016 model year are approximately 37% lower than the limits for the first year of the regulations, the 2009 model year. For light-duty trucks with LVW of 3,751 lbs to GVW of 8,500 lbs, as well as medium-duty passenger vehicles, GHG emissions will be reduced approximately 24% between 2009 and 2016.

In December 2004, a group of car dealerships, automobile manufacturers, and trade groups representing automobile manufacturers filed suit against ARB to prevent enforcement of 13 CCR Sections 1900 and 1961 as amended by AB 1493 and 13 CCR 1961.1 (*Central Valley Chrysler-Jeep et al. v. Catherine E. Witherspoon, in Her Official Capacity as Executive Director of the California Air Resources Board et al.*). The auto-makers' suit in the U.S. District Court for the Eastern District of California contended California's implementation of regulations that, in effect, regulate vehicle fuel economy violates various federal laws, regulations, and policies.

On December 12, 2007, the Court found that if California receives appropriate authorization from the EPA (the last remaining factor in enforcing the standard), these regulations would be consistent with, and have the force of, federal law, thus rejecting the automakers' claim. This authorization to implement more stringent standards in California was requested in the form of a CAA Section 209, subsection (b) waiver in 2005. Since that time, EPA failed to act on granting California authorization to implement the standards. Governor Arnold Schwarzenegger and Attorney General Edmund G. Brown filed suit against EPA for the delay. In December 2007, EPA Administrator Stephen Johnson denied California's request for the waiver to implement AB 1493. Johnson cited the need for a national approach to reducing GHG emissions, the lack of a "need to meet compelling and extraordinary conditions," and the emissions reductions that would be achieved through the Energy Independence and Security Act of 2007 as the reasoning for the denial (Office of the White House 2009).

The state of California filed suit against EPA for its decision to deny the CAA waiver. Then the Obama administration directed EPA to reexamine its position for denial of California's CAA waiver and for its past opposition to GHG emissions regulation. California received the waiver on June 30, 2009.

Executive Order S-3-05

Executive Order S-3-05, which was signed by Governor Schwarzenegger in 2005, proclaims that California is vulnerable to the impacts of climate change. It declares that increased temperatures could reduce the Sierra's snowpack, further exacerbate California's air quality problems, and potentially cause a rise in sea levels. To combat those concerns, the Executive Order established total greenhouse gas emission targets. Specifically, emissions are to be reduced to the 2000 level by 2010, the 1990 level by 2020, and to 80% below the 1990 level by 2050.

The Executive Order directed the Secretary of the California Environmental Protection Agency (Cal/EPA) to coordinate a multi-agency effort to reduce greenhouse gas emissions to the target levels. The Secretary will also submit biannual reports to the governor and state legislature describing: progress made toward reaching the emission targets; impacts of global warming on California's resources; and mitigation and adaptation plans to combat these impacts. To comply with the Executive Order, the Secretary of the Cal/EPA created the California Climate Action Team (CCAT) made up of members from various state agencies and commission. CCAT released its first report in March 2006. The report proposed to achieve the targets by building on voluntary actions of California businesses, local government and community actions, as well as through state incentive and regulatory programs.

Assembly Bill 32, the California Global Warming Solutions Act of 2006

In September 2006, Governor Arnold Schwarzenegger signed AB 32, the California Global Warming Solutions Act of 2006. AB 32 establishes regulatory, reporting, and market mechanisms to achieve quantifiable reductions in GHG emissions and a cap on statewide GHG emissions. AB 32 requires that statewide GHG emissions be reduced to 1990 levels by 2020. This reduction will be accomplished through an enforceable statewide cap on GHG emissions that will be phased in starting in 2012. To effectively implement the cap, AB 32 directs ARB to develop and implement regulations to reduce statewide GHG emissions from stationary sources. AB 32 specifies that regulations adopted in response to AB 1493 should be used to address GHG emissions from vehicles. However, AB 32 also includes language stating that if the AB 1493 regulations cannot be implemented, then ARB should develop new regulations to control vehicle GHG emissions under the authorization of AB 32.

AB 32 requires that ARB adopt a quantified cap on GHG emissions representing 1990 emissions levels and disclose how it arrives at the cap; institute a schedule to meet the emissions cap; and develop tracking, reporting, and enforcement mechanisms to ensure that the state achieves the reductions in GHG emissions necessary to meet the cap. AB 32 also includes guidance to institute emissions reductions in an economically efficient manner and conditions to ensure that businesses and consumers are not unfairly affected by the reductions.

AB 32 Climate Change Scoping Plan

In December 2008, ARB adopted its *Climate Change Scoping Plan* (Scoping Plan), which contains the main strategies California will implement to achieve reduction of approximately 169 MMT CO_2e, or approximately 30% from the state's projected 2020 emission level of 596 MMT CO_2e under a business-as-usual scenario (this is a reduction of 42 MMT CO_2e, or almost 10%, from 2002-2004 average emissions). The Scoping Plan also includes ARB-recommended GHG reductions for each emissions sector of the state's GHG inventory. The Scoping Plan calls for the largest reductions in GHG emissions to be achieved by implementing the following measures and standards:

- improved emissions standards for light-duty vehicles (estimated reductions of 31.7 MMT CO_2e),
- the Low-Carbon Fuel Standard (15.0 MMT CO_2e),
- energy efficiency measures in buildings and appliances and the widespread development of combined heat and power systems (26.3 MMT CO_2e), and
- a renewable portfolio standard for electricity production (21.3 MMT CO_2e).

ARB has not yet determined what amount of GHG reductions it recommends from local government operations; however, the Scoping Plan does state that land use planning and urban growth decisions will play an important role in the state's GHG reductions because local governments have primary authority to plan, zone, approve, and permit how land is developed to accommodate population growth and the changing needs of their jurisdictions. (Meanwhile, ARB is also developing an additional protocol for community emissions.) ARB further acknowledges that decisions on how land is used will have large impacts on the GHG emissions that will result from the transportation, housing, industry, forestry, water, agriculture, electricity, and natural gas emission sectors. The Scoping Plan states that the ultimate GHG reduction assignment to local government operations is to be determined (ARB 2008b). With regard to land use planning, the Scoping Plan expects approximately 5.0 MMT CO_2e will be achieved associated with implementation of Senate Bill (SB) 375, which is discussed further below.

Executive Order S-1-07

Executive Order S-1-07, which was signed by Governor Schwarzenegger in 2007, proclaims that the transportation sector is the main source of GHG emissions in California, at over 40% of statewide emissions. It establishes a goal that the carbon intensity of transportation fuels sold in California should be reduced by a minimum of 10% by 2020. This order also directed ARB to determine if this Low Carbon Fuel Standard could be adopted as a discrete, early-action measure after meeting the mandates in AB 32. ARB adopted the Low Carbon Fuel Standard on April 23, 2009.

Senate Bill 1368

SB 1368 (Chapter 598, Statutes of 2006) is the companion bill of AB 32 and was signed by Governor Schwarzenegger in September 2006. SB 1368 required the California Public Utilities Commission (CPUC) to establish a GHG emission performance standard (EPS) for base-load generation from investor-owned utilities by February 1, 2007. Similarly, the CEC was tasked with establishing a similar standard for local publicly owned utilities by June 30, 2007. In January 2007, CPUC adopted an EPS of 1,100 lbs of CO_2 per megawatt-hour (MWh) of produced electricity for baseload generation from publicly owned facilities or facilities under long-term contract with publicly owned utilities. In May 2007, CEC approved regulations that prohibit the state's publicly owned utilities from entering into long-term financial commitments with plants that exceed the standard adopted by CPUC of 1,100 lb of CO_2/MWh.

Senate Bill 1078 and 107 and Executive Order S-14-08 and S-21-09

SB 1078 (Chapter 516, Statutes of 2002) requires retail sellers of electricity, including investor-owned utilities and community choice aggregators, to provide at least 20% of their supply from renewable sources by 2017. SB 107 (Chapter 464, Statutes of 2006) changed the target date to 2010. In November 2008 Governor Schwarzenegger signed Executive Order S-14-08, which expands the state's Renewable Energy Standard to 33% renewable power by 2020. Governor Schwarzenegger plans to propose legislative language that will codify the new higher standard (Office of the Governor 2008).

Senate Bill 97

SB 97, signed August 2007, acknowledges that climate change is a prominent environmental issue that requires analysis under CEQA. This bill directs the California Office of Planning and Research (OPR) to prepare, develop, and transmit to the California National Resources Agency (CNRA) guidelines for the feasible mitigation of GHG emissions or the effects of GHG emissions, as required by CEQA by July 1, 2009. CNRA is required to certify or adopt those guidelines by January 1, 2010. [Note to City: It is our understanding that CNRA is on track to meet this statutory date. There is no conflicting information on the web sites of OPR or CNRA.] On April 13, 2009, the California Office of Planning and Research submitted to the Secretary for CNRA its proposed amendments to the State CEQA Guidelines for GHG emissions, as required by SB 97. These proposed State CEQA Guidelines amendments would provide guidance to public agencies regarding the analysis and mitigation of the effects of GHG emissions in draft CEQA documents. The CNRA will conduct formal rulemaking in 2009, prior to certifying and adopting the amendments, as required by SB 97.

This bill also removes inadequate CEQA analysis of effects of GHG emissions from projects (retroactive and future) funded by the Highway Safety, Traffic Reduction, Air Quality and Port Security Bond Act of 2006, or the Disaster Preparedness and Flood Protection Bond Act of 2006 (Proposition 1B or 1E) as a legitimate cause of action. This provision will be repealed on January 1, 2010, wherein inadequate CEQA analysis for those projects could then become a legitimate cause of action. This bill would only protect a handful of public agencies from CEQA challenges on certain types of projects for a few years time.

Senate Bill 375

SB 375, signed in September 2008, aligns regional transportation planning efforts, regional GHG reduction targets, and land use and housing allocations. SB 375 requires Metropolitan Planning Organizations (MPOs) to adopt a Sustainable Communities Strategy (SCS) or Alternative Planning Strategy (APS), which will prescribe land use allocation in that MPO's Regional Transportation Plan (RTP). ARB, in consultation with MPOs, will provide each affected region with reduction targets for GHGs emitted by passenger cars and light trucks in the region for the years 2020 and 2035. These reduction targets will be updated every 8 years, but can be updated every 4 years, if advancements in emissions technologies affect the reduction strategies to achieve the targets. ARB is also charged with reviewing each MPO's SCS or APS for consistency with its assigned targets. If MPOs do not meet the GHG reduction targets, transportation projects would not be eligible for funding programmed after January 1, 2012.

This bill also extends the minimum time period for the Regional Housing Needs Allocation (RNHA) cycle from 5 years to 8 years for local governments located within an MPO that meets certain requirements. City and county land use policies (including general plans) are not required to be consistent with the RTP (and associated SCS or APS). However, new provisions of CEQA would incentivize qualified projects that are consistent with an approved SCS or APS, categorized as "transit priority projects."

Executive Order S-13-08

Sea level rise is a foreseeable indirect result associated with climate change, largely attributable to thermal expansion of the oceans and melting polar ice. As discussed above in the environmental setting (subheading "Adaptation to Climate Change"), sea level rise in California could affect coastal erosion, water supply, water quality, saline-sensitive species and habitat, land use compatibility, and flooding. Governor Arnold Schwarzenegger signed Executive Order S-13-08 on November 14, 2008. This executive order directed OPR, in cooperation with CNRA, to provide land use planning guidance related to sea level rise and other climate change impacts by May 30, 2009. It also directed CNRA to develop the *2009 California Climate Adaptation Strategy* (CNRA 2009), which summarizes the best known science on climate change impacts in seven distinct sectors—public health, biodiversity and habitat, ocean and coastal resources, water management, agriculture, forestry, and transportation and energy infrastructure—and provides recommendations on how to manage against those threats. Executive Order S-13-08 also directed CNRA to convene an independent panel to complete the first California Sea Level Rise Assessment Report. This report is to be completed no later than December 1, 2010. The report is intended to provide information on the following:

1. Relative sea level rise projections specific to California, taking into account issues such as coastal erosion rates, tidal impacts, El Niño and La Niña events, storm surge, and land subsidence rates;

2. The range of uncertainty in selected sea level rise projections;

3. A synthesis of existing information on projected sea level rise impacts to state infrastructure (such as roads, public facilities and beaches), natural areas, and coastal and marine ecosystems; and

4. A discussion of future research needs regarding sea level rise for California.

All state-funded construction projects in areas vulnerable to sea level rise should consider a range of sea level rise scenarios for the years 2050 and 2100. The scenarios should assess projected sea level rise vulnerability and develop methods to reduce foreseeable incompatibilities (i.e., risks). However, this planning process is voluntary for projects that have filed a Notice of Preparation on or before November 14, 2008, are programmed for construction funding during the next five years, or are considered routine maintenance projects. This project would be subject to analysis pursuant to this executive order because it is located on the coastline of San Pablo Bay.

Regional and Local Plans, Policies, Regulations, and Laws

Bay Area Air Quality Management District Climate Protection Program

The Bay Area Air Quality Management District (BAAQMD) established a climate protection program to reduce pollutants that contribute to global climate change and affect air quality in the SFBAAB. The climate protection program includes measures that promote energy efficiency, reduce vehicle miles traveled, and develop alternative sources of energy, all of which assist in reducing emissions of GHG and in reducing air pollutants that affect the health of residents. BAAQMD also seeks to support current climate protection programs in the region and to stimulate additional efforts through public education and outreach, technical assistance to local governments and other interested parties, and promotion of collaborative efforts among stakeholders.

Local Climate Action Plans

The City of Pinole is in the process of developing a climate action plan in conjunction with its general plan update. At the time of writing this analysis, the City of Hercules has not adopted, or began to develop, its own local climate action plan or set of GHG reduction policies and programs. Contra Costa County has developed a Municipal Climate Action Plan, which includes GHG reduction measures for facilities operated by the County (Contra Costa County 2008).

Contra Costa County General Plan 2005–2020

No goals or policies of the *Contra Costa County General Plan 2005–2020* (Contra Costa County 2005) regarding climate change are applicable to the project.

City of Pinole General Plan

No goals and policies of the *City of Pinole General Plan* (City of Pinole 1995) regarding climate change are applicable to the project.

City of Hercules General Plan

No objectives, policies, or programs from the *Hercules General Plan* (City of Hercules 1998) regarding climate change are applicable to the project.

3.3.3 ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

THRESHOLDS OF SIGNIFICANCE

The City acknowledges that, by adoption of AB 32 and SB 97, the State of California has identified GHG emission reduction goals and that the effect of GHG emissions as they relate to global climate change is inherently an adverse environmental impact. While the emissions of one single project will not cause global climate change, GHG emissions from multiple projects throughout the world could result in a cumulative impact with respect to global climate change.

OPR is in the process of updating Appendix G of the State CEQA Guidelines to address impacts of GHG emissions, as directed by SB 97. OPR has proposed the following additions to Appendix B of the State CEQA Guidelines regarding GHG emissions. The project was determined to result in a significant impact related to climate change if it would do in any of the following:

- generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment or

- conflict with any applicable plan, policy, or regulation of an agency adopted for the purpose of reducing the emissions of GHGs.

OPR will develop, and CNRA will certify and adopt, amendments to the State CEQA Guidelines on or before January 1, 2010, pursuant to SB 97.

BAAQMD's current CEQA guidelines do not include any recommendations for analyzing project-related GHG emissions and, at the time of writing this DEIR, no other air district in California, ARB, or OPR has officially adopted significance criteria for evaluating whether a project's operational GHG emissions would result in a cumulatively considerable contribution to climate change. Thus, in order to address OPR's proposed checklist questions regarding GHGs, this analysis applies the following significance criteria proposed by BAAQMD in its new proposed *California Environmental Quality Act Air Quality Guidelines* (BAAQMD 2009) to analyze the project's operational emissions:

- For individual land use development projects, long-term operational emissions of GHGs would be a cumulatively considerable contribution of GHG emissions and a cumulatively significant impact to global climate change, if emissions of operation-related GHGs would exceed 1,100 metric tons of carbon dioxide-equivalent per year (MT CO_2e/yr).

The significance criteria proposed in BAAQMD's proposed new guidelines have not yet been formally adopted by BAAQMD's Board of Directors, but may be adopted in June 2010. The project's operational and construction-generated GHG emissions are also analyzed according to their consistency with ARB's Scoping Plan and any applicable local climate action plans or GHG reduction strategies.

In addition to the project's contribution to global climate change, impacts on the project from future climate change are also analyzed qualitatively.

ANALYSIS METHODOLOGY

Construction Emissions

Construction-related GHG emissions associated with Option 1 and Option 2 were estimated using the same methodologies described in Section 3.1, "Air Quality and Odors." Both the Sacramento Metropolitan Air Quality Management District's (SMAQMD's) Roadway Construction Emissions Model and URBEMIS 2007 contain emission factors for CO_2 (in addition to criteria air pollutants and precursors), which were used to estimate the project's construction-related GHG emissions. The maximum daily emissions of CO_2 associated with construction activities under both project options (i.e., Option 1 and Option 2), was multiplied by the corresponding duration of those construction activities to provide a conservative estimate of total construction-related GHG emissions.

Operational Emissions

GHG emissions associated with operation of the existing Pinole-Hercules WPCP, Option 1, and Option 2 conditions were estimated using emission factors developed by the California Climate Action Registry (CCAR) and ARB. Emission factors for CO_2, methane, and N_2O associated with electricity and natural gas consumption were obtained from CCAR's General Reporting Protocol Version 3.1 (CCAR 2009). Emission factors and calculation methodologies for methane combustion at the cogeneration plant and methane flaring were obtained from the ARB's Local Government Operations Protocol Version 1.0 (ARB 2008c:85–104). The annual existing operational GHG emissions were subtracted from the projected Option 1 and Option 2 annual GHG emissions to estimate the annual net change in operational GHG emissions.

GHG emissions associated with construction and operation of the project would predominantly be in the form of CO_2. The on-site cogeneration plant combusts methane (generated by the wastewater treatment process) as fuel and flares any excess methane that cannot be used in the cogeneration plant, both of which result in CO_2 emissions. Fugitive methane emissions from combustion and flaring operations have been quantified for this analysis. Both state law and EPA's proposed endangerment finding also include hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride as important GHGs, as discussed above in the regulatory setting. However, these compounds are typically emitted by industrial manufacturing processes and are not applicable to the project. Thus, project-generated emissions of CO_2 were used as a proxy for total GHG emissions, unless otherwise noted.

IMPACT ANALYSIS

IMPACT 3.3-1 **Generation of Temporary, Short-Term Construction-Related GHG Emissions.** *Construction activities associated with the project would generate temporary GHG emissions. Construction-related GHG emissions would cease following completion of the project and would not be considered a cumulatively considerable contribution of GHG emissions when compared with other relevant regulatory-established levels of substantial GHG emissions. In addition, construction-generated GHG emissions would not conflict with the goals of the AB 32 Scoping Plan.*

Option 1: New Larger Effluent Pipeline to RSD and Option 2: Pinole-Only Flows at Existing Plant

Neither the current nor proposed BAAQMD CEQA guidelines contain quantitative thresholds of significance for GHG emissions generated by construction activities. However, the BAAQMD's *Draft Air Quality Guidelines* recommend that projects quantify their construction-related GHG emissions. Thus, in anticipation of the future adoption of the proposed new BAAQMD *Draft Air Quality Guidelines*, as well as for disclosure purposes, the project's construction-related GHG emissions were quantified using the methods described in Section 3.1, "Air Quality and Odors." Table 3.3-1 presents the GHG emissions associated with each project option and construction activity for the entire construction period (i.e., 30 months for Option 1 and 9 months for Option 2). Refer to Appendix E for a detailed summary of the modeling assumptions, inputs, and outputs.

Table 3.3-1
Summary of Modeled Annual Greenhouse Gas Emissions Associated with Construction

Source	GHG Emissions (MT CO_2) [1,2]
Option 1 (30-month construction period)	
On-Site Upgrades	1,222
Pipeline Installation	217
Corporation Yard Relocation	6
Total Option 1 Construction Emissions [1]	1,445
Option 2 (9-month construction period)	
On-Site Upgrades	664
Total Option 2 Construction Emissions [1]	664

Notes: GHG = greenhouse gases; MT = metric tons; CO_2 = carbon dioxide

[1] GHG emissions for the worst-case day were multiplied by the total duration of construction activities to calculate the total GHG emissions associated with each construction activity.

Source: Modeling performed by AECOM in 2009

Neither the current BAAMQD CEQA guidelines nor the BAAMQD's *Draft Air Quality Guidelines* propose a numerical construction-related GHG threshold of significance. Therefore, to establish additional context in which to consider the order of magnitude of the project's construction-related GHG emissions, this analysis takes into account the following considerations by other government agencies and associations about what levels of GHG emissions constitute a substantial contribution:

- Facilities (i.e., stationary, continuous sources of GHG emissions) that generate greater than 25,000 MT CO_2 per year (CO_2/yr) are mandated to report their GHG emissions to the ARB pursuant to AB 32.

- The South Coast Air Quality Management District's significance screening level of 3,000 MT CO_2/yr for residential and commercial projects in its Draft Guidance Document–Interim CEQA GHG Significance Threshold (SCAQMD 2008); and

- BAAQMD's significance threshold for operational emissions of 1,100 MT CO_2e/yr in its *Draft Air Quality Guidelines* (BAAQMD 2009).

As shown in Table 3.3-1, the total Option 1 construction emissions over 30 months (2.5 years) would be 1,445 MT CO_2. In order to be conservative, it is assumed that as much as half of the construction-related emissions generated under Option 1 would occur in a single year's time, which would be equivalent to a peak annual rate of approximately 723 MT CO_2/yr. Also shown in Table 3.3-1, approximately 664 MT CO_2 would be generated over the 9-month period that would be required to build Option 2. Thus, the annual rate of construction emissions would be less than any of the emission levels listed in the bulleted list of reports above. This information is presented for informational purposes only, and it is not the intention of the City to adopt any of the above-listed emission levels as a numeric threshold. Rather, the intention is to put project-generated GHG emissions in the appropriate statewide context in order to evaluate whether the project's contribution to the global impact of climate change would be substantial.

As discussed above, another criterion to evaluate a project's GHG emissions is to evaluating a project's consistency with an applicable GHG reduction plan (i.e., ARB's Scoping Plan). None of the measures listed in ARB's Scoping Plan directly address construction activity. While the Scoping Plan does include some measures that would indirectly address GHG emissions levels associated with construction activity, including the phasing in of cleaner technology for diesel engine fleets (including construction equipment) and the development of a Low Carbon Fuel Standard, successful implementation of these measures will predominantly depend on the development of future laws and policies at the state level, rather than separate actions by individual municipalities or for individual projects. Thus, it is assumed that those polices formulated under the mandate of AB 32 that are applicable to construction-related activity, either directly or indirectly, would be implemented during construction of the project if those policies and laws are developed before the commencement of project construction. Therefore, it is assumed that project construction would not conflict with ARB's Scoping Plan. Additionally, it is also assumed that construction activity would not conflict with any of the GHG reduction efforts that will be included in the climate action plan being prepared by the City of Pinole in conjunction with its general plan update because local climate action plans do not typically address construction-generated emissions. At the time of writing this analysis, the City of Hercules has not adopted, or began to develop, its own local climate action plan or set of GHG reduction policies and programs.

Because the project's construction-related emissions would be temporary and finite in nature, would be below screening levels being considered and/or discussed by other government agencies and associations, and would not conflict with the AB 32 Scoping Plan or any local GHG reduction efforts, the project's construction-related GHG emissions would not result in a cumulatively considerable contribution to climate change, and therefore, this impact would be considered **less than significant** under both Option 1 and Option 2.

Mitigation Measure: No mitigation measures are required.

IMPACT 3.3-2	Generation of Long-Term Operational GHG Emissions. *Project implementation would change the amount of electricity and natural gas consumed by operation of the Pinole-Hercules WPCP and the associated level of GHG emissions; however the project would not result in an increase in operational GHG emissions that would exceed the BAAQMD's proposed threshold of significance of 1,100 MT CO_2e/yr.*

Option 1: New Larger Effluent Pipeline to RSD and Option 2: Pinole-Only Flows at Existing Plant

Following buildout of the project, implementation of Option 1 and Option 2 would result in a net change in the long-term operational GHG emissions generated by the Pinole-Hercules WPCP. Neither the current BAAMQD

CEQA guidelines nor ARB or any other regulatory agency has formally adopted thresholds of significance for evaluating operational GHG emissions of project. Therefore, for the purposes of this analysis, the proposed new BAAMQD GHG threshold of significance of 1,100 MT CO_2e/yr is applied to evaluate the GHG emissions associated with operation of the project. The proposed new BAAQMD GHG threshold of significance for stationary sources is also provided below. The stationary source threshold is intended to be applied to projects where BAAQMD is the lead agency and is shown herein for informational purposes only.

Table 3.3-2 presents the level of operational GHG emissions generated by the Pinole-Hercules WPCP under existing conditions, Option 1, and Option 2, as well as the net change in operational emissions under both Option 1 and Option 2. Refer to Appendix E for a detailed summary of the modeling assumptions, inputs, and outputs.

Table 3.3-2
Summary of Modeled Annual Greenhouse Gas Emissions
Associated with Operational Activities

Operating Scenario	GHG Emissions (MT CO_2/yr) [1]
Existing Conditions [2]	1,878
Option 1	
Gross Option 1 Emissions	2,640
Net Option 1 Emissions [3]	762
Option 2	
Gross Option 2 Emissions	1,534
Net Option 2 Emissions [3]	(344)
Proposed BAAQMD Significance Threshold	1,100
Proposed BAAQMD Significance Threshold for Stationary Sources	10,000

Notes: GHG = greenhouse gases; MT CO_2/yr = metric tons carbon dioxide per year; ( ) indicates negative value

[1] Emission levels include GHG emissions associated with electricity consumption, natural gas consumption, methane combustion at the cogeneration plant, and methane flaring.

[2] Existing emissions do not include mobile source GHG emissions associated with worker vehicles. However, omitting the existing mobile-source GHG emissions provides a more conservative estimate of the net change in operational GHG emissions (i.e., a smaller existing conditions would slightly overstate the net change in emissions).

[3] Net Option 1 and Option 2 emissions are calculated by subtracting the Existing Conditions GHG emissions from the gross Option 1 and Option 2 emissions, respectively.

Source: Modeling performed by AECOM in 2009

The net change in operational emissions for both Option 1 and 2, which are shown in Table 3.3-2, associated with both options are compared to BAAQMD's threshold of 1,100 MT CO_2/yr used to determine significance. Under Option 1, operational emissions would increase by 762 MT CO_2/yr due to increased consumption of natural gas and electricity associated with the treatment of additional wastewater. Under Option 2, operational emissions would decrease by 344 MT CO_2/yr because the Pinole-Hercules WPCP would no longer treat wastewater from the city of Hercules and therefore would consume less electricity and natural gas compared to existing operations. Thus, because neither Option 1 or Option 2 would result in a net increase in GHG emissions that would exceed BAAQMD's threshold of 1,100 MT CO_2/yr, the GHG emissions associated with operation of the project would not result in a cumulatively considerable contribution to climate change and, therefore, would be considered a less-than-significant impact. In addition, both the gross and net operational emissions associated with implementation of Option 1 and Option 2 would be less than the proposed new BAAQMD GHG threshold of 10,000 MT CO_2/yr for stationary sources.

Another consideration for evaluating the project is its consistency with ARB's Scoping Plan, which aims to reduce GHG emissions throughout the state. The project would be consistent with multiple measures discussed and recommended in ARB's Scoping Plan. First, use of a co-generation plant (a.k.a., combined heat and power) at the Pinole-Hercules WPCP is consistent with the Scoping Plan's recommendation for the development of additional combined heat and power system throughout the state (ARB 2008b:43). Second, the Pinole-Hercules WPCP's cogeneration plant is fueled primarily by methane captured from the biosolids and sludge digesters, which is consistent with measures in the Scoping Plan that call for methane capture at refineries, landfill and recycling facilities, and agricultural operations. By using methane captured from biosolids and sludge, which are typically considered a waste product, as a fuel source for generating electricity and heat, the Pinole-Hercules WPCP reduces the amount of natural gas it needs to operate, and its associated GHG emissions. Though combustion of methane also produces GHG emissions (which are accounted for in Table 3.3-2), the source of methane is a by-product of wastewater treatment and, unlike natural gas, it does not require extensive processing and other energy intensive inputs that are also GHG-intensive. Therefore, the project would be consistent with the goals of the AB 32 Scoping Plan to increase energy efficiency through the continued operation of the cogeneration plant and use of captured methane to fuel the cogeneration plant. ARB's Scoping Plan does not contain any other measures that pertain directly to the operation of wastewater treatment plants. Because operation of the Pinole-Hercules WPCP under Option 1 or Option 2 would be consistent with applicable measures in the Scoping Plan, the project would not conflict with the GHG reduction goals of AB 32.

In summary, because both Option 1 and Option 2 would not result in a net increase in GHG emission that exceeds BAAQMD's proposed threshold of significance of 1,100 MT CO_2/yr, and because both Option 1 and Option 2 would not conflict with applicable measures in ARB's Scoping Plan, operational GHG emissions under both options would not result in a cumulatively considerable contribution to climate change. As a result, this impact would be **less than significant** under both Option 1 and Option 2.

Mitigation Measure: No mitigation measures are required.

IMPACT 3.3-3	Effects of Climate Change on the Project. *The future effects of climate change, including sea level rise, increased intensity of storm surges, and increased variability in precipitation patterns, could adversely affect the Pinole-Hercules WPCP.*

Option 1: New Larger Effluent Pipeline to RSD and Option 2: Pinole-Only Flows at Existing Plant

Due to its location near sea level and close to the shoreline of the San Pablo Bay, future effects from climate change that could adversely affect the Pinole-Hercules WPCP include rising sea levels, increased variability in precipitation, and increased frequency and intensity of storm surges. On November 14, 2008, Governor Schwarzenegger signed Executive Order S-13-08 which directs a number of state agencies to address California's vulnerability to future sea level rise caused by climate change.

Multiple studies and reports have published a variety of predictions about the expected rise in sea level:

- The Intergovernmental Panel on Climate Change has predicted that by the year 2100 sea level will rise approximately 0.6 to nearly 2 feet depending on the severity of future climate change scenarios (IPCC 2007b);

- The CNRA's discussion of a rise in sea level up to 55 inches (4.6 feet) by 2100 (CNRA 2009), which is based on a report produced by the California Energy Commission (CEC 2009). This amount of sea level rise is also published in the California Climate Change Center's March 2009 report titled *The Impacts of Sea-Level Rise on the California Coast* (California Climate Change Center 2009).

- A paper prepared by the U.S. Geological Service for the California Climate Change Center called *Potential Inundation Due to Rising Sea Levels in the San Francisco Bay Region* developed multiple scenarios of sea level rise in San Francisco Bay, including amounts of 46, 100, and 139 centimeters (cm) (1.5, 3.3, and 4.6 feet, respectively) and considers 100 cm 33 feet) as a common reference point (CEC and Cal/EPA).

Exhibit 3.3-1 displays how a rise in sea level of 100 cm (3.3 feet) would inundate the areas around the project site. As shown in Exhibit 3.3-1, sea level rise could affect the safety and operation of the Pinole-Hercules WPCP if the water in San Pablo Bay rose to levels that inundated the plant, either during a storm surge or under normal conditions.

More intense storms events and changes in precipitation patterns could increase peak wet-weather flow volumes above current levels. It is conceivable that peak levels could exceed the levels that could be handled by both the existing and proposed capacity of the Pinole-Hercules WPCP. In these situations, wastewater treated only at the primary or secondary level might be discharged into San Pablo Bay, thereby resulting in unsafe levels of nutrients and toxics in San Pablo Bay. At the time of writing this DEIR, however, no projections of precipitation increases directly relevant to the project site have been published. Also, the wet-weather treatment capacity of the Pinole-Hercules WPCP would be increased under Option 1, making it more adaptable to increased wet-weather events.

The project could also be affected by storm surges that would increase in both frequency and intensity and could potentially cause physical damage to the Pinole-Hercules WPCP and associated pipelines. Future storm and wet weather events could cause accelerated erosion of the shoreline along San Pablo Bay, which could jeopardize the WPCP's foundation. However, coastal erosion is mostly a concern along ocean coastlines and the impact of extreme storm events would be attenuated by San Pablo Bay.

The information about future projected impacts of climate change is limited at this time. While, based on today's wide-ranging projections, it appears that the Pinole-Hercules WPCP could be affected by future climate change affects, much is under study. For instance, as a result of Executive Order S-13-08, an independent panel convened by CNRA will complete the first California Sea Level Rise Assessment Report. This report is not yet completed, but is expected sometime before December 1, 2010. As climate change affects are better understood, and more immediate, it may ultimately be necessary to construct a protective feature such as a sea wall or levee, or even to relocate the Pinole-Hercules WPCP at some point in the future. However, there is too much uncertainty at this time to conclude whether there would be an impact, and the extent to which it may occur. For these reasons, the analysis of how future conditions resulting from climate change could adversely affect the Pinole-Hercules WPCP is considered to be **too speculative** to support a significance determination under both Option 1 and Option 2.

Mitigation Measure: Since a significance determination cannot be reached, no mitigation measures are appropriate.

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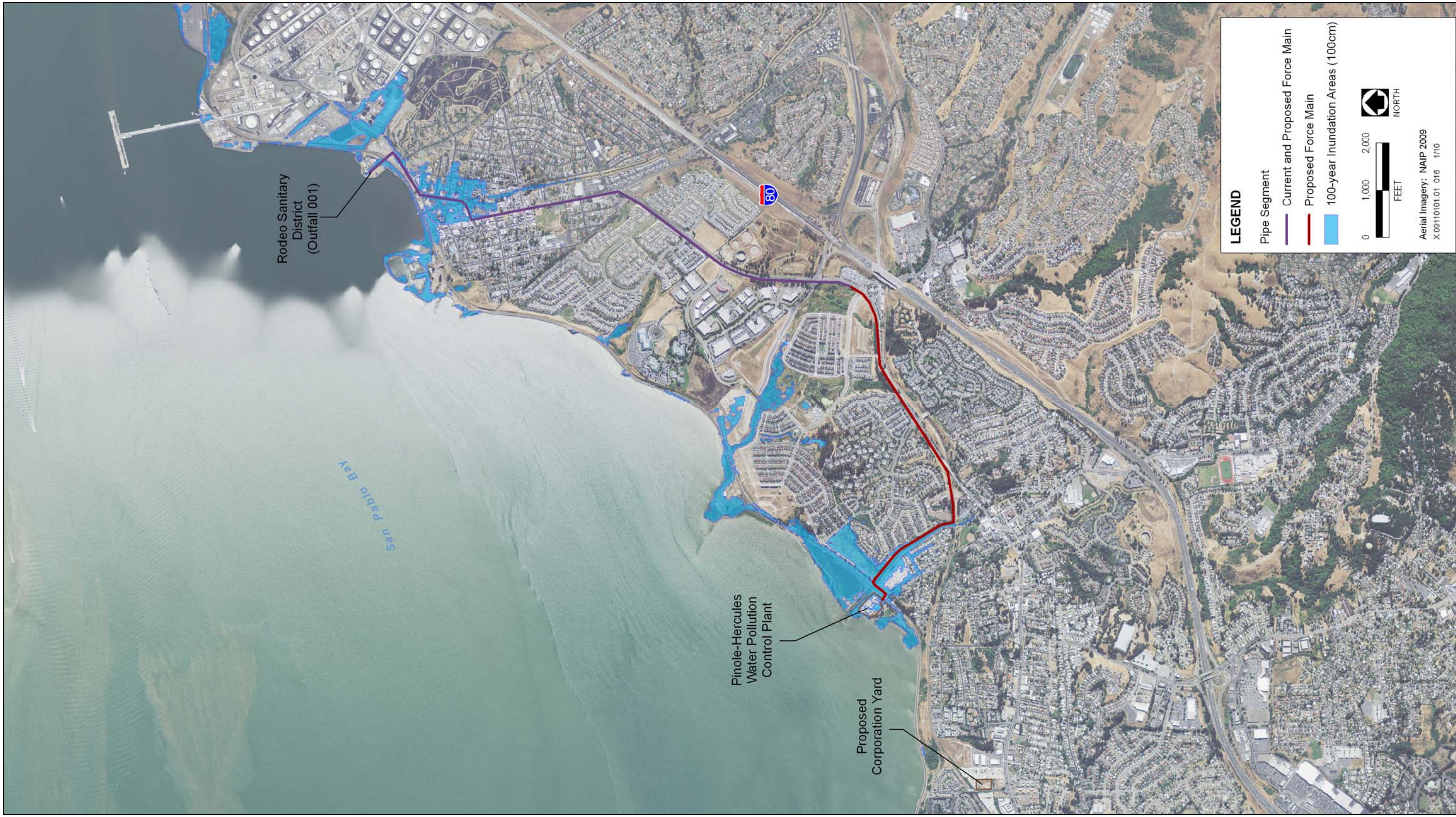


Source: USGS 2009

Predicted 100-Year Sea Level Rise (100 cm) **Exhibit 3.3-1**

3.4 FISHERIES AND AQUATIC RESOURCES

3.4.1 ENVIRONMENTAL SETTING

OVERVIEW OF FISH COMMUNITIES

San Pablo Bay

Evaluating potential impacts on fish requires an understanding of life histories and life-stage environmental requirements of fish species potentially affected by the project. This information is provided herein for fish species of primary management concern that have the potential to occur in San Pablo Bay and could potentially be affected by the project. Species of primary management concern include federal- and state-listed species of the region and those that are considered recreationally or commercially important. At least 59 marine and anadromous fish species have been documented in San Pablo Bay in midwater trawl and tow-net surveys conducted since 1967 (BDAT 2009), of which 52 species (88%) are native to California waters and 7 (12%) are introduced species (Table 3.4-1). Over one million fish were captured during these combined surveys. Northern anchovy (*Engraulis mordax*) comprised 92% of the fish captured in these surveys, followed by longfin smelt (*Spirinchus thaleichthys*) (4%) and Pacific herring (*Clupea pallasii*) (1%); the remaining 56 species each comprised less than 1% of all fish captured.

Table 3.4-1
Fish Species Potentially Occurring in San Pablo Bay and Their Status

Common Name	Scientific Name	Native/Introduced	Federal/State Status *
Acipenseridae – Sturgeons			
White sturgeon	*Acipenser transmontanus*	Native	--/--
Green sturgeon	*Acipenser medirostris*	Native	T/--
Atherinidae – Jacksmelts			
Jacksmelt	*Atherinopsis californiensis*	Native	--/--
Atherinopsidae – Silversides			
Inland silverside	*Menidia beryllina*	Introduced	--/--
Topsmelt	*Atherinops affinis*	Native	--/--
California grunion	*Leuresthes tenuis*	Native	--/--
Batrachoididae – Toadfishes			
Plainfin midshipman	*Porichthys notatus*	Native	--/--
Bothidae – Lefteye Flounders			
California halibut	*Paralichthys californicus*	Native	--/--
Carcharhinidae – Requiem Sharks			
Brown smoothhound	*Mustelus henlei*	Native	--/--
Grey smoothhound	*Mustelus californicus*	Native	--/--
Clupeidae – Herrings			
Pacific sardine	*Sardinops sagax*	Native	--/--
Pacific herring	*Clupea pallasii*	Native	--/--
Threadfin shad	*Dorosoma petenense*	Introduced	--/--
American shad	*Alosa sapidissima*	Introduced	--/--

Table 3.4-1 **Fish Species Potentially Occurring in San Pablo Bay and Their Status**			
Common Name	Scientific Name	Native/Introduced	Federal/State Status *
Cyprinidae – Minnows			
Sacramento pikeminnow	*Ptychocheilus grandis*	Native	--/--
Sacramento splittail	*Pogonichthys macrolepidotus*	Native	--/--
Embiotocidae – Surfperches			
Shiner perch	*Cymatogaster aggregata*	Native	--/--
Black perch	*Embiotoca jacksoni*	Native	--/--
Walleye surfperch	*Hyperprosopon argenteum*	Native	--/--
Tule perch	*Hysterocarpus traskii*	Native	--/--
Dwarf surfperch	*Micrometrus minimus*	Native	--/--
White seaperch	*Phanerodon furcatus*	Native	--/--
Pile surfperch	*Rhacochilus vacca*	Native	--/--
Rubberlip seaperch	*Rhacochilus toxotes*	Native	--/--
Engraulidae – Anchovies			
Northern anchovy	*Engraulis mordax*	Native	--/--
Gadidae – Cods and Haddocks			
Pacific tomcod	*Microgadus proximus*	Native	--/--
Gasterosteidae – Sticklebacks			
Threespine stickleback	*Gasterosteus aculeatus*	Native	--/--
Gobiidae – Gobies			
Yellowfin goby	*Acanthogobius flavimanus*	Introduced	--/--
Arrow goby	*Clevelandia ios*	Native	--/--
Longjaw mudsucker	*Gillichthys mirabilis*	Native	--/--
Bay goby	*Lepidogobius lepidus*	Native	--/--
Chameleon goby	*Tridentiger trigonocephalus*	Introduced	--/--
Shimofuri goby	*Tridentiger bifasciatus*	Introduced	--/--
Mobulidae – Devil Rays			
Bat ray	*Myliobatis californica*	Native	--/--
Moronidae – Striped Basses			
Striped bass	*Morone saxatilis*	Introduced	--/--
White sea bass	*Morone chrysops*	Native	--/--
Osmeridae – Smelts			
Whitebait smelt	*Allosmerus elongatus*	Native	--/--
Surf smelt	*Hypomesus pretiosus*	Native	--/--
Delta smelt	*Hypomesus transpacificus*	Native	T/T
Night smelt	*Spirinchus starksi*	Native	--/--
Longfin smelt	*Spirinchus thaleichthys*	Native	--/T

Table 3.4-1
Fish Species Potentially Occurring in San Pablo Bay and Their Status

Common Name	Scientific Name	Native/Introduced	Federal/State Status *
Paralichthyidae – Large-tooth Flounders			
Pacific Sanddab	*Citharichthys sordidus*	Native	--/--
Speckled Sanddab	*Citharichthys stigmaeus*	Native	--/--
Petromyzontidae – Lampreys			
Pacific lamprey	*Lampetra tridentata*	Native	SC/--
River lamprey	*Lampetra ayresii*	Native	--/SSC
Pleuronectidae – Righteye Flounders			
Pacific halibut	*Hippoglossus stenolepis*	Native	--/--
Rock sole	*Lepidopsetta bilineatta*	Native	--/--
English sole	*Parophrys vetulus*	Native	--/--
Starry flounder	*Platichthys stellatus*	Native	--/--
Diamond turbot	*Pleuronichthys guttulatus*	Native	--/--
Pacific sand sole	*Psettichthys melanostictus*	Native	--/--
Rajidae – Skates			
Big skate	*Raja binoculata*	Native	--/--
Salmonidae – Salmon and Trout			
Chinook salmon (spring-run)	*Oncorhynchus tshawytscha*	Native	T/T
Chinook salmon (fall-run)	*O. tshawytscha*	Native	SC/SSC
Chinook salmon (late fall–run)	*O. tshawytscha*	Native	SC/SSC
Chinook salmon (winter-run)	*O. tshawytscha*	Native	E/E
Steelhead (Central Valley)	*O. mykiss*	Native	T/--
Steelhead (Central Coast)	*O. mykiss*	Native	T/--
Sciaenidae – Drums, Croakers, and Hardheads			
White croaker	*Genyonemus lineatus*	Native	--/--
Squalidae – Dogfish Sharks			
Spiny dogfish	*Squalus acanthias*	Native	--/--
Stromateidae – Butterfishes			
Pacific pompano	*Peprilus simillimus*	Native	--/--
Syngnathidae – Seahorses and Pipefishes			
Bay pipefish	*Syngnathus leptorhynchus*	Native	--/--
Triakidae – Hound Sharks			
Leopard shark	*Triakis semifasciata*	Native	--/--

* Status abbreviations: E = Endangered; T = Threatened; SC = Species of Concern; SSC = Species of Special Concern; -- = not listed.
Source: Bay Delta Tributaries Project 2009, Moyle 2002

Affected Tributaries

A total of 17 fish species occur in the creeks potentially affected by the project (Table 3.4-2). The fish communities of these creeks are composed of a variety of native and introduced fish species. The number of confirmed fish species in each watershed ranges from two (Refugio Creek) to 16 (Pinole Creek).

Table 3.4-2
Fish Species Potentially Occurring in Tributaries Potentially Affected by the Project and their Status

Common Name	Scientific Name	Native/ Introduced	Federal/State Status *	Pinole Creek	Refugio Creek	Rodeo Creek
Atherinopsidae – Silversides						
Inland silverside	*Menidia beryllina*	Introduced	--/--	x		
Catostomidae – Suckers						
Sacramento sucker	*Catostomus occidentalis*	Native	--/--	x		x
Centrarchidae – Sunfishes and Basses						
Green sunfish	*Lepomis cyanellus*	Introduced	--/--	x		x
Cottidae – Sculpins						
Prickly sculpin	*Cottus asper*	Native	--/--	x		
Cyprinidae – Minnows						
California roach	*Herseroleucus symmetricus*	Native	--/--	x		x
Common carp	*Cyprinus carpio*	Introduced	--/--	x		
Goldfish	*Carassius auratus*	Introduced	--/--	x		
Golden shiner	*Notemigonus crysoleucas*	Introduced	--/--	x		
Hitch	*Lavinia exilicauda*	Native				x
Sacramento pikeminnow	*Ptychocheilus grandis*	Native	--/--	x		x
Fundulidae – Killifishes and Topminnows						
Rainwater killifish	*Lucania parva*	Introduced	--/--	x		x
Gasterosteidae – Sticklebacks						
Threespine stickleback	*Gasterosteus aculeatus*	Native	--/--	x	x	x
Gobiidae – Gobies						
Yellowfin goby	*Acanthogobius flavimanus*	Introduced	--/--	x		
Ictaluridae – Catfishes and Bullheads						
Brown bullhead	*Ameiurus nebulosus*	Introduced	--/--	x		
White catfish	*Ameiurus catus*	Introduced	--/--	x		
Poeciliidae – Livebearers						
Western mosquitofish	*Gambusia affinis*	Introduced	--/--	x	x	x
Salmonidae – Salmon and Trout						
Steelhead/rainbow trout	*Oncorhynchus tshawytscha*	Native	T/--	x		

* Status abbreviations: T = Threatened; -- = not listed; x = species with potential to occur.
Sources: Leidy 1999, Leidy et al. 2005

In a summary of fish surveys of Contra Costa County creeks, Leidy (2005) reported that 16 native and introduced species of freshwater fish occur in Pinole Creek (Table 3.4-2). Leidy (1999) sampled the fish community at five sites in Pinole Creek in 1994. He identified a total of six species in these surveys: (1) California roach (*Lavinia symmetricus*), (2) western mosquitofish (*Gambusia affinis*), (3) threespine stickleback (*Gasterosteus aculeatus*), (4) prickly sculpin (*Cottus asper*), (5) rainbow trout (*Oncorhynchus mykiss*), and (6) Sacramento sucker (*Catostomus occidentalis*). The number of fish species occurring at each site ranged from one to five. All rainbow trout were captured at one site located along Pinole Valley Road, a short distance upstream of Eastshore Freeway. In a review of historic fish sampling events of Pinole Creek and its tributaries, Leidy et al. (2005) concluded that Pinole Creek supports native rainbow trout in its headwaters and that steelhead have also been observed in the creek, although the size of the run is not known. However, passage to the upper reaches is restricted by a natural bedrock waterfall located approximately 0.4 mile upstream of the intersection of Alhambra Valley and Bear Creek roads upstream of the City of Pinole and may also be limited by a 100-foot-long concrete box culvert under Interstate 80. Salmon have not been observed in Pinole Creek.

Only two fish species—threespine stickleback and western mosquitofish—are known to occur in Refugio Creek (Table 3.4-2, Leidy et al. 2005) and these same species are presumed to occur in its tributary, Ohlone Creek. There are no known records of steelhead or Chinook salmon in Refugio Creek or its tributaries. At least four substandard culverts located at public road crossings in the lower watershed are thought to preclude passage of anadromous fishes into the upper reaches of the watershed. In a review of existing fish surveys in tributaries to the Sacramento–San Joaquin Delta (Delta), Leidy et al. (2005) found no evidence that the Refugio Creek watershed has ever supported salmonids.

Leidy (2005) reported that eight native and introduced species of freshwater fish occur in Pinole Creek (Table 3.4-2). Fish sampling conducted by Leidy (1999) at two locations in Rodeo Creek identified only rainwater killifish (*Lucania parva*) and threespine stickleback. Both species were present at one site, but only threespine stickleback was present at the upstream site. No salmonids were collected in Rodeo Creek during these surveys and a summary of fish sampling events conducted since the 1970s, Leidy et al. (2005) concluded that the Rodeo Creek watershed "does not represent a significant habitat resource" for rainbow trout or steelhead. Salmon have not been observed in Rodeo Creek.

SPECIAL-STATUS FISH SPECIES

The following sections provide more information about the importance and environmental requirements of each special-status species that have the potential to occur in water bodies affected by the project.

Chinook Salmon

Numerous runs of Chinook salmon occur in California's rivers, including several evolutionarily significant units (ESU). An ESU is a population of anadromous salmonids native to the Pacific Ocean that is considered reproductively isolated from other nonspecific population units and represents an important component of the evolutionary legacy of the species for the purposes of conservation under the Endangered Species Act (ESA). Four runs of Chinook salmon (*Oncorhynchus tshawytscha*)—Central Valley spring-run ESU, Sacramento River winter-run ESU, Central Valley fall-run ESU, and Central Valley late fall–run Chinook salmon—occur in the Sacramento and San Joaquin River systems and, therefore, may occur seasonally in San Pablo Bay near the project area during their migrations. Chinook salmon do not occur in Ohlone, Refugio, Rodeo, or Pinole creeks and available information indicates that the aquatic habitat is not suitable for sustaining populations of Chinook salmon (see "Aquatic Habitat" section below); however, because these creeks empty into San Pablo Bay, there is a potential for seasonal opportunistic use of these creeks by Chinook salmon.

All adult and juvenile Central Valley Chinook salmon pass through the lower reaches of the San Joaquin and/or Sacramento Rivers and the San Francisco–San Pablo–Suisin Bay estuarine complex during their movement from ocean to freshwater. Regardless of run-specific life history, the project area serves primarily as a migration corridor to and from upstream spawning and rearing habitats. Adult fish migrating into the Sacramento and San Joaquin Rivers and their upstream tributaries may be present in the project area during the fall and early winter months. Juvenile fish may occur in the project area during their downstream migration from natal streams to the Pacific Ocean and may occur throughout the Delta during short-term rearing from late fall/early winter through spring.

Chinook salmon fry (i.e., larval fish that have lost their yolk sacs and emerged from gravel) and parr (i.e., subyearling juveniles that have not undergone physiological transformation to the saltwater-tolerant smolt stage) may rear in riverine or estuarine habitats of the Sacramento and San Joaquin rivers. In the Delta, juvenile fish follow the tidal cycle in their movements in the estuarine habitat, following the rising tide into shallow-water habitats from the deeper main channels and returning to the main channels when the tide recedes (NMFS 2004). Juvenile Chinook salmon forage for invertebrates (e.g., cladocerans, copepods, amphipods, diptera, arachnids) in shallow areas with protective cover, such as intertidal and subtidal mudflats, marshes, channels, and sloughs (NMFS 2004). As juvenile fish grow, they tend to school in the surface waters of the main and secondary channels and sloughs, following the tide into shallow-water habitats to feed (Allen and Hassler 1986). Moyle et al. (2002) reported that juvenile Chinook salmon demonstrated a diel (i.e., over a 24-hour period) migration pattern, orienting themselves to nearshore cover and structure during the day and moving into open offshore waters at night. This study also reported that juvenile Chinook salmon were distributed vertically in the water column in relation to available light, where fish were distributed randomly in the water column at night, but would form schools in the upper 3 meters of the water column during daylight hours. Moyle et al. (1986) reported that juvenile Chinook salmon in Suisin Marsh tend to stay close to the banks and vegetation, near protective cover, and in dead-end tidal channels. Shallow water habitats are more productive than the main river channels, supporting higher growth rates, partially attributable to higher prey consumption rates, as well as favorable environmental conditions (Sommer et al. 2001).

Hanson (1991) reported that juvenile Chinook salmon from the Feather River acclimated at 55.4°F had an upper incipient lethal temperature (UILT; temperature that 50% of test organisms can tolerate for 7 days after prior acclimation to a constant temperature of 78.8°F. Cech and Myrick (1999) found that juvenile Chinook salmon exposed to acute temperature changes can tolerate temperatures as high as 83.8°F when acclimated to 66.2°F. Their ability to tolerate temperatures higher than the UILT is a function of exposure time, with an inverse relationship between exposure time and tolerated temperature. Marine (1997) reared juvenile Chinook salmon at temperatures ranging from 69.8°F to 75.2°F without experiencing significant mortality. Chinook salmon juveniles undergo smoltification (i.e., physiological transformation for saltwater environments) at temperatures as low as 42.8°F and as high as 68°F (McCullough 1999). Chinook salmon will actively try to avoid unsuitable temperatures through behavioral thermoregulation (Nielsen et al. 1994). Sublethal temperature impacts include reduced growth and/or maturation rates, increased vulnerability to predation, and increased risk of disease. Juvenile Chinook salmon show positive growth at temperatures ranging from 46.4°F (Clarke and Shelbourn 1985) to 77°F (Brett et al. 1982) with maximum growth under maximal rations at approximately 66.2°F (Cech and Myrick 1999).

Descriptions of current status, life history timing, and occurrences in the project area for individual races are provided in the following subsections.

Central Valley Spring-Run Chinook Salmon Evolutionarily Significant Unit

Central Valley spring-run Chinook salmon ESU was listed as threatened on September 16, 1999 (50 FR 50394). Historically, spring-run Chinook salmon were abundant throughout the Sacramento and San Joaquin River systems and were the dominant run of salmon in the San Joaquin River system prior to being extirpated by the construction of low-elevation dams on the main tributaries of the watershed (Moyle 2002, NMFS 2003. Other factors leading to the decline of spring-run Chinook salmon include harvest, direct mortality associated with agricultural practices, loss of habitat, predation, decreased water quality, disease, and competition with introduced species (Moyle 2002). Compared with the larger fall/late fall-run Chinook salmon, spring-run Chinook salmon are at greater risk for population declines because of their lower fecundity associated with their relatively smaller size, and greater risk of disease associated with suboptimal conditions encountered during the summer holding period (NMFS 2003). The last significant spring run in the San Joaquin River occurred in 1945, when an estimated 56,000 fish migrated up the river (Moyle 2002). Naturally spawning populations of Central Valley spring-run Chinook salmon currently are believed to be restricted to accessible reaches of the upper Sacramento River, Antelope Creek, Battle Creek, Beegum Creek, Big Chico Creek, Butte Creek, Clear Creek, Deer Creek, Feather River, Mill Creek, and Yuba River (DFG 1998).

Premature adult Central Valley spring-run Chinook salmon migrate into the San Francisco–San Pablo–Suisin Bay estuarine complex and Sacramento River system between March and July, with peak migration occurring in May and June. Thus, any adult fish that may migrate into the Sacramento and San Joaquin River systems may be present near the project area during these months. Fish hold in pools of natal coldwater streams at elevations of approximately 1,500 feet mean sea level (msl) prior to spawning, conserving energy while their gonadal tissue matures (NMFS 2003). Spawning occurs from late August through early October, peaking in mid-September (Fisher 1994; Yoshiyama et al. 1998). Spring-run Chinook salmon fry emerge from the gravel between November and March, spending approximately 3 to 15 months in freshwater habitats, emigrating as both fry and smolts (Yoshiyama et al. 1998). Juvenile emigration to the Delta generally occurs from November through April. Data from the Central Valley Project (CVP) and State Water Project (SWP) indicate that most spring-run Chinook salmon smolts are present in the Delta from mid-March through mid-May, depending on flow conditions (DFG 2000). Spring-run Chinook salmon yearlings are larger and undergo smoltification earlier than other Chinook salmon runs; therefore, they probably spend little time rearing in the Delta before ocean entry (NMFS 2004) and may emigrate through the project area in San Pablo Bay from mid-March through mid-May.

Sacramento River Winter-Run Chinook Salmon Evolutionarily Significant Unit

Winter-run Chinook salmon are found exclusively in the Sacramento River system (Moyle 2002, NMFS 2004). Both the ESA and CESA list the winter-run Chinook salmon as an endangered species. Sacramento River winter-run Chinook salmon ESU was listed as endangered under the ESA on January 4, 1994 (59 FR 440), and this status was reaffirmed on June 28, 2005 (50 CFR Parts 223 and 224). Critical habitat has been designated in the Sacramento River for winter-run Chinook salmon from Keswick Dam (river mile [RM] 302) to Chipps Island (RM 0) at the western margin of the Delta, including Kimball Island, Winter Island, and Brown's Island; all waters from Chipps Island westward to the Carquinez Bridge, including Honker Bay, Grizzly Bay, Suisin Bay, and the Carquinez Strait; all waters of San Pablo Bay westward of the Carquinez Bridge; and all waters of San Francisco Bay north of the San Francisco–Oakland Bay Bridge, including San Pablo Bay. Habitat loss stemming from construction of impassible dams is the primary factor responsible for a reduction in the abundance of winter-run Chinook salmon.

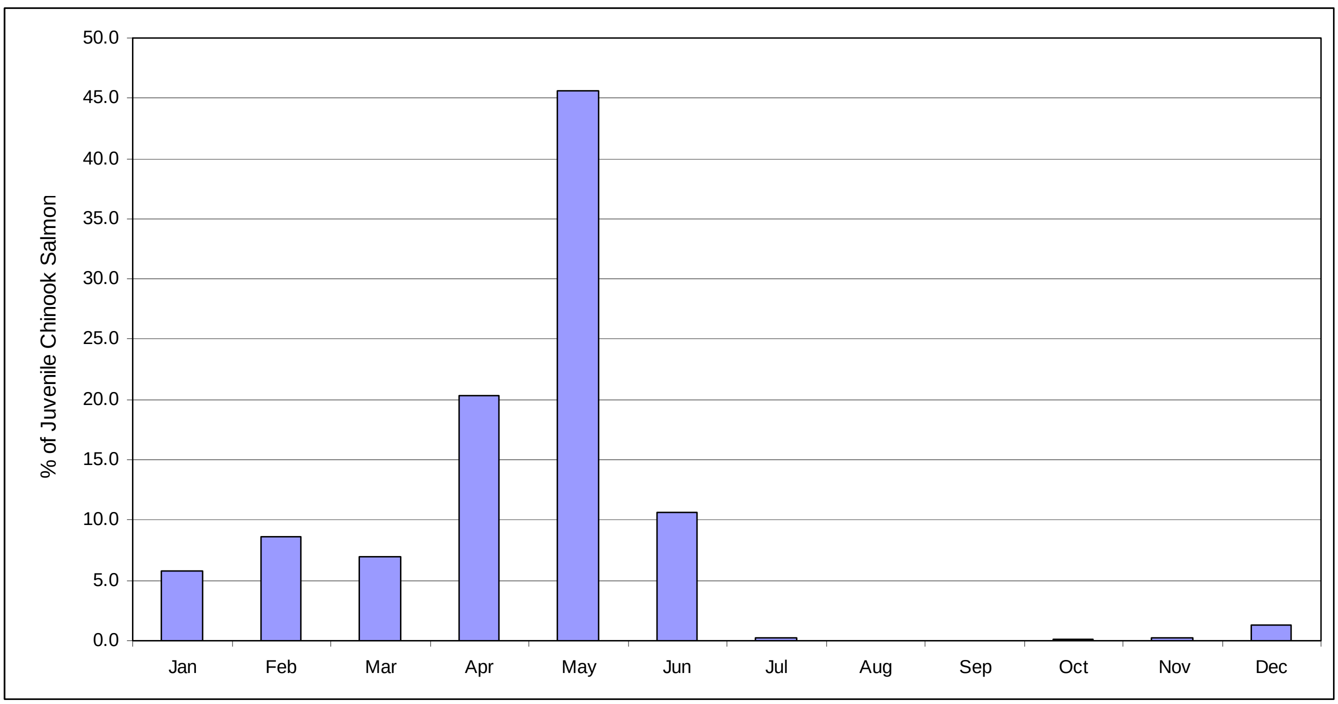
Adult winter-run Chinook salmon immigration through the San Francisco–San Pablo–Suisin Bay estuarine complex and into the lower Sacramento River occurs from December through July, with peak immigration occurring during the period January through April. Winter-run Chinook salmon spawn in the mainstem Sacramento River primarily between Keswick Dam (RM 302) and Red Bluff Diversion Dam (RBDD) (RM 242). Winter-run Chinook salmon spawn between late April and mid-August, with peak spawning generally occurring in June (Snider et al. 2000).

Juvenile emigration past the RBDD (RM 242) begins in late July, peaks during September, and may extend through mid-March (NMFS 1997). The peak period of juvenile emigration through the lower river into the Delta generally occurs between January and April (NMFS 1997). Differences in peak emigration periods between these two locations indicate that juvenile winter-run Chinook salmon may exhibit a sustained residence in the upper or mid-reaches of the Sacramento River before entering the lower Sacramento River or San Francisco–San Pablo–Suisin Bay estuarine complex. Although the location and extent of rearing in these lower or middle reaches are unknown, it is believed that the duration of fry presence in an area is directly related to the magnitude of river flows during the rearing period.

Central Valley Fall/Late Fall–Run Chinook Salmon

Central Valley ESU fall-run (and late fall-run) Chinook salmon were transferred from the federal candidate species list to the federal species of concern list in 2004 (69 FR 19975; April 15, 2004); however, the change in the *Federal Register* rule came as the result of a formality, and not as a result of a documented improvement in status of the ESU. Candidate species are generally defined under Section 4 of the ESA as those species or ESUs that are being considered by Secretary of the Interior for designation as endangered or threatened; however, the list came to include numerous species or ESUs for which there is sufficient concern or uncertainty regarding their biological status and threats, but most of which were not formally under consideration for listing under the ESA. Consequently, the National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NMFS) established the Species of Concern list to identify those species and ESUs that had sufficient level of concern, but is not actively being considered for listing under the ESA (69 FR 19975). Because fall-run Chinook salmon represents the greatest proportion of the four runs in the Sacramento and San Joaquin River system, they continue to support commercial and recreational fisheries of significant economic importance.

Fall-run Chinook salmon spawn in the upper Sacramento River (i.e., between Red Bluff and Redding) and in the lower, accessible reaches of most major tributaries to the Sacramento River, including Battle, Cottonwood, Clear, and Mill Creeks, and the Feather, Yuba, and American rivers. The fall-run is the most abundant run of Chinook salmon in the Sacramento River system, and the only run of Chinook salmon occurring in the American, Cosumnes, and Mokelumne Rivers. Furthermore, the fall-run Chinook salmon ESU is the only run generally recognized as currently existing in the San Joaquin River system. The majority of fall-run Chinook salmon occurring in the San Joaquin River system spawns in the Stanislaus, Tuolumne, and Merced Rivers.



Source: Bay Delta and Tributaries Project 2009

Percent of Juvenile Chinook Salmon Captured in the Delta by Month for the Period May 1976 through June 2006 by the USFWS Juvenile Chinook Salmon Monitoring Program. Total capture of Chinook salmon during this period was 49,636 fish. **Exhibit 3.4-1**

In general, adult fall-run Chinook salmon migrate through the San Francisco–San Pablo–Suisin Bay estuarine complex and into the Sacramento and San Joaquin rivers and, therefore, may be present in the project area from July through December, with immigration peaking from mid-October through November (Reynolds et al. 1993). Spawning in the tributaries and upper reaches of the mainstems of the rivers typically occurs immediately following immigration and may extend into January. Fry emerge from redds from late December through April, with peak emergence occurring in February. Fall-run Chinook salmon emigrate as postemergent fry, juveniles, and as smolts after rearing in their natal streams for up to 6 months. Juvenile emigration extends from late February into early June, with peak emigration occurring in April and May (Source: Bay Delta and Tributaries Project 2009). Thus, larval and/or juvenile fall-run Chinook salmon may occur near the project area between December and June.

Steelhead

Central Valley Steelhead Evolutionarily Significant Unit

Central Valley steelhead ESU was listed as threatened under the ESA on March 19, 1998 (63 FR Part 13347). Steelhead, the anadromous form of rainbow trout, was once abundant in California coastal and Central Valley drainages from the Mexican to Oregon borders. Populations have declined significantly in recent years as a result of habitat loss stemming from dam construction. The upper Sacramento River and many of its major tributaries, including the Feather, Yuba, and American rivers, support populations of steelhead, many of which are supplemented by California Department of Fish and Game (DFG) hatchery fish. Until recently, steelhead was thought to be extirpated from the San Joaquin River system. Recent monitoring has detected small self-sustaining populations of steelhead in the Stanislaus, Mokelumne, Calaveras, and other streams previously thought to be devoid of steelhead (McEwan 2001). Steelhead smolts have been captured in rotary screw traps in the Stanislaus River at Caswell State Park and Oakdale each year since 1995 (Demko et al. 2000). After 2 years of operating a fish-counting weir on the Stanislaus River, no adult steelhead have been observed moving upstream, although several large rainbow trout have washed up on the weir in late winter (Demko 2004). It is possible that naturally spawning populations exist in many other streams, but are undetected because of a lack of monitoring programs (IEP Steelhead Project Work Team 1999). The only consistent data available on steelhead numbers in the San Joaquin River basin come from DFG mid-water trawling samples collected on the lower San Joaquin River at Mossdale (NMFS 2004). These data indicate that a small population of emigrating steelhead smolts is captured at the DFG trawl survey station at Mossdale on the lower San Joaquin River each year (USBR 1999). In 2003, 12 steelhead smolts were collected at Mossdale (NMFS 2004). Existing wild steelhead stocks in the Central Valley are now mostly confined to the upper Sacramento River and its tributaries (McEwan and Jackson 1996). Cech and Myrick (2001) provide a comprehensive summary of temperature impacts and thermal tolerance values on steelhead and their work is incorporated here by reference. Additional information pertaining to the life history and habitat requirements of steelhead is contained in McEwan and Jackson (1996).

The majority of life history information available for the Central Valley steelhead ESU is derived from studies of fish in the Sacramento River watershed. Adult steelhead, generally averaging 600 to 800 millimeters (mm) in length (Moyle et al. 1995), generally leave the ocean and begin upstream migration from August through April, and therefore, may be present in the project area. All adult Central Valley steelhead use the Delta and lower reaches of the Sacramento and San Joaquin rivers as migration corridors in their return to natal streams for spawning. Timing of immigration is correlated with increased flow events (e.g., freshets) and corresponding decreases in water temperature. Peak adult immigration occurs in late September through October (Moyle 2002). Spawning occurs in cool, clear foothill and mountain streams with suitable substrate, water depth, and current velocity. Spawning occurs primarily between January and March, but may extend into spring in some years (McEwan and Jackson 1996). Steelhead are iteroparous (i.e., able to spawn repeatedly) and may spawn for up to 4 consecutive years before dying; however, it is rare for steelhead to spawn more than twice and the majority of repeat spawners are females (Busby et al. 1996). Although one-time spawners make up the majority, Shapolov and Taft (1954) report that repeat spawners are relatively numerous (i.e., 17.2%) in California streams. Thus, kelts (postspawning adults) may be present in the project area shortly after spawning (i.e., January through mid-April).

Following spawning, eggs incubate in the gravel for 30–60 days (temperature-dependent). Fry emerge from the gravel during the spring months and rear in their natal streams for a period of 1 to 3 (typically 2) years before emigrating downstream (Moyle 2002). Emigration occurs under high-flow events occurring during fall, winter, and spring, with peak emigration occurring from April to May on the Stanislaus River and from December to February on the American River (NMFS 2003). All emigrating juvenile Central Valley steelhead smolts use the lower reaches of the Sacramento and San Joaquin rivers and the Delta for rearing and as a migration corridor to the ocean. Some juveniles may use tidal and nontidal freshwater marshes and other shallow-water areas in the Delta as rearing areas for short periods prior to ocean entry. Thus, juvenile (1- to 3-year-old) steelhead may be present in the project area from February to mid-June.

Under acute conditions, juvenile steelhead critical maximum temperatures range from 81.9°F for American River steelhead acclimated to 51.8°F to a maximum of 85.3°F for American River steelhead acclimated to 66.2°F (McCullough 1999). Steelhead, like most salmonids, will actively try to avoid unsuitable temperatures through behavioral thermoregulation (Nielsen et al. 1994). Sublethal temperature effects include reduced growth and/or maturation rates, increased vulnerability to predation, and increased risk of disease. Wurtsbaugh and Davis (1977) found that juvenile steelhead growth rates were greatest at 61.5°F, depending on food ration; growth rates declined rapidly above 61.5°F, yet were still positive at 72.5°F, the highest experimental temperature used in their study.

Central Coast Steelhead Evolutionarily Significant Unit

The California Central Coast steelhead ESU was listed as threatened under the ESA on August 18, 1997 (62 FR Part 43937) and this status was reaffirmed on January 5, 2006 (50 CFR Parts 223 and 224). This ESU was once abundant in the Russian River and numerous tributaries to the San Francisco–San Pablo–Suisin Bay estuary complex. The Central Coast steelhead distinct population segment (DPS) (the smallest division of a taxonomic species permitted for protection under the ESA) includes all naturally spawned populations of steelhead in coastal streams from the Russian River to Aptos Creek; and the drainages of San Francisco, San Pablo, and Suisin Bays eastward to Chipps Island at the confluence of the Sacramento and San Joaquin Rivers; and tributary streams to Suisin Marsh including Suisin Creek, Green Valley Creek, and an unnamed tributary to Cordelia Slough (commonly referred to as Red Top Creek), exclusive of the Sacramento–San Joaquin River Basin of the California Central Valley. Two artificial propagation programs are considered part of the DPS: the Don Clausen Fish Hatchery, and Kingfisher Flat Hatchery/Scott Creek (Monterey Bay Salmon and Trout Project).

The Russian River population of Central Coast ESU was once the third most abundant run in California following the Sacramento and Klamath rivers (Moyle 2002); however, populations in the Russian River declined from approximately 65,000 in the 1960s to less than 7,000 in the 1990s (Busby et al. 1996; Good et al. 2005). In tributaries to the San Francisco–San Pablo–Suisin Bay estuarine complex, anadromous runs are believed to have been extirpated as a result of passage barriers, diversions, and urbanization; however, remnant populations of rainbow trout still persist in habitats upstream of barriers in many of these streams (Moyle 2002). The greatest threats to this DPS include agricultural and forestry operations, artificial barriers, gravel extraction, illegal harvest, streambed alteration, substandard or unscreened diversions, suction dredging, urbanization, excessive water demand, and water quality degradation. No recovery plan has been completed for the Central Coast DPS; however, NMFS has identified the following priority recovery actions that are needed for the DPS:

- Research and monitor distribution, status, and trends of steelhead.
- Promote operations of current recovery hatcheries and develop Hatchery and Genetics Management Plan to minimize negative influences of hatcheries.
- Improve freshwater habitat quantity and quality.
- Protect and restore habitat complexity and connectivity from the upper watershed to the ocean.

- Conduct focused freshwater habitat restoration in anadromous salmonid streams (e.g., erosion control, bank stabilization, riparian protection and restoration, and reintroduction of large woody debris).
- Balance water supply and allocation with fisheries needs through a water rights program, designate fully appropriated watersheds, develop passive diversion devices or offstream storage, eliminate illegal water diversions, and improve criteria for water drafting and dam operations.
- Improve agricultural and forestry practices, in particular, riparian protections, road construction, and road maintenance.
- Improve county/city planning, regulations (e.g., riparian and grading ordinances) and county road maintenance programs.
- Remove/upgrade high-priority man-made fish passage barriers (e.g., watercourse crossings and non-hydropower dams).
- Screen all water diversion structures.
- Replace existing outdated septic systems and improve wastewater management.
- Identify and treat point and non-point source pollution of streams from wastewater, agricultural practices, and urban environments.
- Modify channel and flood control maintenance and eliminate artificial breeching of sandbars for improvements in channel and estuarine habitats.

The life histories of the Central Coast ESU steelhead are similar to those of Central Valley ESU steelhead. Consequently, if any anadromous steelhead were to migrate through the project area, they would likely occur during their immigration period of August through April and kelts could occur following spawning in January through mid-April. However, as discussed above, the anadromous form of *O. mykiss* is no longer believed to occur in tributaries of the San Francisco–San Pablo–Suisin Bay estuarine complex. The thermal tolerances of Central Coast steelhead are the same as those of the Central Valley ESU.

Delta Smelt

The U.S. Fish and Wildlife Service (USFWS) listed delta smelt (*Hypomesus transpacificus*) as a threatened species under the federal ESA in March 1993 (58 FR 12854). In early 2005, the USFWS reviewed the population status of this species and, based on 37 years of data, recommended that no change in its threatened status was warranted. The delta smelt also was listed as threatened under the CESA in 1993 and redesignated by the state as endangered in 2008. Delta outflow and the position of X2 are believed to be key factors affecting delta smelt production annually. X2 is the location of the 2 parts per thousand salinity contour (isohaline), one meter off the bottom of the estuary, as measured in kilometers upstream from the Golden Gate Bridge. The abundance of several estuarine species has been correlated with X2. Maintaining the location of X2 is accomplished via project reservoir releases that increase inflow to the Delta thus “pushing” X2 toward the Golden Gate Bridge.

Delta smelt historically were one of the most abundant fish found in the estuary, with a range extending from Suisin Bay upstream to the City of Sacramento. The current range extends from Suisin Bay upstream through the Delta in Contra Costa, Sacramento, San Joaquin, and Yolo Counties (Moyle 2002; Moyle and Randall 2002); however, Moyle (2002) reports that they may be carried to San Pablo Bay under high outflows, but have not established permanent populations there.

Delta smelt are pelagic (live in open waters near the surface) and tend to form large schools. Adult spawning migrations begin in late winter and last through early summer. Spawning occurs in shallow waters of dead-end sloughs upstream of the brackish water of the estuary. Eggs sink to the bottom and adhere to the substrate. Adult fish die after spawning. Eggs incubate for 10–14 days and, following hatching, the planktonic (drifting in the water column) larvae are transported downstream near the surface of the water column by currents to zones of freshwater/saltwater mixing from late March through July (Wang 1986, DWR and Reclamation 1994).

Longfin Smelt

The longfin smelt (*Spirinchus thaleichthys*) was first petitioned for listing under the CESA in August 2007 and was listed as threatened under the California Endangered Species Act on March 5, 2009, because of apparent long-term declines in abundance. No federal ESA designation has been made for this species. The primary cause of decline in San Francisco Bay is reduction in outflows associated with water exports from state and federal pumping operations, especially during periods of drought (Moyle 2002). Other reasons contributing to decline of longfin smelt include entrainment losses to diversions, extreme climatic variation, toxic substances (especially pesticides), predation, and introduced species (Moyle 2002).

The Delta supports the largest population of longfin smelt in California, but their range also includes San Pablo Bay, San Francisco Bay, South San Francisco Bay, Gulf of the Farallones, and the lower reaches of the Sacramento River from Suisin Bay and Suisin Marsh upstream to Rio Vista. Longfin smelt are found in areas ranging from almost pure seawater upstream to areas of pure fresh water. Distribution of longfin smelt is centered in the west Delta, Suisin Bay, and San Pablo Bay. In wet years they may be distributed more toward San Pablo Bay and in dry years more toward the west Delta. Peak spawning occurs between February and April in upper Suisin Bay and the middle Delta. Spawning occurs in fresh water over substrates composed of sand and/or gravel, rocks, and aquatic plants and may occur from November into June, with peak spawning activity occurring from February through April (Emmett et al. 1991, Wang 1986). Spawning occurs mainly below Rio Vista in the Sacramento River and below Medford Island in the San Joaquin River, with a downstream boundary near Pittsburg and Montezuma Slough (Moyle 2002). Embryos hatch in 40 days at 45ºF, and newly hatched larvae are buoyant and strong enough swimmers to move horizontally in the water column in order to maintain position within the mixing zone of the estuary (Moyle 2002). Longfin smelt are relatively short-lived, reaching maturity at age 2. The majority of individuals lives only 2 years, but may live as long as 3 years.

Green Sturgeon

NMFS proposed the southern DPS of green sturgeon (*Acipenser medirostris*), which includes all fish populations south of the Eel River, as threatened under the ESA in February 2005. A final rule listing the southern DPS as threatened was published on April 7, 2006 (71 FR 17757). The primary threats to the southern DPS include reduction of spawning areas, which is restricted to the upper Sacramento River, habitat loss resulting from impassible barriers, insufficient flows in spawning areas, water quality degradation, commercial bycatch, poaching, entrainment at water intakes, introduction of nonnatives, small population size, and elevated water temperatures.

The only known spawning populations of green sturgeon in North America are in the Klamath, Rogue, and Sacramento River systems (Moyle 2002). Angler catches of green sturgeon in the Feather River suggest that this river supports a population. The Sacramento River is the southernmost known spawning population; however, it is not known whether spawning does (or once did) occur in the lower San Joaquin River.

Although little is known about the spawning habits of green sturgeon in the Sacramento–San Joaquin system, spawning times are thought to be similar to those in the Klamath River (Emmett et al. 1991). Three general phases are part of the green sturgeon life history: the freshwater stage (less than 3 years old), the coastal migrant stage (3–13 years old), and the adult stage (greater than 3 years old) (EPIC et al. 2001). Adult green sturgeon move into estuaries and lower reaches of rivers in spring and early summer to feed and spawn and, therefore, may occur in the project area during this period. Based on angler and incidental catches of green sturgeon in the Sacramento River, spawning times are believed to be from March through July, peaking from mid-April to mid-June (USFWS

1997). Spawning takes place in relatively deep (greater than 3 meters), fast water of rivers over substrates often dominated by cobbles; however, substrates may range from clean sand to bedrock (Emmett et al. 1991). Females are oviparous and iteroparous. Eggs are broadcast and fertilized externally. The adhesive eggs settle to the river bottom and attach to substrates. Excessive silt is known to prevent eggs from attaching to each other and/or substrates (Moyle 2002), likely resulting in decreased egg survival. Eggs likely hatch within approximately 200 hours at 55°F, based on their presumed similarity to white sturgeon (*A. transmontanus*) (Kohlhurst 1976). Adults are believed to move back to the ocean shortly after spawning and, therefore, may be present in the project area from summer through fall (EPIC et al. 2001).

Little is known about the movement of juvenile green sturgeon, but they are believed to reside in freshwater habitats for 1 to 4 years, with most emigrating as yearlings, migrating downstream to the Delta under winter high-flow events, and subsequently to the ocean (EPIC et al. 2001). Ocean entry occurs primarily during the summer through fall period and, therefore, juveniles may occur in the project area during this time.

Juvenile green sturgeon may reside in the Delta for 4 to 6 years prior to ocean entry, moving out to nearshore waters with increased growth; therefore, juveniles may be present in the project area throughout the year. Relatively large captures of juvenile fish are made during the summer months in the Delta, where large numbers are caught in gill nets in the San Joaquin River at Santa Clara Shoal (EPIC et al. 2001). It has been suggested that fish move into this area seasonally to feed (Radtke 1966 as cited in EPIC et al. 2001). Variable numbers (ranging from 0 to more than 7,000) of juvenile green sturgeon have been captured seasonally at the intakes for the Tracy Pumping Plant (Wang 1986) and at CVP pumps in the south Delta in recent decades (Moyle et al. 1992). All postalevin life stages of green sturgeon are primarily bottom feeders (EPIC et al. 2001). Juvenile green sturgeon residing in rivers and estuaries are primarily invertivores, feeding largely on amphipods, opossum shrimp, annelid worms, and isopods. Unlike the well-studied salmonids, the thermal tolerances of green sturgeon are not well understood.

River Lamprey

The river lamprey is a California species of special concern. The river lamprey is relatively small (averaging 17 centimeters) and highly predaceous (Moyle 2002). They are anadromous and will attack fish in both fresh and salt water (Moyle 2002). A great deal of what is known about the river lamprey is from information on populations in British Columbia, where adults migrate from the Pacific Ocean into rivers and streams in September and spawn in the winter months. Adults excavate a saucer-shaped depression in sand or gravel riffles where the eggs are deposited. Adults die after spawning. Juvenile river lamprey, called ammocoetes, remain in backwaters for several years, where they feed on algae and microorganisms (Moyle et al. 1995). The metamorphosis from juvenile to adult begins in July and is complete by the following April. From May through July, following completion of metamorphosis, the river lamprey congregate in the Delta prior to entering the ocean. Therefore, river lamprey may occur in the project area during the summer months.

The river lamprey is distributed in streams and rivers along the eastern Pacific Ocean from Juneau, Alaska, to San Francisco Bay. It may have its greatest abundance in the Sacramento–San Joaquin River system although it is not commonly observed in large numbers (Moyle et al. 1995).

Pacific Lamprey

The Pacific lamprey is a federal species of concern; however, no State designation has been made. Its range includes Pacific coast drainages extending from Hokkaido Island, Japan to Alaska and south to Rio Santo Domingo, California (Moyle 2002) and includes rivers and creeks of the Central Valley, California. Pacific lamprey are anadromous and highly predaceous. The predatory adult stage is spent in the ocean, although some scattered landlocked populations occur in some freshwater reservoirs. The adults begin their upstream spawning migrations to freshwater rivers as early as January, with peak immigration occurring from early March through late June (Moyle 2002) and, therefore, may be present in the project area during this period. Spawning occurs shortly after the adult lamprey reach suitable spawning areas, primarily during the spring and summer months. The majority of adults die after spawning; however, a small percentage of adults are iteroparous (i.e., repeat spawners) and, therefore, may occur in the project area in the summer months during their postspawning emigrations. Following hatching, the ammocoetes reside in upstream waters for a period of 5–7 years, where they burrow into the sediments and filter organic matter, before undergoing metamorphosis to the predatory and saltwater-tolerant adult phase and subsequent emigration from freshwater to the ocean. Emigration occurs under high flows during the winter and spring and, therefore, the emigrating postammocoete lifestages coincide in the project area with the spawning immigrations of adults (i.e., January through May).

Pacific lamprey are still present throughout much of their historical range. However, some populations have been reduced or extirpated from streams that have been highly degraded or modified by humans.

BENTHIC MACROINVERTEBRATES

San Pablo Bay

Benthic macroinvertebrates (BMI) are important components of the ecology of aquatic ecosystems and provide a forage base for fish. The California Department of Water Resources (DWR) conducted BMI sampling in the project area at stations located near Pinole Point from January 1996 to April 2006 (BDAT 2009). A combined total of 323,532 specimens were collected at this station during this period. The taxonomic composition included 133 species grouped in 99 genera, 78 families, and 35 orders. Four taxa accounted for 90% of the total number of specimens collected (Table 3.4-3). The remaining taxa each accounted for 1.1% or less of the total number of specimens collected.

Table 3.4-3
Benthic Macroinvertebrate Taxa Commonly Found near the Project Area

Order	Family	Description	Percent (%) of Total
Amphipoda	*Ampeliscidae*	Tube-dwelling amphipod crustaceans	59.8
Myoida	*Corbulidae*	Bivalve mollusk	15.1
Cumacea	*Leuconidae*	Marine hooded shrimp	7.9
Amphipoda	*Corophiidae*	Amphipod crustacean	7.3

Source: Bay Delta and Tributaries Project 2009

The presence of the Asian clam (*Potamocorbula amurensis*) has led to alterations in the levels of phytoplankton and zooplankton found in water column samples taken in the Delta. This species of clam efficiently filters out and feeds upon a significant number of planktonic organisms, thus reducing the food base for the fish community of the Delta.

Tributaries

Of the four creeks potentially affected by the project, BMI data is only available for Pinole Creek, which was sampled by the Contra Costa Clean Water Program in 2002, 2003, and 2005–2007 (Armand Ruby Consulting 2008). The Index of Biotic Integrity (IBI) scores for the 11 sites sampled during the course of these surveys indicate that habitat conditions typically ranged from poor to fair in the downstream sites (i.e., within the City of Pinole limits) and generally increased with increasing distance upstream, where they typically ranged from fair to good. Although the authors do not provide a taxonomic list of BMI organisms by water body, the metric scores do indicate that the combined number of Ephemeroptera, Plecoptera, and Trichoptera (EPT Taxa) were relatively low at the Pinole Creek sampling sites. Because these taxa are generally less tolerant of environmental perturbation than many other organisms, their presence, abundance, and diversity are a good indicator of water quality conditions.

AQUATIC HABITAT

San Pablo Bay

San Pablo Bay is a major drainage for the Sacramento and San Joaquin rivers, as well as numerous smaller tributaries in Marin, Sonoma, Napa, Solano, and Contra Costa counties. One of several large bays in the Delta, San Pablo Bay is approximately 10 miles wide, has a surface area of approximately 90 square miles and drains a watershed of approximately 810 square miles (USACE 1999). Flow is received from the Sacramento and San Joaquin rivers via Suisin Bay and the Carquinez Strait, which lie directly to the east (Exhibit 2-1). San Pablo Bay is connected to the Pacific Ocean via San Francisco Bay and is a popular sport fishing destination (Exhibit 2-1).

San Pablo Bay is a relatively shallow and tidally influenced water body. Water depths are generally less than approximately 30 feet, and large areas of shoals between 6 and 10 feet in depth are common throughout San Pablo Bay; the human-made ship channel traversing San Pablo Bay is 40–50 feet deep. In addition to tidal influence, San Pablo Bay's hydrology is also strongly influenced by inflow from the Sacramento and San Joaquin River systems. The bay contains heavy deposits of silt contributed primarily from outflows of the Sacramento and San Joaquin rivers. Salt marshes and mudflats dominate the undeveloped portions of the shoreline and San Pablo Bay supports a diverse community of marine and anadromous fishes and benthic macroinvertebrates.

Affected Tributaries

Four small creeks draining the Santa Ynez Mountains in northwestern Contra Costa County may be affected by the project under different options: Pinole Creek, Refugio Creek, Ohlone Creek, and Rodeo Creek (Exhibit 2-3). Each of these is described below. Because Ohlone Creek is part of the Refugio Creek watershed, it is described under Refugio Creek. Except where indicated by other references, the information describing these creeks was obtained from the *Contra Costa County Watershed Atlas* (CCCCDD 2003).

Pinole Creek

Pinole Creek originates at an elevation of 1,240 feet in the Santa Ynez Mountains in northwestern Contra Costa County and drains a watershed of approximately 9,705 acres (15.2 square miles). The creek flows approximately 11 miles northwest through the City of Pinole before terminating at San Pablo Bay. The watershed receives an average annual rainfall of approximately 23 inches and the estimated mean daily flow is 10.4 cubic feet per second (cfs).

Approximately 92% of Pinole Creek's banks consist of natural riparian vegetation with no obvious bank stabilization. Concrete and constructed earth make up a total of approximately 8% of the channel where surface flow occurs and approximately 2% of the total channel length is underground. The creek originates within Briones Regional Park where the upper third of the watershed is dominated by ranchlands with mixed oak and grassland habitats. The East Bay Municipal Utility District (EBMUD) owns and manages the middle third of the watershed and has been actively restoring riparian habitat and stabilizing banks along numerous tributaries to this reach. The channel has been extensively modified for flood control along the lower one-third of its reach (i.e., within the City of Pinole boundaries); however, numerous groups, including Friends of Pinole Creek, are active in restoring the creek within the City boundaries. Substrate in the creek channel consist largely of cobble, boulders, and medium-sized gravels.

Refugio Creek

Refugio Creek originates at an elevation of 780 feet in the Santa Ynez Mountains in northwestern Contra Costa County and drains a watershed of approximately 3,116 acres (4.9 square miles). The creek flows approximately

9.2 miles northwest through Refugio State Park and the City of Hercules before terminating at San Pablo Bay. Ohlone Creek, which originates in the southern portion of the watershed, flows northward and empties into Refugio Creek in the City of Hercules approximately 1 mile before it empties into San Pablo Bay. The watershed receives an average annual rainfall of approximately 19 inches and the estimated mean daily flow is 4.2 cfs.

Approximately 50% of the total channel length of creeks in the watershed is underlain by impervious surfaces and approximately 1.3 miles of the flow in these creeks is subsurface. Approximately 83% of Refugio Creek banks consist of natural riparian vegetation with no obvious bank stabilization. Riparian habitat in the headwater origins consist of grasslands and diverse woodland, including oak woodlands. In its middle reaches, Refugio Creek flows primarily through parks within the incorporated area of Hercules. In its lower reaches, the creek flows through an urban landscape having a mixture of commercial/business land uses and open spaces. The lower 3 miles of the creek are heavily infested with *Arundo donax*. Substrate within the channel consists of cobbles and large boulders interspersed with gravels.

Rodeo Creek

Rodeo Creek originates at an elevation of 1,100 feet in northwestern Contra Costa County and drains a watershed of approximately 6,657 acres (10.4 square miles). Rodeo Creek flows approximately 8.4 miles northwest through the City of Rodeo before terminating at San Pablo Bay approximately 1 mile northeast of the Refugio Creek terminus. The watershed receives an average annual rainfall of approximately 21 inches and the estimated mean daily flow is 7.0 cfs.

Approximately 81% of the creek banks consist of natural riparian vegetation with no obvious bank reinforcement and only approximately 10% of its watershed in the lower reaches has been altered for flood conveyance purposes (Restoration Design Group 2006). Approximately 19% of the total channel length of creeks in the watershed is underlain by impervious surfaces and approximately 4.6 miles of the flow in these creeks is subsurface. Like nearby Refugio Creek, Rodeo Creek originates in grasslands and diverse woodland habitats, flows through urban and rural areas in its middle reaches, and flows primarily through parks, mixed urban, commercial, and public lands in its lower reaches.

Although the majority of Rodeo Creek remains in a natural condition, much of the upper portion of the watershed has been degraded by erosion and channel incision (Restoration Design Group 2006). Rodeo Creek is identified in the state’s 303(d) list of impaired water bodies for diazinon.

CRITICAL HABITAT

Central Valley Spring-Run Chinook Salmon Evolutionarily Significant Unit

Critical habitat for Central Valley ESU spring-run Chinook salmon was designated September 2, 2005 (70 FR 52488) and includes numerous CALWATER Hydrologic Units in Tehama, Butte, Glenn, Shasta, Yolo, Sacramento, Solano, Colusa, Yuba, Sutter, Trinity, Alameda, San Joaquin, and Contra Costa counties. The downstream boundary within the Delta/ San Francisco–San Pablo–Suisin Bay estuarine complex is in Carquinez Strait and, therefore, does not include San Pablo Bay or the project area.

Sacramento River Winter-Run Chinook Salmon Evolutionarily Significant Unit

The final critical habitat designation for Sacramento River winter-run Chinook salmon was issued June 16, 1993 (50 CFR 226). Critical habitat for winter-run Chinook salmon is defined as occurring in the Sacramento River from Keswick Dam (RM 302) to Chipps Island (RM 0) in the Delta. Also included are waters west of the Carquinez Bridge, Suisin Bay, San Pablo Bay, and San Francisco Bay north of the Oakland Bay Bridge (NMFS 1997). The Pinole-Hercules Water Pollution Control Plant (WPCP) outfall is located in critical habitat for winter-run ESU Chinook salmon; however, the creeks potentially affected by the project are not.

Central Valley Steelhead Evolutionarily Significant Unit

Critical habitat for this ESU was designated September 2, 2005 (50 CFR 52488). Critical habitat for Central Valley steelhead ESU, which includes the entire south Delta and upstream water bodies in the Sacramento and San Joaquin River watersheds, ends upstream of San Pablo Bay and, therefore, does not include the project area.

California Central Coast Steelhead Evolutionarily Significant Unit

Critical habitat for this ESU was designated September 2, 2005 (50 CFR 52488). Critical habitat for the Central Coast steelhead ESU includes the San Pablo Hydrologic Unit 2206. Consequently, the project area lies within the designated critical habitat for California Central Coast steelhead.

Primary constituent elements of critical habitat in the project area include:

- Freshwater rearing sites with:
  - water quality and floodplain connectivity to form and maintain physical habitat conditions and support juvenile growth and mobility;
  - water quality and forage supporting juvenile development; and
  - natural cover such as shade, submerged and overhanging large wood, log jams and beaver dams, aquatic vegetation, large rocks and boulders, side channels, and undercut banks.
- Freshwater migration corridors free of obstruction and excessive predation with water quantity and quality conditions and natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, side channels, and undercut banks supporting juvenile and adult mobility and survival.
- Estuarine areas free of obstruction and excessive predation with:
  - water quality, water quantity, and salinity conditions supporting juvenile and adult physiological transitions between fresh- and saltwater;
  - natural cover, such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, and side channels; and
  - juvenile and adult forage, including aquatic invertebrates and fishes, supporting growth and maturation.

Delta Smelt

Critical habitat for delta smelt was designated in December 1994 (59 FR 65256) and includes Suisin Bay (and the contiguous Grizzly Bay and Honker Bay), Goodyear, Suisin, Cutoff, First Mallard (Spring Branch), and Montezuma sloughs, and the Delta, as defined in Section 12220 of the California Water Code. The downstream boundary of critical habitat for delta smelt is Carquinez Strait, located west and upstream of the project area. As such, the Pinole-Hercules WPCP outfall and the creeks potentially affected by the project are not located within critical habitat for delta smelt.

Green Sturgeon

Critical habitat was designated on October 9, 2009 (74 FR 52300) and includes Coastal United States marine waters within 60 fathoms depth from Monterey Bay, California (including Monterey Bay), north to Cape Flattery, Washington, including the Strait of Juan de Fuca, Washington, to its United States boundary; the Sacramento River, lower Feather River, and lower Yuba River in California; the Sacramento–San Joaquin Delta and Suisin, San Pablo, and San Francisco bays in California; the lower Columbia River estuary; and certain coastal bays and estuaries in California (Humboldt Bay), Oregon Coos Bay, Winchester Bay, Yaquina Bay, and Nehalem Bay), and Washington (Willapa Bay and Grays Harbor). Consequently, the project area is in the area designated as critical habitat for green sturgeon.

Longfin Smelt

No critical habitat designation has been proposed or published for longfin smelt.

ESSENTIAL FISH HABITAT

The project area is located in the region identified as essential fish habitat (EFH) for Pacific salmon, which includes all runs of Chinook salmon. The Magnuson-Stevens Act of 1996 defines EFH as “those waters and substrates necessary to fish for spawning, breeding, feeding or growth to maturity” (NMFS 1998). The Act requires federal agencies to consult with NMFS when a project has the potential to adversely affect EFH. States are not required to consult with NMFS; however, NMFS is required to develop EFH conservation recommendations for any state agency activities that would affect EFH. Although the concept of EFH is similar to critical habitat of the ESA, measures recommended by NMFS or a regional fisheries management council to protect EFH are advisory, not prescriptive (NMFS 1998).

3.4.2 REGULATORY FRAMEWORK

FEDERAL PLANS, POLICIES, REGULATIONS, AND LAWS

Fisheries Management Jurisdictions

Management of anadromous fish is the responsibility of NMFS, whereas management of nonanadromous fish and other aquatic biological resources in the project area is the responsibility of USFWS and DFG. DFG acts as state trustee for aquatic species. These three agencies, either independently or in collaboration with other state and federal agencies, implement numerous fish management and restoration plans and initiatives. The majority of these plans and initiatives are focused on the Sacramento and San Joaquin rivers, their primary tributaries, and the Delta, which are used by anadromous fishes.

Federal and State Endangered Species Act

The ESA and/or the California Endangered Species Act (CESA) regulate threatened, endangered, and other special-status fish species. NMFS and USFWS jointly implement the ESA for aquatic species, whereas DFG implements the CESA. Section 9 of the ESA and federal regulations prohibit the “take” of federally listed species. “Take” is defined under ESA, in part, as killing, harming, or harassment of listed species. Under federal regulations, “take” is further defined to include habitat modification or degradation where such activity actually results in death or injury to wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. An incidental take permit under Section 10(a) or federal consultation under Section 7 of the ESA is required if the project might affect a federally listed species. ESA- and CESA-listed fish species occurring in the project area are discussed in the Environmental Setting section of this chapter.

Section 1600 of the California Fish and Game Code

All diversions, obstructions, or changes to the natural flow or bed, channel, or bank of any river, stream, or lake in California that supports wildlife resources are subject to regulation by DFG, pursuant to Section 1600 of the California Fish and Game Code. Section 1603 provides that it is unlawful for any person to substantially divert or obstruct the natural flow or substantially change the bed, channel, or bank of any river, stream, or lake designated by DFG, or use any material from the streambed without first notifying DFG of such activity. Stream is defined as a body of water that flows, at least periodically or intermittently, through a bed or channel having banks and supports fish or other aquatic life. This includes watercourses having a surface or subsurface flow that supports or has supported riparian vegetation. DFG's jurisdiction within altered or artificial waterways is based on the value of those waterways to fish and wildlife. A DFG Streambed Alteration Agreement must be obtained for any project that would result in an impact on a river, stream, or lake.

Section 401 of the Clean Water Act

Section 401 of the Clean Water Act (CWA) requires that any person applying for a federal permit or license for activity(ies) that may result in a discharge of pollutants into waters of the United States, must obtain a state water quality certification that the activity complies with all applicable water quality standards, limitations, and restrictions. The State Water Resources Control Board (SWRCB), through its Regional Water Quality Control Boards (RWQCBs), administers this certification in California. No license or permit may be issued by a federal agency until certification required by Section 401 has been granted. Further, no license or permit may be issued if certification has been denied. Section 401 Water Quality Certifications are typically required in order to obtain a Streambed Alteration Agreement from DFG or a CWA Section 404 permit.

Fisheries Management Plans

USFWS Biological Opinion on the Operations Criteria and Plan and Wanger Decisions

The operation of CVP/SWP is described in the Operations Criteria and Plan (OCAP). As updated in 2004, the OCAP provides a detailed description of the coordinated operations of the CVP and SWP based on historical data and serves as a starting point for planning project operations in the future. Under the ESA, USFWS must produce formal Biological Opinions analyzing the impact of OCAP implementation on ESA-listed species (including the delta smelt). In effect, the ESA authorizes USFWS to require changes to the OCAP for the protection of the delta smelt and other federally listed species.

In 2005, USFWS issued a biological opinion for OCAP, and concluded that CVP/SWP operations did not jeopardize delta smelt populations. However, that opinion was struck down by a federal judge (Judge Wanger) following a lawsuit filed by environmentalists. USFWS was ultimately ordered to revise the Biological Opinion. The court also severely restricted CVP and SWP pumping in the Delta (Wanger Decision) pending the USFWS's completion of the new Biological Opinion. Those restrictions took effect in December 2007.

In December 2008, USFWS released a new biological opinion concluding that CVP and SWP operations would jeopardize the continued existence of endangered delta smelt. USFWS further detailed a "reasonable and prudent alternative" (RPA) to the proposed OCAP protocol that would, it claimed, protect the delta smelt and its habitat from the adverse effects of pumping operations. The "reasonable and prudent alternative" would restrict Delta pumping operations and would thus limit deliveries of water to CVP/SWP contractors south of the Delta. Extrapolating from the text of the RPA there are several Actions (1, 2, and 3) that will affect Delta exports by virtue of limitations on Old and Middle River (OMR) flows, and Action 4 requiring additional X2 flows in the fall months that will affect reservoir releases.

NMFS Biological Opinion on the Operations Criteria and Plan

Like the USFWS, under the ESA, NMFS must produce a formal biological opinion analyzing the impact of OCAP implementation on ESA-listed species under NOAA's jurisdiction, in this case including; endangered Sacramento River winter-run Chinook salmon, threatened Central Valley spring-run Chinook salmon, threatened Central Valley steelhead, and threatened Southern DPS of North American green sturgeon. As stated earlier, in effect, the ESA authorizes NMFS to require changes to the OCAP for the protection of the federally listed species identified above.

In October 2004, NMFS issued a biological opinion for OCAP, and concluded that CVP/SWP operations were not likely to jeopardize the continued existence of the Sacramento River winter-run Chinook salmon, spring-run Chinook salmon, and Central Valley steelhead populations. In April, 2008, that opinion was struck down by a federal judge (Judge Wanger) following a lawsuit filed by Pacific Coast Federation of Fishermen's Associations, Institute for Fisheries Resources, and others. The court found that NMFS failed to analyze multiple factors and the 2004 biological opinion was remanded to NMFS and the U.S. Bureau of Reclamation (Reclamation) for further consultation.

In June 2009, NMFS released a new biological opinion concluding that CVP and SWP operations would jeopardize the continued existence of endangered Sacramento River winter-run Chinook salmon, threatened Central Valley spring-run Chinook salmon, threatened Central Valley steelhead, threatened Southern DPS of North American green sturgeon, and Southern Resident killer whales. NMFS further detailed a "reasonable and prudent alternative" to the proposed OCAP protocol that would, it claimed, protect these species and their habitat from the adverse effects CVP/SWP. The "reasonable and prudent alternative" would restrict Delta pumping operations and NMFS estimated that deliveries of water to CVP/SWP contractors south of the Delta would be reduced by 5% to 7% of average annual exports. The RPA includes multiple actions applied to various CVP-influenced watersheds.

Anadromous Fish Restoration Program

Congress directed the Secretary of the Interior to develop and implement a program that makes all reasonable efforts, including increased river flows, to restore and enhance anadromous fish habitat in the rivers and streams of California's Central Valley, excluding the San Joaquin River upstream of Mendota Pool. The program has an overall target of doubling the natural production of anadromous fish relative to the average levels attained during the period 1967–1991 (Sections 3046[b][1] of the Central Valley Project Improvement Act; Public Law 102-575). Section 3046(b)(1) is referred to as the Anadromous Fish Restoration Program. The Secretary directed the USFWS and Reclamation to jointly implement the Central Valley Project Improvement Act. Implementation of the Anadromous Fish Restoration Program was required by the year 2002 (USFWS 1997) and culminated in the *Final Restoration Plan for the Anadromous Fish Restoration Program* (USFWS 2001).

Bay Delta Conservation Plan

The Bay Delta Conservation Plan (BDCP) is a planning and environmental permitting process to restore habitat for Delta fisheries in a way that reliably delivers water supplies to 25 million Californians. The BDCP is:

- identifying conservation strategies to improve the overall ecological health of the Delta;
- identifying ecologically friendly ways to move fresh water through and/or around the Delta; and
- addressing toxic pollutants, invasive species, and impairments to water quality.

The BDCP is being developed under the federal ESA and the California Natural Community Conservation Planning Act (NCCPA) and will undergo extensive environmental analysis that will include opportunities for public review and comment. As the BDCP evaluates alternatives necessary to restore the Delta ecosystem while providing water supply reliability, state and federal agencies are developing a joint environmental impact report/environmental impact statement (EIR/EIS) to determine the environmental impacts of the BDCP. Presently, the alternatives are being formulated but are not yet public. The draft EIR/EIS is expected to be ready for public review and comment no sooner than early 2010.

Water Quality Control Plans

Water Quality Control Plan for the San Francisco Bay Basin

The Pinole/Hercules WPCP and Rodeo Sanitary District (RSD) wastewater treatment plant outfalls lie within the jurisdiction of the San Francisco RWQCB. The water quality control plan (Basin Plan) for the San Francisco Bay Basin (RWQCB 2007) identifies beneficial uses of waters in the basin and establishes numerical and narrative water quality objectives for the protection of the beneficial uses. Beneficial uses of the San Pablo Bay identified in the plan that are directly associated with aquatic resources include those below.

- **Ocean, Commercial, and Sport Fishing (COMM)**—Uses of water for commercial or recreational collection of fish, shellfish, or other organisms in oceans, bays, and estuaries, including, but not limited to, uses involving organisms intended for human consumption or bait purposes.
- **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.
- **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).
- **Migration of Aquatic Organisms (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 water within the region.
- **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.
- **Fish Spawning (SPWN)—**Uses of water that support high quality aquatic habitats suitable for reproduction and early development of fish.

Water Quality Control Plan for Control of Temperatures in Coastal and Interstate Waters and Enclosed Bays and Estuaries of California (Thermal Plan)

The SWRCB's Water Quality Control Plan for Control of Temperatures in Coastal and Interstate Waters and Enclosed Bays and Estuaries of California (Thermal Plan) contains temperature objectives applicable to discharges in waters to enclosed bays such as San Pablo Bay. The Thermal Plan objectives state that an existing elevated temperature waste discharge shall comply with limitations necessary to assure protection of beneficial uses.

National and California Toxics Rules and the Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California

Numeric water quality criteria for priority pollutants (13 trace metals and specific organic compounds) were established for the protection of aquatic life in the state of California and are promulgated in the National Toxics Rule (NTR) and California Toxics Rule (CTR). The *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays* and *Estuaries of California (Phase 1 of the Inland Surface Waters Plan and the Enclosed Bays and Estuaries Plan)* (SWRCB 2005) applies to discharges of toxic pollutants into inland surface waters, enclosed bays, and estuaries. The policy establishes implementation provisions for NTR and CTR criteria and for priority pollutant objectives established in basin plans. The policy also establishes certain monitoring requirements and chronic toxicity control provisions, and includes special provisions for certain types of discharges.

National Pollutant Discharge Elimination System Program

The CWA requires wastewater dischargers to obtain a permit that establishes effluent limitations and specifies monitoring and reporting requirements. The National Pollutant Discharge Elimination System (NPDES) program requires wastewater dischargers to regulate nondomestic wastes discharged to sewers through activities such as pretreatment programs and sewer use ordinances. NPDES permits include the following terms and conditions designed to ensure that the waste discharge complies with applicable water quality objectives:

- effluent discharge limitations,
- prohibitions,
- receiving water limitations,
- compliance monitoring and reporting requirements, and
- other provisions.

STATE PLANS, POLICIES, REGULATIONS, AND LAWS

California Endangered Species Act

Pursuant to the CESA of the California Fish and Game Code, a DFG permit is required for projects the implementation of which could result in the take of a species state listed as threatened or endangered (i.e., species listed under CESA). Pursuant to Section 2080, take of a listed species is prohibited without an Incidental Take Permit. Take is defined in Section 86 of the Fish and Game Code as “hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill.” The CESA definition of take does not include “harm” or “harass” as is included in the federal act. As a result, the threshold for take under CESA is generally considered higher than under ESA. Four fish listed under the CESA occur in the project area (Table 3.4-1): winter-run ESU Chinook salmon (endangered), spring-run ESU Chinook salmon (threatened), delta smelt (threatened), and longfin smelt (threatened).

Porter-Cologne Water Quality Control Act

Under the Porter-Cologne Water Quality Control Act, “waters of the state” fall under the jurisdiction of the appropriate RWQCB. The RWQCB must prepare and periodically update water quality control plans (basin plans). Each basin plan sets forth water quality standards for surface water and groundwater, as well as actions to control nonpoint and point sources of pollution to achieve and maintain these standards. Projects that discharge waste to wetlands or waters of the state must meet waste discharge requirements of the RWQCB, which may be issued in addition to a water quality certification or waiver under Section 401 of the CWA.

More recently, the appropriate RWQCB has also generally taken jurisdiction over “waters of the state” that are not subject to USACE jurisdiction under the CWA, in cases where USACE has determined that certain features do not fall under its jurisdiction. Mitigation requiring no net loss of wetlands functions and values of waters of the state is typically required.

REGIONAL AND LOCAL PLANS, POLICIES, REGULATIONS, AND LAWS

Contra Costa County General Plan 2005–2020

The following goals and policies of the *Contra Costa County General Plan 2005–2020* (Contra Costa County 2005) regarding conservation of vegetation and wildlife are applicable to the project.

- **Goal 8-D:** To protect ecologically significant lands, wetlands, plan and wildlife habitats.
- **Goal 8-E:** To protect rare, threatened and endangered species of fish, wildlife and plants, significant plant communities, and other resources which stand out as unique because of their scarcity, scientific value, aesthetic quality or cultural significance. Attempt to achieve a significant net increase in wetland values and functions within the County over the life of the General Plan.
- **Goal 8-F:** To encourage the preservation and restoration of the natural characteristics of the San Francisco Bay/Delta estuary and adjacent lands, and recognize the role of Bay vegetation and water area in maintaining favorable climate, air and water quality, and fisheries and migratory waterfowl.

In addition, the *Contra Costa County General Plan 2005–2020* identifies the following five 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.
- **Goal 8-U:** To maintain the ecology and hydrology of creeks and streams and provide an amenity to the public, while at the same time preventing flooding, erosion and danger to life and property.
- **Goal 8-V:** To preserve and restore remaining natural waterways in the County which have been identified as important and irreplaceable natural resources.
- **Goal 8-W:** To employ alternative drainage system improvements which rely on increased retention capacity to lessen or eliminate the need for structural modifications to watercourses, whenever economically possible.
- **Goal 8-X:** To enhance opportunities for public accessibility and recreational use of creeks, streams, drainage channels and other drainage system improvements.

To achieve these goals, the *Contra Costa County General Plan 2005–2020* identifies the following vegetation and wildlife and water resources policies specifically applicable to the aquatic biological resources potentially affected by the project.

- **Policy 8-16:** Native and/or sport fisheries shall be preserved and re-established in the streams within the County wherever possible.
- **Policy 8-17:** The ecological value of wetland areas, especially the salt marshes and tidelands of the bay and Delta, shall be recognized. Existing wetlands in the County shall be identified and regulated. Restoration of degraded wetland areas shall be encouraged and supported whenever possible.
- **Policy 8-18:** The filling and dredging of lagoons, estuaries, and bays which eliminate marshes and mud flats shall be allowed only for water-oriented projects which will provide substantial public benefits and for which there are not reasonable alternatives, consistent with State and federal laws.
- **Policy 8-20:** Fish, shellfish, and waterfowl management shall be considered the appropriate land use for marshes and tidelands, with recreation being allowed as a secondary use in limited locations, consistent with the marshland and tideland preservation policies of the General Plan.

- **Policy 8-81:** Fisheries in the streams within the County shall be preserved and re-established wherever possible.

City of Pinole General Plan

The following goal and subgoals of the *City of Pinole General Plan* (City of Pinole 1995) regarding aquatic biological resources are applicable the project.

Open Space and Environmental Protection Element

- **Goal OS1: Preserve Natural Resources**. Preserve natural resources which provide important habitat, ecological or archaeological value, and maintain clean air and water quality.

- **Goal OS1.1: Habitat Protection.** Preserve oak/woodland, riparian vegetation, creeks, fisheries, saltwater and freshwater marsh, native bunchgrass grasslands, wildlife corridors and sensitive nesting sites. Loss of these habitats should be fully offset through creation of habitat of equal value. Compensation rate for habitat re-creation shall be determined by a qualified biologist.

- **Goal OS1.2: Rare and Endangered Species.** Limit development in areas which support rare and endangered species. If development of these areas must occur, any loss of habitat should be fully compensated on-site. If off-site mitigation is necessary, it should occur within the Pinole planning area whenever possible, and must be accompanied by plans and a monitoring program prepared by a qualified biologist.

- **Goal OS1.3: Minimize Environmental Impacts.** Encourage development patterns which minimize impacts on the City's biological, visual and cultural resources, and integrate development with open space areas.

- **Goal OS1.5: Riparian Areas and Creek Setbacks.** Lands adjacent to riparian areas should be protected as public or private permanent open space through dedication or easements. Require new development adjacent to creeks and major drainages to provide adequate building setbacks from creek banks, provision of access easements for creek maintenance purposes, and creek improvements such as bank stabilization. Riparian vegetation outside the setback should also be protected. Until such time as Program OSI-1 (Habitat Protection Ordinance) is completed, creeks and major drainages include: (1) Pinole Creek, (2) Catty Creek, (3) Duncan Canyon/Cole Creek, (4) Shady Draw, (5) Faria Creek, and (6) Roble Creek.

In addition, the *City of Pinole General Plan* identifies 24 programs that should be implemented for achieving its goals and objectives. The following programs are proposed for protection and conservation of aquatic biological resources:

- **OSIP-1: Habitat Protection Ordinance.** Consider adoption of a habitat protection ordinance that would identify and protect areas of biological value, including streams, creeks, and wetlands;

- **OSIP-2: Riparian and Stream Restoration Programs.** Establish riparian and stream restoration programs that include erosion control measures, stream clean-up projects, and re-vegetation plans for denuded areas;

- **OSIP-21: Water Quality Strategies.** Implement habitat protection programs and evaluate proposed projects for potential water quality impacts; and

- **OSIP-22: Consultation on Fish and Wildlife Impacts.** The City will continue to notify and consult with the California Department of Fish and Game (DFG) and the U.S. Army Corps of Engineers (USACE) when development projects are proposed in locations where there may be impacts to fish and wildlife and their habitats.

City of Hercules General Plan

The following goal and objectives of the *City of Hercules General Plan* (City of Hercules 1998) are applicable to the project.

Open Space and Environmental Protection Element

- **Goal:** The basic goal of the Open Space and Conservation Element is to provide for both human and environmental needs in creating a natural environment compatible with urban development by the wise use and enhancement of natural resources with the City. Subgoals are to:

  a) Develop a plan to preserve and maintain open space within the community.

  b) Establish a management program for the conservation and enhancement of the natural amenities in the City.

  c) Incorporate conservation areas such as drainage courses, areas of natural vegetation and baylands into the open space system.

  d) Provide for the linkage of public and private open spaces throughout the community.

- **Objective 2:** Preserve seasonal freshwater wetlands.
- **Objective 3:** Protect the Refugio Creek riparian corridor from encroaching development.
- **Objective 4:** Protect riparian and wetland communities from degradation through introduction of urban pollutants in stormwater runoff.
- **Objective 5:** Preserve salt marsh zones along San Pablo Bay.
- **Objective 6:** Protect native plant communities and habitats for special-status plant and animal species.

3.4.3 ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

THRESHOLDS OF SIGNIFICANCE

The project was determined to result in a significant impact related to fisheries and aquatic resources if it would do any of the following:

- cause changes to water quality in one or more water bodies by a sufficient magnitude, frequency, and geographic extent to cause lethality or adversely affect an aquatic species' long-term population level in these water bodies;
- cause a reduction in habitat quantity via changes to creek/river flows or shaded riparian aquatic (SRA) cover or cause degradation in habitat quality, via changes to temperature, of sufficient magnitude, frequency and geographic extent such that it would adversely affect a species' long-term population level in one or more water body;
- reduce or degrade habitat used by state or federal special-status species, including habitat designated as critical habitat, to an extent that could cause a reduction in species abundance or long-term population levels, or ability to sustain a population. Special-status species are defined as those that are currently listed as endangered or threatened under the ESA and/or CESA and species formally proposed for federal and/or State listing as threatened or endangered;

- cause sufficient change to or degradation of water quality in San Pablo Bay or surrounding water bodies that would substantially delay, block, or otherwise substantially interfere with the success of upstream adult migration, spawning, egg incubation, early rearing, or downstream juvenile emigration of resident marine or anadromous fishes, thereby resulting in adverse effects on year-class production; or

- reduce benthic macroinvertebrate abundance within a water body by a sufficient magnitude and geographic extent as to adversely affect overall BMI community structure or function, including the fish forage base that it provides within the water body.

ANALYSIS METHODOLOGY

This analysis of impacts on aquatic biological resources resulting from implementing the project includes construction of the pipeline under Option 1 and long-term operations of the improved wastewater treatment facilities under both Options 1 and 2. This assessment is based on review of data provided by Pinole-Hercules WPCP staff, site-specific information associated with habitat and water quality in the affected water bodies collected by various organizations and agencies, and existing documentation that addresses the aquatic biological resources potentially occurring near the project area.

Construction-Related Methodology

Under Option 1, a new larger capacity force main would be installed from the Pinole-Hercules WPCP to the permitted Outfall 001 at the RSD (Exhibit 2-3). The construction-related activities under Option 1 with the potential to adversely affect fish and habitat resources include construction activities along a creek or channel and disturbance to the benthos associated with the repair and modification of the diffuser at Outfall 001. The effects of the project components on instream and riparian habitat, water quality, and fish communities and migration were assessed as described in the following sections. (Direct, construction-related water quality impacts related to sediment transport and contamination from construction materials are addressed in Chapter 3.6, “Hydrology and Water Quality.”)

Water Quality Impacts

Impacts on fish and habitat resources from increases in sedimentation and turbidity that could result from construction-related activities were assessed based on the magnitude and extent of expected change in these water quality parameters. Toxicity impacts on aquatic life that could result from chemical spills during construction were assessed based on the probability of a spill event and the volume of various contaminants likely to be spilled in any such event.

Direct Lethality or Injury to Aquatic Organisms

The potential for aquatic organisms to be directly injured or killed because of construction-related activities was evaluated in terms of the timing and duration of construction, the spatial scale of in-channel disturbance, the equipment used and construction approach implemented, the nature of disturbance, and the fish and BMI communities likely to occur at, or immediately downstream of, each creek crossing or near the diffuser.

Habitat Impacts

Impacts on fish and aquatic life from temporary changes in riparian and instream habitat were evaluated in terms of the type and magnitude of area affected, the nature and duration of effects, and how such effects would affect resident and migratory fish species and other populations and communities of aquatic life (e.g., BMI).

Operation and Maintenance Methodology

The project would increase the permitted wet-weather capacity from 12.8 million gallons per day (mgd) to 17.09 mgd maximum daily average flow at the deepwater outfall (Outfall 001). Consequently, the future scenario for Option 1 assumes a wet-weather discharge rate of 17.09 mgd on an average daily basis. Additionally, under Option 1, two damaged outlet ports among a total of 30 ports on the 120-foot long existing outfall diffuser would be repaired. Based on the CORMIX modeling, the dilution ratio (i.e., receiving water: effluent discharge) in the initial zone of mixing would decrease from 42:1 under existing conditions to 32:1 under the project. The current dry weather effluent discharge rate would not be changed by the planned upgrades to the WPCP. Therefore, there would be no adverse water quality changes under dry weather conditions and, therefore, such conditions are not evaluated further in this assessment.

Under Option 2, only the City of Pinole flows would be treated at the plant. Option 2 assumes a wet-weather discharge rate of 12.8 mgd on an average daily basis. This is the current permitted wet-weather discharge capacity at the plant and the CORMIX-determined dilution ratio in the initial zone of mixing under the project would remain unchanged from existing conditions at 42:1. This is further discussed in the Assessment of Operational Water Quality Impacts in Chapter 3.1, “Hydrology and Water Quality.” The dry weather effluent discharge would decrease from the current 5.20 mgd to 2.89 mgd. Because the potential constituent discharges under dry weather conditions would be reduced, the related water quality effects would be reduced relative to existing conditions and, therefore, are not evaluated further in this assessment.

The effects of the increased chemical and temperature load and flow alteration on fish and habitat resources were assessed as described below.

Water Quality Impacts

Effects of the increased discharge of chemical constituents on fish and habitat resources downstream of the diffuser were evaluated by comparing potential effluent and background receiving water constituent concentrations to appropriate water quality criteria (or objectives) for the protection of aquatic life. The projected constituent concentrations in the combined Pinole-Hercules WPCP and RSD effluent under Option 1, and constituent concentrations in the combined Pinole and RSD flows under Option 2, and the potential for effluent concentrations to exceed regulatory criteria in the receiving water, are assessed in Chapter 3.6, “Hydrology and Water Quality.”

Based on the projected performance of the Pinole-Hercules WPCP treatment facilities following the proposed upgrades, and the projected combined effluent discharge from Pinole-Hercules and RSD, the wet-weather effluent discharges to the deepwater outfall have the potential to contain ammonia, copper, and cyanide at maximum concentrations that exceed the lowest applicable aquatic life criteria. Therefore, these constituents have the potential to be present within the initial zone of effluent mixing at elevated concentrations with respect to the applicable criteria, resulting in the exposure of aquatic organisms to potentially harmful concentrations, and are carried forward for detailed impact assessments. The screening of all other contaminants known to occur in the effluent indicated that the projected maximum effluent concentrations would be less than applicable aquatic life criteria and, thus, would not cause toxicity to organisms or otherwise adversely affect aquatic life beneficial uses in the receiving water (see Chapter 3.6, “Hydrology and Water Quality,” for additional information).

To determine potential impacts to near-field water quality at the deepwater outfall (i.e., initial zone of mixing), the dilution rates achieved at the deepwater outfall were evaluated for existing and future wet-weather effluent discharge rates using the near-field mixing zone model CORMIX (Version 5.0GT), as described in Chapter 3.6, “Hydrology and Water Quality.” CORMIX is an EPA-approved mixing zone model for environmental impact assessment of regulatory mixing zones resulting from continuous point source discharges. The effect of the effluent discharge on constituent concentrations in the near-field mixing zone was modeled under existing effluent discharge and future effluent discharge rates proposed for Option 1 and Option 2.

Under Option 2, the potential changes in effluent constituent concentrations associated with treatment of only the City of Pinole flows were also assessed. Effects of the project on receiving water constituent concentrations in the far-field zone (i.e., beyond the initial zone of mixing) were assessed with a two-dimensional, free-surface flow-modeling system developed by Resource Management Associates (RMA) that simulates the San Pablo Bay and estuary system (see Chapter 3.6, "Hydrology and Water Quality" for additional information).

Under both Option 1 and Option 2, the incremental changes in water quality in the initial zone of mixing and in the far-field were evaluated by comparing the mass-balance combined effluent and background receiving-water constituent concentrations to appropriate water quality objectives/criteria and other relevant effect thresholds, as necessary. The anticipated water quality effects were based on an evaluation of the project-related water quality changes caused by the effluent discharge at Outfall 001 compared to the existing conditions. The elimination of the existing wet weather effluent discharges from Outfall 002 was considered under both Option 1 and Option 2. Under Option 1, the project-related increase in wet-weather discharge of chemical constituents from Outfall 001 and associated changes in constituent concentrations within the initial zone of mixing and the incremental increase in the size of the mixing zone needed to meet applicable objectives/criteria were evaluated. Under Option 2, the effluent discharge rate at Outfall 001 would not change; however, the incremental project-related changes in effluent quality were evaluated, which could change the constituent concentrations within the initial zone of mixing and the size of the mixing zone for certain constituents.

The potential incremental changes in receiving water concentrations in the initial zone of mixing, relative to existing conditions, were evaluated for reasonable worst-case acute (i.e., short-term) and chronic (i.e., typical) exposure conditions. Acute exposure was assessed using the projected maximum effluent concentrations and chronic exposure was assessed using the projected average effluent concentrations. Acute criteria typically apply to the allowable maximum 1-hour average receiving water concentration, and chronic criteria commonly apply to the maximum 4-day average concentration, that the most sensitive organisms can tolerate. The receiving water concentrations were calculated using the CORMIX-determined dilution ratio for the maximum wet-weather effluent discharge rates and using maximum background receiving water concentration measured at Davis Point (i.e., the nearest ambient sample collection site used for the San Francisco Estuary Institute-operated Regional Monitoring Program [RMP]). The use of both maximum effluent and receiving concentrations reflect the maximum concentrations expected to occur in the initial zone of mixing. All other conditions would represent lower initial zone of mixing concentrations relative to this worst-case condition.

The CEQA significance of anticipated effects was determined based on how water quality changes would affect aquatic organisms, and comparing such findings to the thresholds of significance as the basis for making impact determinations. If consistent compliance with the applicable water quality criteria/objectives, or other relevant effect thresholds identified for this assessment was demonstrated for the project condition, it was determined that the constituent concentration in the receiving water would not adversely affect fishery resources. If the effluent discharge plume would cause receiving water to exceed acute or chronic aquatic life criteria within the initial zone of mixing, the exposure duration of aquatic organisms to the discharge plume was assessed to determine impacts. The effects of the effluent discharge on contaminant levels, dissolved oxygen (DO) levels, and temperature were assessed to determine the potential for project-related increases in toxic effects, relative to existing conditions, or mortality of fish species, and to determine whether a migration barrier or population-level effects would result from incremental increases in these constituents from the project-specific contribution of effluent discharge to San Pablo Bay. Dilution of effluent discharged from Outfall 001, mixing characteristics of the plume near the outfall, organisms exposed, exposure durations, and constituent-specific toxicity characteristics were considered in determining whether any exceedance of an applicable objective/criterion, or another relevant effect threshold, in the initial zone of mixing would adversely affect one or more beneficial use of San Pablo Bay, thereby producing substantial scientific evidence upon which to base impact determinations.

Thermal Impacts

The project could seasonally alter the volume of water discharged from Outfall 001, which could affect the size of the thermal plume and temperatures within the plume. This could result in potential impacts on fish and BMI communities in San Pablo Bay. The applicable Thermal Plan objectives are not well supported by current scientific information pertaining to thermal effects on aquatic life. Therefore, compliance with these thermal limits does not provide an adequate means by which to assess actual thermal impacts to aquatic life in the water bodies affected by the project. Rather, a scientific assessment of thermal effects was performed based on the amount of additional thermal loading to San Pablo Bay that could occur under each option. This assessment examined the receiving water and effluent temperatures under existing conditions, the size and thermal conditions within the plume, the relative magnitude of change from background that would occur in the plume and receiving water as a result of project-related discharges, and the increase in the size of the plume under project conditions relative to the total available aquatic habitat in San Pablo Bay.

The impact assessment was based, in part, on the near-field dilution study and the expected DO and thermal conditions within the existing plume and the project-specific contribution to the temperatures and DO levels within the plume, the increase in the area of the channel cross-section that would result from project-specific increases in seasonal effluent discharge rates, and available literature regarding fish behavior and avoidance of extreme temperatures and DO concentrations.

Anadromous salmonids (i.e., Chinook salmon and steelhead) are the focus of the fish passage assessments because: (1) they have some of the lowest thermal tolerance of the species known to occur in the project area, and (2) several ESUs have special-status designations under the ESA and CESA. If no thermal impacts on anadromous salmonids are determined, thermal impacts on other fish species having greater thermal tolerances are not expected.

ISSUES NOT DISCUSSED FURTHER IN THIS EIR

Impacts to Aquatic Resources at the Proposed Corporation Yard Under Option 1—The work associated with the proposed corporation yard under Option 1 has a potential for direct, water quality impacts, which are analyzed in Section 3.6, “Hydrology and Water Quality.” However, because the proposed corporation yard site is not located adjacent to any creeks that would support aquatic life or San Pablo Bay, no impacts on fish and benthic macroinvertebrate communities are expected, and therefore potential impacts related to aquatic resources from the proposed corporation yard are not discussed further in this EIR.

Impacts to Aquatic Resources Under Option 2—All work associated with Option 2 would occur within the footprint of the WPCP and would, therefore, have no adverse impacts on the aquatic biological resources of San Pablo Bay or any of its tributaries. Consequently, the potential impacts of this construction are not discussed further in this EIR.

IMPACT ANALYSIS

Construction-Related Impacts

IMPACT 3.4-1	Potential for Construction-Related Water Quality Impacts on Fish and Benthic Macroinvertebrate Communities Resulting from Construction of the Proposed Force Main. *The new pipeline would cross several creeks supporting fish and benthic macroinvertebrate communities. Construction-related activities associated with placement of the pipeline could introduce pollutants and/or sediments into these creeks.*

Option 1: New Larger Effluent Pipeline to RSD

As part of the project, a new effluent pipeline, which would cross several small tributaries to San Pablo Bay, would be constructed. As indicated in Section 3.4.1 above, no salmonids or other special-status fish species are known to occur in Rodeo, Refugio, or Ohlone creeks. Rainbow trout have been documented in Pinole Creek upstream of the Pinole-Hercules WPCP; however, they have not been observed in the lower reaches of the creek and, due to the marginal habitat in the vicinity of the WPCP, are unlikely to occur there. However, there is a potential for anadromous salmonids, including ESA-listed ESUs, and other ESA- and CESA-listed species (e.g., delta smelt, longfin smelt) to stray into these creeks. Construction could result in soil erosion with resultant sedimentation of surface water bodies and the introduction of pollutants into surface waters within the project site, which could adversely affect the water quality of these creeks. This assessment addresses the potential impacts on fish species and benthic macroinvertebrate communities resulting from construction and placement of the proposed force main.

Under Option 1, a proposed force main would be installed from the Pinole-Hercules WPCP to the RSD. The majority of the force main would be installed underground on developed urban land; however, it would cross four small tributaries: Pinole Creek, Ohlone Creek, Refugio Creek, and Rodeo Creek. As stated in Chapter 2.0, “Project Description,” the portion of the pipeline that crosses Pinole Creek would be installed by suspending the pipeline from the existing bridge crossing; therefore, no excavation directly above or underneath this creek crossing is expected to occur.

The proposed force main would be routed beneath the other creeks using jack and bore drilling. When implemented properly, jack and bore drilling creates little, if any, disturbance to a water body and/or the aquatic communities that it supports. However, the primary risk associated with directional drilling and/or jack and bore drilling is the escape of pressurized drilling fluids resulting from a spill, tunnel collapse, or rupture in the streambed, commonly referred to as “frac-out.” The risk and potential impacts resulting from spills, collapses, and/or frac-outs can be minimized through proper design and planning, use of the appropriate equipment, conducting monitoring, and implementing response measures in the event that a frac-out occurs.

Because the proposed force main would be attached to bridge crossings or bored under the creek channels, no in-channel work is anticipated. However, because the force main would be buried along its length except at bridge crossings, some excavation would likely occur on the bank adjacent to each of the creeks and where the force main parallels the 2,000-foot-reach of lower Pinole Creek between the WPCP and San Pablo Avenue. As stated in Chapter 2.0, “Project Description,” no sediments related to pipeline excavation would placed in the creeks. However, there is still a potential for unintentional introduction of sediments and/or pollutants into each of these creeks from construction equipment and supplies, which could have an indirect adverse impact on fish and benthic macroinvertebrate communities. Consequently, this impact is considered **potentially significant**.

Option 2: Pinole-Only Flows at Existing Plant

Under Option 2, construction activities would occur only at the Pinole-Hercules WPCP and a parallel force main would not be constructed. Consequently, this option would have **no impact**.

Mitigation Measure 3.4-1a. Prepare and Implement a Spill Prevention Plan

Applies to: Option 1

A spill prevention plan shall be prepared outlining measures to be taken to immediately clean up and properly dispose of any fluid spills. Staging and storage areas shall be established away from the in-water construction areas to store, service, and maintain construction equipment and supplies and thereby minimize the potential for leaks or spills of oil, diesel fuel, gasoline, or related chemicals to enter the water, further contributing to degradation of water quality in the creeks.

Mitigation Measure 3.4-1b. Develop and Implement a Frac-Out Plan for Jack and Bore Drilling.

Applies to: Option 1

A qualified engineer shall develop a frac-out plan for jack and bore drilling at any of the creek crossings. The frac-out plan shall include, at a minimum, frac-out prevention, monitoring, and response measures to contain slurry, and all provisions of this plan shall be implemented during construction operations. The plan shall be submitted to the City of Pinole for review and approval prior to the start of any jack and bore operations.

Mitigation Measure: Implement Mitigation Measures 3.6-3a and 3.6-3b.

Applies to: Option 1

Mitigation Measure: Implement Mitigation Measure 3.9-1.

Applies to: Option 1

Implementation of Mitigation Measures 3.4-1a, 3.4-1b, 3.6-3a, 3.6-3b, and 3.9-1 would reduce the potentially significant impacts related to construction-related water quality effects on salmonids to a **less-than-significant** level because the potential for pollutants and/or sediments associated with construction-related activities to enter the creeks would be minimized through preparation and implementation of a spill prevention plan, SWPPP, and BMPs; a biological monitor would be onsite during construction activities adjacent to the creeks; and a frac-out plan would be prepared to address a slurry spill it if were generated by jack and bore drilling.

IMPACT 3.4-2 Potential for Construction-related Impacts Associated with the Proposed force main to Alter Aquatic and Riparian Habitat. *The new pipeline would cross several creeks supporting fish and benthic macroinvertebrate communities. However, because the pipeline would be attached to bridge crossings or routed underneath the creek channels, no in-channel work is anticipated, and the extent of disturbance is expected to be confined to an area immediately surrounding the exit and entrance of the force main on the banks of the channel. Furthermore, no large trees or other shade-providing physical components of the riparian zone are expected to be removed and the channel would be returned to its preproject condition following construction.*

Option 1: New Larger Effluent Pipeline to RSD

As described in Impact 3.4-1, construction of the proposed force main would cross four creeks that are tributary to San Pablo Bay. These creeks support numerous native and introduced fish and benthic macroinvertebrate communities. In-channel habitat in the lower reaches of the four creeks crossed by the proposed force main consists primarily of engineered channels and underground storm drains. Riparian habitat in the lower reaches of the creeks, particularly at bridge crossings, are largely characterized as channelized and uniform cross-sections with concrete and riprap reinforcement, and grasses. The riparian areas surrounding the four bridge crossings are largely devoid of trees or other beneficial habitat elements for aquatic organisms.

Because the proposed force main would be suspended from the bridge at Pinole Creek and routed underneath the other creeks using jack and bore drilling, construction-related activities would likely have no direct impact on in-channel habitat. However, a small section of either bank at each creek crossing may be disturbed in a small area directly around the exit and entrance of the pipeline, which would be placed in a trench immediately adjacent to San Pablo Avenue. The expected area to be disturbed would be confined to within a few feet of the existing and proposed force main. No trees or large shade-providing vegetation is anticipated to be moved or disturbed during construction. Construction activities would last only a few days at each creek crossing and no more than several weeks for the section paralleling Pinole Creek, so any disturbance would be temporary and the area of disturbance would be returned to its prior condition following construction. Finally, as discussed in Impact 3.4-1, no habitat used by special-status fish or BMI species would be disturbed as a result of construction-related activities. Consequently, this impact is considered **less than significant**.

Option 2: Pinole-Only Flows at Existing Plant

Under Option 2, a parallel force main would not be constructed. Consequently, this option would have **no impact**.

Mitigation Measure: No mitigation measures are required.

IMPACT 3.4-3	Potential for Construction-Related Impacts on Aquatic Habitat Associated with Modification of the Diffuser. *The existing diffuser at Outfall 001 would be modified to achieve the full capacity of the diffuser under Option 1. Construction-related activities may resuspend benthic sediments immediately surrounding the diffuser; however, any impacts would be temporary and confined to a small area.*

Option 1: New Larger Effluent Pipeline to RSD

The existing diffuser at Outfall 001 has thirty (30) 3-inch diameter ports. Based on a diver inspection conducted in 2005, the majority of the diffuser's ports were operating as designed; however, two ports (#7 west and #12 east) on the existing diffuser exceeded 3 inches in size as a result of corrosion. Under Option 1, these two ports would be repaired to decrease the size to 3 inches in order to attach a duckbill valve. The blocked ports would be cleared and the two smaller ports (#1 west and #2 west) would be modified so that all of the ports would be a uniform 3 inches in diameter to achieve the full capacity of the diffuser. Three-inch duckbill valves would be attached using stainless steel clamps on each of the diffuser ports (for a total of 30 valves) to provide enhanced jet velocity and to improve initial dilution. All work would be performed by hand, by divers launched from boats; no dredging would occur as part of the diffuser modification. At each set of ports, a very small amount of the bedding material beneath the outfall pipe may be temporarily disturbed by the divers in order to create a small gap in which the stainless steel straps/clamp assembly would be positioned beneath and around the outfall pipe. Once the clamp is in place, the small amount of disturbed bedding material would be returned by the divers to its prior condition and bed elevation.

The diffuser modification would be completed during the summer months when outflows are at their lowest and the potential for ESA-listed species, including anadromous salmonids or green sturgeon, to be present in the vicinity of the diffuser is low. Activities associated with the diffuser modification are expected to last no longer than one or two days. Given the nature of the diffuser-related activities, any sediment resuspended as a result of activities by the divers to attach the clamps would be confined to a small area (i.e., less than 20 feet in diameter) directly surrounding the diffuser and would likely return to its previous condition within a few hours of disturbance. The small disturbance that would occur during repair of the diffuser would not cause a measurable or long-term change in the aquatic habitat of San Pablo Bay, including critical habitat for any ESA-listed species, nor is it expected to have any impacts on any special-status species that would cause lethality or adversely affect the species' long-term population levels in these water bodies.

Because the area of habitat that could be disturbed under this option would be confined to a very small area surrounding the diffuser, and because disturbance to the benthos would be short-term and temporary, and any disturbed benthos would be returned to its previous condition within a few hours of completing the diffuser modifications, this impact is considered **less than significant**.

Option 2: Pinole-Only Flows at Existing Plant

Under Option 2, there would be no alterations to the diffuser. Consequently, there would be **no impact** associated with this option.

Mitigation Measure: No mitigation measures are required.

OPERATION AND MAINTENANCE IMPACTS

IMPACT 3.4-4 **Impacts of Project Discharges on Ammonia, Copper, and Cyanide in Receiving Water to Adversely Affect Fish or Macroinvertebrates.** *Ammonia, copper, and cyanide concentrations in the undiluted effluent may exceed applicable regulatory water quality criteria that have been established for the protection of aquatic life--the beneficial use most sensitive to these constituents. In considering the appropriate averaging periods that result in exposure to organisms, the maximum concentration of undiluted effluent may exceed the lowest acute criteria, or the average effluent concentration may exceed the chronic criteria, or both criteria may be exceeded, depending on the individual constituent. Under Option 1, the project would incrementally increase the size of the initial zone of effluent mixing during the wet-weather discharge periods, although the potential acute and chronic exposure impacts to fish and other aquatic organisms would be limited to a smaller area within this zone close to the diffuser. Under Option 2, the quality of the effluent discharge to the deepwater outfall may change compared to existing conditions as a result the City of Hercules effluent contribution being eliminated. However, under both options, the discharge would not cause lethal exposure or adverse long-term population or community level impacts on any aquatic species. Thus, the project-related discharges of these constituents to San Pablo Bay would not adversely affect beneficial uses related to aquatic life.*

Option 1: New Larger Effluent Pipeline to RSD

As described in Chapter 3.6, "Hydrology and Water Quality," the discharge of combined Pinole-Hercules WPCP and RSD undiluted effluent has the potential to exceed the applicable aquatic life criteria for ammonia, copper, and cyanide. This section provides the assessment of potential impacts of increased wet-weather effluent discharge on receiving water concentrations of these constituents.

An important consideration in the assessment of potential impacts on aquatic resources associated with Option 1 is the project-specific contribution to the size of the plume at the deepwater outfall. Under existing conditions, the plume's initial zone of mixing covers an area of approximately 0.8 acre at the time of slow background tidal flow under slack tide conditions. Under Option 1, wet-weather discharges would increase by approximately 35%, which would increase the area of the initial zone of mixing to a total of 0.9 acre, which would result in the outer edge of the initial zone of mixing being approximately 170 feet from the diffuser.

Ammonia

Ammonia is a key inorganic form of nitrogen in the nitrogen cycle that can be discharged directly or in runoff from sources such as fertilizers and animal fecal wastes, or in organic matter that is converted to ammonia through decay. Ammonia is also a component of domestic wastewater. Ammonia is readily oxidized to nitrite and nitrate nitrogen in aquatic environments with sufficient oxygen (i.e., aerobic environments). The unionized form of ammonia is a constituent of concern for its potential to cause toxicity to aquatic organisms at low concentrations. The Basin Plan's aquatic life objectives for unionized ammonia concentrations are 0.025 milligrams per liter (mg/l) (as N) as an annual median and 0.16 mg/l (as N) as a maximum. The RWQCB's policy is to translate the unionized ammonia objectives to the total ammonia form using EPA aquatic life criteria formulas which account for receiving water pH, temperature, and salinity conditions (EPA 1989).

For Option 1, Table 3.4-4 summarizes the San Pablo Bay background ammonia concentrations, projected maximum and average ammonia concentrations in the effluent; projected maximum receiving water concentrations at the edge of the initial zone of mixing under acute and chronic scenarios; the applicable water quality criteria for the protection of aquatic life; and the minimum dilution ratio needed to meet the aquatic life criteria. At the CORMIX-determined dilution ratio of 32:1 in the initial zone of mixing, the mass balance analysis indicates that dilution would reduce the ammonia concentrations, resulting in receiving water concentrations that would be well below the applicable ammonia objectives within the initial zone of mixing (i.e., within 170 feet of the outfall diffuser). Based on the maximum receiving water and effluent concentrations, the acute objective would be met where dilution is at least 2.4:1, and the chronic objective would be met where dilution is at least 5.1:1. The dilution ratios necessary to meet the acute and chronic objectives are small compared to the 32:1 initial dilution provided by the diffuser, thus, the objectives would be met within a substantially shorter distance from the diffuser than the edge of the initial zone of mixing. Finally, the far-field modeling with the RMA model indicates that the increased effluent discharge at the deep water outfall would negligibly increase receiving water ammonia concentrations at the nearby RMP monitoring locations (see Chapter 3.6, "Hydrology and Water Quality," for additional information).

Table 3.4-4
Option 1 - Analysis of Acute and Chronic Impacts to Aquatic Life from Ammonia

Exposure Scenario	Concentration (mg/l)		Criteria (mg/l)	Receiving Water Concentration in Initial Zone of Mixing (mg/l)	Dilution Required to Achieve Water Quality Criteria
	San Pablo Bay Background	Effluent			
Acute	0.16	18.7	5.67 [1]	0.72	2.4:1
Chronic	0.16	8.3	1.49 [2]	0.41	5.1:1

Note: mg/l = milligrams per liter
1 Saltwater acute criterion for total ammonia based on maximum receiving water pH, salinity, and temperature.
2 Saltwater chronic criterion for total ammonia based on average receiving water pH, salinity, and temperature.
Source: Data compiled by Robertson-Bryan Inc. in 2009

Copper

Copper is an abundant trace element in the earth's crust and can occur in surface waters at background levels. Potential sources of copper in wastewater effluent include corrosion of copper pipes in the service area, industrial discharges, infiltration, and inflow. Concentrations of copper in surface waters are of potential concern for toxicity to aquatic life at part-per-billion (µg/L) levels. Water hardness, dissolved organic carbon, various salts, and pH affect the bioavailability and, therefore, toxicity and related (e.g., olfactory) impacts of copper. In 2007, the RWQCB adopted site-specific objectives for copper that are applicable to protection of aquatic life in San Pablo Bay. Concentrations of copper of potential concern to aquatic life are orders of magnitude lower than concern levels for drinking water supplies.

Table 3.4-5 summarizes the San Pablo Bay background ammonia concentrations, maximum and average effluent copper concentrations and projected receiving water concentrations based on the CORMIX-determined dilution ratio of 32:1 for Option 1. The maximum effluent copper concentration is less than the acute copper criterion and the average effluent concentration slightly exceeds the chronic criterion. The mass balance analysis indicates that receiving water copper concentrations would be well below the applicable chronic criteria within the initial mixing zone. Moreover, only a very small dilution ratio in the mixing zone of greater than 0.1:1 is sufficient to result in receiving water concentrations below the chronic criteria. Compared to the 32:1 initial dilution provided by the diffuser, dilution of 0.1:1 likely occurs within a few feet of the diffuser ports. The RMA far-field model results indicate that the increased wet-weather effluent discharge under Option 1 would not measurably change receiving water copper concentrations at the nearby RMP monitoring locations (see Chapter 3.6, "Hydrology and Water Quality" for additional information).

Table 3.4-5 Option 1 – Analysis of Acute and Chronic Impacts to Aquatic Life from Copper					
Exposure Scenario	Concentration (µg/l)		Criteria (dissolved) (µg/l)	Receiving Water Concentration in Zone of Initial Mixing (µg/l)	Dilution Required to Achieve Water Quality Criteria
	San Pablo Bay Background	Effluent			
Acute	2.56	8.6	9.4 [1]	2.74	- -
Chronic	2.56	6.4	6.0 [1]	2.68	0.1:1

Note: µg/l = micrograms per liter

- - No dilution is necessary; undiluted effluent concentration is less than criteria.

[1] Site specific objective for San Pablo Bay.

Source: Data compiled by Robertson-Bryan Inc. in 2009

Cyanide

Cyanide is known to be a by-product that can be formed by the chlorine disinfection process in municipal WWTPs. Other potential sources of cyanide in the environment that could be discharged into municipal wastewater include discharges from metal plating industries and organic chemical industries, vehicle exhaust, and pesticides containing cyanide compounds (ATSDR 2006). Additionally, the observed detections of total cyanide in the Pinole, Hercules, and RSD effluent may be artifacts associated with interferences of the laboratory total cyanide analyses. The total cyanide test is known to be affected by several potential matrix interferences that, if not properly resolved during the time of sampling, can result in substantial positive and/or negative bias (Weinberg et al. 2005). Investigations of cyanide levels in municipal wastewater effluents have shown that total cyanide levels determined by acid distillation using EPA's standard method 335 series and American Public Health Association Standard Methods vary depending on where in the treatment process the measurement is taken, on the disinfection method at the plant, and on the presence of other interfering compounds in the effluent (WERF 2003). EPA is currently preparing draft rules, with final rule approval expected no later than about mid-2011, which would modify the sample preservation procedure to allow cyanide analysis to be conducted on unpreserved samples if analyzed immediately after collection.

Table 3.4-6 summarizes the San Pablo Bay background ammonia concentrations, maximum and average effluent cyanide concentrations, and projected receiving water concentrations based on the CORMIX-determined dilution ratio of 32:1 for Option 1. The maximum effluent cyanide concentration is less than the acute cyanide criterion and the average effluent concentration slightly exceeds the chronic criterion. The mass balance analysis indicates that receiving water cyanide concentrations would be well below the applicable chronic criteria within the initial mixing zone. Moreover, only a very small dilution ratio in the mixing zone of greater than 0.2:1 is sufficient to result in receiving water concentrations below the chronic criteria. Compared to the 32:1 initial dilution provided by the diffuser, dilution of 0.2:1 likely occurs within a few feet of the diffuser ports. The RMA far-field model results indicate that the increased wet-weather effluent discharge under Option 1 would not measurably change receiving water cyanide concentrations at the nearby RMP monitoring locations (see Chapter 3.6, "Hydrology and Water Quality" for additional information).

Table 3.4-6 Option 1 - Analysis of Acute and Chronic Impacts to Aquatic Life from Cyanide					
Exposure Scenario	Concentration (µg/l)		Criteria (dissolved) (µg/l)	Receiving Water Concentration in Zone of Initial Mixing (µg/l)	Dilution Required to Achieve Water Quality Criteria
	San Pablo Bay Background	Effluent			
Acute	0.4	6.2	9.4 [1]	0.58	- -
Chronic	0.4	3.4	2.9 [1]	0.49	0.2:1

Note: µg/l = micrograms per liter

- - No dilution is necessary; undiluted effluent concentration is less than criteria.

[1] Site specific objective for San Pablo Bay.

Source: Data compiled by Robertson-Bryan Inc. in 2009

Chronic Exposure Assessment

Fish migrating past the diffuser would not be exposed to the effluent plume for a sufficient period of time to cause adverse chronic impacts. The majority of juvenile anadromous fish typically migrate along the margins of the river channels and bay shoreline and would not be exposed to the plume. However, some proportion of adult and juvenile fish migrating in open water may encounter the plume, in which case they may either avoid the plume (e.g., due to unfavorable conditions) or swim through the plume. Fish swimming through the plume may be temporarily exposed to the incrementally increased ammonia, copper, and cyanide concentrations and slightly larger zone of initial mixing relative to existing conditions; however, the duration of exposure to concentrations potentially exceeding the chronic criteria (i.e., within the 0.9 acre around the diffuser) would likely be on the order of several seconds to several minutes, given the swim speeds of anadromous fishes; The project's contribution to the plume would only increase the exposure time on the order of seconds. Bell (1986) reports sustained swimming speeds of 0.5 to more than 2 feet per second for juvenile salmon ranging from 2 to 4.75 inches (51–120 mm) in length. Because juvenile steelhead emigrate as 1- to 3-year-old fish, their swimming abilities are considerably better than those of Chinook salmon. In its BO for the Port of Stockton's West Complex Dredging Project, NMFS reports a burst swimming speed of 10 body lengths per second for juvenile salmonids, which translates into approximately 150 centimeters per second (5 feet per second) for a 150-mm steelhead smolt and approximately 250 centimeters per second (8 feet per second) for a 250-mm steelhead smolt.

Regarding resident fish species, neither fry, juvenile, nor adult fishes would be expected to remain exposed to concentrations exceeding the 4-day chronic objective for four or more continuous days. The total area of aquatic habitat that would be affected by constituent concentrations exceeding the objectives (i.e., less than 0.9 acre) would occur in open water largely devoid of aquatic habitat features (e.g., structure, cover). The size of the initial zone of mixing at the diffuser is negligible relative to the amount of aquatic habitat present throughout San Pablo Bay. Fishes may make daily and/or seasonal movements throughout San Pablo Bay (e.g., foraging, spawning migrations). However, given the lack of habitat features that would attract fish, it is unlikely that individual resident fish would remain in the open waters near the diffuser continuously for long periods. Because the likelihood of exposure to areas of the plume exceeding the chronic criterion under existing conditions, and the project-related incremental increased discharge, is low and, if exposed, the duration of exposure would be short compared to the long-term averaging period for the constituents of concern, the project-specific contribution to concentrations of toxic compounds in the discharge would not increase chronic toxicity to mobile resident or migratory organisms near the outfall. Additionally, ammonia is rapidly oxidized to nitrate (i.e., a less toxic nitrogen compound) in water, which would further lessen the effect of the discharge to aquatic organisms over chronic exposure periods.

Several factors would reduce the potential for average concentrations of ammonia, copper, and cyanide in the effluent to cause adverse chronic impacts to BMI organisms near the diffuser. In general, the freshwater effluent plume, which is less dense than the saltwater in San Pablo Bay and, therefore, buoyant, would tend to disperse into the water column where it would mix and limit the magnitude and frequency of sediment substrate exposure to undiluted effluent. The BMI communities residing in the open waters of San Pablo Bay are composed primarily of organisms that burrow into the sediments and collect their food by filtering the water column. The discharge could potentially affect the species composition and species-specific relative abundance of BMIs that reside in sediments immediately adjacent to the diffuser, based on species-specific tolerance levels to contaminants and other wastewater characteristics in general (e.g., dissolved oxygen levels, temperature, organic matter content). However, the project-specific contribution to increased concentrations of toxic compounds in the plume would be negligible and, therefore, any changes in BMI community composition within the footprint of the plume, including sessile organisms residing in the benthos surrounding the diffuser, would likely be immeasurable. Moreover, because the area where the chronic criteria could occasionally be exceeded is negligible in size relative to San Pablo Bay as a whole, no significant adverse impacts to BMI populations would occur as a result of the project-specific contributions to discharge of these constituents. Furthermore, potential localized reduction in the BMI abundance or community composition resulting from project-related increases in discharges would likely be immeasurable, and would be confined to the area within a short distance (i.e., several feet) of the diffuser, and would, therefore, not be expected to cause a substantial adverse impact on BMI populations or higher trophic levels (e.g., wildlife) via the food chain.

Acute Exposure Assessment

Under Option 1, the undiluted effluent is projected to contain only ammonia at concentrations that could exceed the acute aquatic life objective. The potential area of San Pablo Bay near the deepwater outfall diffuser where exposure could occur would be slightly larger under Option 1 than existing conditions as a result of the increased wet-weather discharge rates. The effluent concentrations of copper and cyanide would not exceed their respective acute criteria. Fish migrating past the diffuser would not be exposed to the plume for a sufficient period of time as to cause adverse acute impacts. Anadromous fish swimming through the plume may be temporarily exposed to increased ammonia concentrations; however, the additional duration in which a fish moving through the incrementally larger plume under project conditions would be on the order of seconds, given the typical swim speeds of anadromous juvenile and adult fishes discussed above. Consequently, no acute lethality to migrating fish or drifting BMIs would be expected to occur.

Regarding resident fish species, the potential exposure of fry, juvenile, or adult fishes to water exceeding the acute objective within the small zone of mixing would be expected to be low given the negligible size of the initial zone of mixing relative to San Pablo Bay. However, resident fish or BMIs that may hold or reside in the sediments near the diffuser for extended periods (e.g., while feeding) would be subjected to the plume for extended periods of time. The likelihood that resident fish and BMIs would be subjected to ammonia concentrations at acute exposure conditions is low for several reasons. First, whole effluent acute toxicity monitoring (i.e., fathead minnow test species) of the Pinole-Hercules WPCP effluent for the period of 2002 through 2005 indicated a minimum survival of 90% and an average survival rate of 93% (RWQCB 2007). Thus, the frequency with which undiluted effluent concentrations could potentially cause acute toxicity is low. Second, the relatively high velocity of effluent discharge from the diffuser ports would make it difficult for fish to hold their position in the water column within the immediate vicinity of the diffuser, thereby not exposing themselves to elevated ammonia concentrations for an extended period of time. Third, the plume is composed of freshwater that is less dense and warmer than the receiving water. Therefore, the plume is highly buoyant and, given the jet mixing, rises rapidly to the surface. Consequently, sessile organisms residing in the benthos or demersal (bottom-dwelling) fish holding near the diffuser would not be measurably affected by the incrementally higher project-related wet-weather effluent discharges. Finally, because the project only incrementally increases the size of the initial zone of mixing, the potential for acute exposure impacts to fish and other aquatic organisms would not change appreciably.

Impact Summary

The area where the chronic and acute ammonia objectives, and chronic copper and cyanide criteria, could potentially be exceeded would be only slightly larger (0.9 acre) than under existing conditions (0.8 acre), and is negligible in size relative to the San Pablo Bay as a whole. Therefore, no significant adverse impacts to the fish or BMI populations, including special-status fish species, would be expected to occur within the receiving water as a result of Option 1. Based on these findings, the impacts of the discharge on receiving water ammonia, copper, and cyanide concentrations:

- would not cause lethal exposure to fish or BMI passing through the initial zone of mixing;
- would not substantially delay, block, or otherwise interfere with movements of fishes, including ESA- or CESA-listed species, past the diffuser;
- would not result in receiving water conditions within the initial zone of mixing or the greater San Pablo Bay that would cause adverse long-term population or community level impacts on any aquatic species, and
- would not reduce BMI abundance by a magnitude that would cause adverse community structure, function, and measurable depletion of the fish forage base.

Moreover, the discharge impacts on receiving water ammonia, copper, and cyanide concentrations would not degrade the quality of physical San Pablo Bay aquatic habitats. Hence, the discharge-related impacts on these constituents are considered a **less-than-significant** impact. Additionally, discontinuing the use of the shallow water outfall for the Pinole-Hercules WPCP discharges would result in a **beneficial impact** by eliminating constituent discharges to productive shallow water habitats, where fish and BMI abundance may be higher.

Option 2: Pinole-Only Flows at Existing Plant

Under Option 2, the wet-weather discharges from the treated wastewater generated only by the City of Pinole to the deepwater outfall would be similar to existing discharge rates. However, the projected effluent quality may change slightly by eliminating City of Hercules flows.

Ammonia

Under Option 2, the undiluted effluent is projected to contain ammonia at concentrations that could exceed the respective chronic and acute aquatic life objectives. However, eliminating Hercules flow would result in a lower maximum and higher average effluent ammonia concentrations at the RSD diffuser than under existing conditions, as a result of wet-weather dilution impacts and differences in the respective concentrations of each city's contribution to the flow. Table 3.4-7 summarizes the San Pablo Bay background ammonia concentrations, maximum and average effluent ammonia concentrations and projected receiving water concentrations based on the CORMIX-determined dilution ratio of 42:1 for existing conditions, which would be equivalent under Option 2. The size and distance of the initial zone of mixing at the deepwater outfall diffuser would be similar to existing conditions (i.e., about 0.8 acre) because wet-weather effluent discharge rates would be similar. The mass balance analysis indicates that dilution would reduce the ammonia concentrations, resulting in receiving water concentrations that would be well below the applicable ammonia criteria within the initial zone of mixing. As described above for Option 1, the dilution ratios necessary to meet the acute (0.2:1) and chronic criteria (6.0:1) are small compared to the 42:1 initial dilution provided by the diffuser. Based on the results of the RMA far-field modeling conducted for Option 1, it is anticipated that the effluent discharge rate for Option 2, which is similar to existing conditions, would not measurably change the percentage of effluent at the nearby RMP monitoring locations, and thereby background ammonia levels would not measurably change relative to the existing condition (see Chapter 3.6, "Hydrology and Water Quality," for additional information).

Table 3.4-7 Option 2 - Analysis of Acute and Chronic Impacts to Aquatic Life from Ammonia					
Exposure Scenario	Concentration (mg/l)		Criteria (mg/l)	Receiving Water Concentration in Initial Zone of Mixing (mg/l)	Dilution Required to Achieve Water Quality Criteria
	San Pablo Bay Background	Effluent			
Acute	0.16	6.6	5.67 [1]	0.31	0.2:1
Chronic	0.16	9.5	1.49 [2]	0.38	6.0:1

Note: mg/l = milligrams per liter.

[1] Saltwater acute criterion for total ammonia based on maximum receiving water pH, salinity, and temperature.

[2] Saltwater chronic criterion for total ammonia based on average receiving water pH, salinity, and temperature.

Source: Data compiled by Robertson-Bryan Inc. in 2009

Copper and Cyanide

Under Option 2, the average effluent copper concentration could exceed the chronic criterion, but the maximum concentration would be expected to be lower than under existing conditions as a result of the elimination of Hercules wastewater flows and would not be expected to exceed the acute criterion. Effluent cyanide concentrations would not be expected to exceed chronic or acute criteria, thus resulting in no impact to fish or aquatic organisms. Table 3.4-8 summarizes the mass-balance assessment for effluent concentrations of copper and cyanide, and receiving water background concentrations based on the CORMIX-determined dilution ratio of 42:1 for Option 2.

Table 3.4-8 Option 2 - Analysis of Acute and Chronic Impacts to Aquatic Life from Copper and Cyanide							
Constituent	Concentration (µg/l)		Criteria (µg/l)		Receiving Water Concentration in Zone of Initial Mixing (µg/l)	Dilution Required to Achieve Water Quality Criteria	
	San Pablo Bay Background	Effluent	Acute	Chronic		Acute Criterion	Chronic Criterion
Copper	2.56	13.3 [1]	9.4 [2]	6.0 [2]	2.81	- -	2.1:1
Cyanide	0.4	2.9 [1]	9.4 [2]	2.9 [2]	0.46	- -	- -

Note: µg/l = micrograms per liter

- - No dilution is necessary; undiluted effluent concentration is less than criteria.

[1] Average effluent concentration used in mass balance, which is higher than maximum effluent concentration.

[2] Site specific objective for San Pablo Bay.

Source: Data compiled by Robertson-Bryan Inc. in 2009

The analysis indicates that dilution would reduce the copper concentrations in receiving water concentrations to well below the applicable chronic criterion within the initial zone of mixing. Very little dilution is necessary to meet the chronic copper criterion (i.e., 2.1:1), and the dilution ratio is small compared to the 42:1 initial dilution provided by the diffuser. Moreover, the necessary dilution to meet the criterion would occur within a few feet of the diffuser. As described above for ammonia, it is anticipated that the effluent discharge under Option 2 would not measurably change the percentage of effluent at the nearby RMP monitoring locations, and thereby background copper and cyanide levels would not measurably change relative to the existing condition (see Chapter 3.6, "Hydrology and Water Quality," for additional information).

Chronic and Acute Exposure Assessment

Under Option 2, anadromous or resident fish and BMI may encounter the effluent discharge plume, which would result in temporary exposure to an initial zone of mixing that is similar in size and having comparable ammonia and copper concentrations as the existing conditions, which may exceed the respective chronic objective/criterion. As detailed in the analysis of Option 1 (above), any fish that were exposed to elevated ammonia and copper concentrations in the plume while migrating past the diffuser would not be exposed for a sufficient period of time as to cause adverse chronic impacts. Given the lack of habitat features that would attract fish near the diffuser, the duration of exposure would be short and not be expected to cause chronic toxicity to mobile resident or migratory organisms near the outfall. Any changes in BMI community composition within the plume footprint would likely be minimal because the area where the chronic criteria could occasionally be exceeded is negligible in size relative to San Pablo Bay as a whole, and the project's impacts on the size of this area is even lesser.

Because acute toxicity is infrequently detected in the undiluted effluent, the effluent would be rapidly dispersed within a short distance from the diffuser, and there would be no appreciable change in discharge rates or the size of the initial zone of mixing under Option 2 compared to existing conditions, it is expected that there would be no acute impacts to migrating fish or drifting BMIs that are exposed to the effluent plume while moving past the diffuser. The exposure of resident fish and BMIs holding or residing immediately adjacent to the diffuser to ammonia concentrations exceeding the acute objective would not be expected to result in adverse impacts.

Based on these findings, the impacts of the discharge on receiving water from ammonia and copper concentrations would not cause lethal exposure to fish or BMI passing through the initial zone of mixing; would not substantially delay, block, or otherwise interfere with movements of fishes, including ESA- and CESA-listed species, past the diffuser; and would not result in receiving water conditions within the initial zone of mixing or the greater San Pablo Bay that would cause adverse long-term population or community level impacts on any aquatic species. Moreover, the discharge impacts on receiving water constituent concentrations would not further degrade the quality of physical San Pablo Bay aquatic habitats, including designated critical habitats for ESA-listed aquatic species. Hence, the discharge-related effect on ammonia and copper concentrations in terms of fish and BMI exposure is considered a **less-than-significant** impact. Additionally, discontinuing the use of the shallow water outfall for the Pinole-Hercules WPCP discharges would result in a **beneficial impact** by eliminating constituent discharges to productive shallow water habitats, where fish and BMI abundance may be higher.

Mitigation Measure: No mitigation measures are required.

IMPACT 3.4-5 Potential for Decreased Dissolved Oxygen Concentrations Downstream of the Diffuser. *Dissolved oxygen concentration in the undiluted effluent may be less than minimum Basin Plan objectives and EPA recommended criteria that have been established for the protection of aquatic life-- the beneficial use most sensitive to dissolved oxygen. Under Option 1, the project would incrementally increase the size of the initial zone of effluent mixing during the wet-weather discharge periods, although the potential acute and chronic exposure impacts to fish and other aquatic organisms would be limited to a smaller area within this zone close to the diffuser. Under Option 2, the quality of the effluent discharge to the deepwater outfall may change compared to existing conditions as a result the City of Hercules effluent contribution being eliminated. However, under both options, the discharge is not expected to cause lethal exposure or adverse long-term population or community level impacts on any aquatic species. Thus, the project-related discharges of oxygen-demanding substances and DO levels to San Pablo Bay would not adversely affect beneficial uses related to aquatic life.*

Option 1: New Larger Effluent Pipeline to RSD

Effluent from a wastewater treatment plant typically contains oxygen-demanding substances in the form of a variety of suspended and/or dissolved organic matter compounds and specific readily oxidized compounds such as ammonia. Upon discharge of effluent to a receiving water, the extent of any receiving water DO reduction, or "sag," downstream from a discharge depends on the rate of oxygen use to satisfy the biochemical oxygen demand (BOD) and assimilative capacity provided in the receiving water through dilution, atmospheric reaeration, and instream oxygen production/use rates via photosynthesis/respiration.

The Basin Plan contains an objective for San Pablo Bay that limits the minimum DO to 5 mg/l downstream of Carquinez Bridge. The EPA established recommended ambient water quality criteria for DO (EPA 1986), presented in Table 3.4-9, that are more technically refined than those of the Basin Plan and are, therefore, used as the basis for this assessment. The fish species that are known to occur in the project area where the effluent discharge is located consist of both resident and anadromous fish species. The EPA criteria are applicable to both freshwater and saltwater conditions.

Table 3.4-9
U.S. Environmental Protection Agency Ambient Water Quality Criteria for Dissolved Oxygen

	Cold-Water Criteria (mg/l)		Warm-Water Criteria (mg/l)	
	Early Life Stages[1,2]	Other Life Stages	Early Life Stages[2]	Other Life Stages
30-Day Mean	NA[3]	6.5	NA	5.5
7-Day Mean	9.5 (6.5)	NA	6.0	NA
7-Day Mean Minimum	NA	5.0	NA	4.0
1-Day Minimum[4,5]	8.0 (5.0)	4.0	5.0	3.0

Note: mg/l = milligrams per liter

[1] Criteria reported as the water column concentrations recommended to achieve the required intergravel DO concentrations shown in parentheses.

[2] Includes all embryonic and larval stages and all juvenile forms to 30 days following hatching.

[3] NA (not applicable).

[4] For highly controllable discharges, further restrictions apply (see pg. 37 of EPA 1986).

[5] All minima should be considered as instantaneous concentrations to be achieved at all times.

Source: Data compiled by Robertson-Bryan Inc. in 2009

Table 3.4-10 provides a summary of the daily DO levels for the winter months (i.e., November through April) when the project-related wet-weather effluent discharges would change. Daily DO data for the undiluted Pinole-Hercules WPCP effluent are based on a representative 2-year period (i.e., November 2007 through April 2009) and receiving water DO levels are based on occasional grab sample values from San Pablo Bay collected at the U.S. Geological Survey's Water Quality of San Francisco Bay North of Pinole Point station (Station ID 13) during the period of November 1999 through April 2009. The data demonstrate that minimum DO (7.3 mg/l) and lowest monthly average DO (8.0 mg/l) in San Pablo are consistently above 6.5 mg/l, which is the most restrictive objective applicable to anadromous species migrating through the bay upstream to natal spawning areas in the rivers of the Central Valley. The effluent data demonstrate that minimum DO levels can be lower than the applicable minimum 30-day, 7-day, and 1-day EPA criteria.

Table 3.4-10
Dissolved Oxygen Concentrations in San Pablo Bay and Pinole-Hercules WPCP Effluent

Month	San Pablo Bay [1]		Pinole-Hercules WPCP Effluent [2]		
	Min DO (mg/l)	Avg DO (mg/l)	Min DO (mg/l)	Avg DO (mg/l)	Minimum 7-day Avg DO (mg/l)
Nov	7.4	8.0	4.3	5.8	4.7
Dec	7.9	8.5	4.6	6.0	5.5
Jan	8.8	9.2	3.3	5.8	4.7
Feb	7.3	8.7	5.2	6.2	5.5
Mar	8.4	8.9	4.0	6.0	5.2
Apr	8.1	8.7	3.8	5.8	5.3

Note: DO = dissolved oxygen; mg/l = milligrams per liter; WPCP = waste pollution control plant
[1] San Pablo Bay DO data from USGS' Water Quality of San Francisco Bay North of Pinole Point station (Station ID 13) for period of November 1999 through April 2009.
[2] Pinole-Hercules WPCP effluent DO data for period November 2007 through April 2009.
Source: Data compiled by Robertson-Bryan Inc. in 2009

Table 3.4-11 summarizes the minimum daily and 7-day average effluent DO values and projected receiving water concentrations based on the CORMIX-determined dilution ratio of 32:1 for Option 1. The mass balance analysis indicates that receiving water DO levels would be well above the applicable EPA criteria within the initial zone of mixing. Moreover, only a very small dilution ratio in the mixing zone of greater than 0.2:1 is sufficient to result in receiving water DO levels above the minimum allowable criteria. Compared to the 32:1 initial dilution provided by the diffuser, dilution of 0.2:1 likely occurs within a few feet of the diffuser ports. The RMA far-field model results described above indicate that the increased wet-weather effluent discharge under Option 1 would not measurably change the percentage of effluent at the nearby RMP monitoring locations, and thereby background DO levels would not measurably change relative to the existing condition (see Chapter 3.6, "Hydrology and Water Quality," for additional information).

Table 3.4-11
Option 1 – Analysis of Acute and Chronic Impacts to Aquatic Life from Dissolved Oxygen

Exposure Scenario	Concentration (mg/l)		Criteria (mg/l)	Receiving Water Concentration in Initial Zone of Mixing (mg/l)	Dilution Required to Achieve Water Quality Criteria
	San Pablo Bay	Effluent			
1-Day	7.3	3.3	4.0 [1]	7.2	0.2:1
7-Day	7.3	4.7	5.0 [2]	7.2	0.1:1

Notes: mg/l = milligrams per liter
Source: Data compiled by Robertson-Bryan Inc. in 2009

DO Exposure Assessment

Under Option 1, anadromous or resident fish and BMI may encounter the incrementally larger initial zone of mixing for the effluent discharge plume which would result in temporary exposure to comparable DO levels as the existing conditions, which may be less than EPA 7-day average and 1-day minimum DO criteria within a few feet of the diffuser. Any fish that were exposed to reduced DO concentrations in the plume while migrating past the diffuser would not be exposed for a sufficient period of time as to cause adverse chronic impacts. Additionally, no acute impacts would be expected for migrating fish or drifting BMIs moving past the diffuser that may be exposed to reduced DO levels. Given the lack of habitat features that would attract fish near the diffuser, the duration of exposure would be short and not be expected to cause adverse impacts to mobile resident or migratory organisms near the outfall. Moreover, the size of the initial zone of mixing where DO levels may be reduced is negligible in size relative to San Pablo Bay as a whole and would be readily avoidable if DO levels were less preferable to aquatic organisms occurring near the diffuser.

Based on these findings, the impacts of the discharge on receiving water DO levels would not cause lethality to fish or BMI passing through the initial zone of mixing; would not substantially delay, block, or otherwise interfere with movements of fishes, including ESA- or CESA-listed species, past the diffuser; and would not result in receiving water conditions within the initial zone of mixing or the greater San Pablo Bay that would cause adverse long-term population or community level impacts on any aquatic species. Moreover, the discharge impacts on receiving water constituent concentrations would not degrade the quality of physical San Pablo Bay aquatic habitats, including designated critical habitat for ESA-listed aquatic species. Hence, the discharge-related effect on DO levels related to fish and BMIs is considered a **less-than-significant** impact. Additionally, discontinuing the use of the shallow water outfall for the Pinole-Hercules WPCP discharges would result in a **beneficial impact** by reducing DO effects to productive nearshore shallow water habitats in the vicinity of that outfall, where fish and BMI abundance may be higher.

Option 2: Pinole-Only Flows at Existing Plant

Under Option 2, the treated effluent would contain City of Pinole discharges only, thus resulting in wet-weather discharges to the deepwater Outfall 001 similar to existing discharge rates. The projected effluent DO levels may change slightly by eliminating City of Hercules flows. However, the potential changes in DO levels would be expected to be minimal because effluent DO levels are a property of wastewater dependent on the level of biochemical degradation of organic matter. Moreover, estimated BOD levels in the combined Pinole-RSD effluent is projected to be lower, compared to the existing conditions, when the Hercules contribution is eliminated (see Chapter 3.6, "Hydrology and Water Quality," for additional information). Given the combination of multiple wastewater streams and similarity of treatment processes at the Pinole-Hercules WPCP and RSD plants, it is reasonable to assume that the effluent DO levels and other oxygen demanding substances would likely be similar to existing conditions (and no worse than existing conditions) following elimination of the Hercules flow contribution.

Based on the CORMIX-determined dilution ratio of 42:1 for existing conditions (i.e., equivalent to Option 2), the initial zone of mixing at the deepwater outfall diffuser would be similar to existing conditions (i.e., approximately 0.8 acre). Consequently, the receiving water DO levels would be expected to be similar to existing conditions. As assessed for Option 1 above, the impacts of the discharge on receiving water DO levels would not cause lethality to fish or BMI passing through the initial zone of mixing; would not substantially delay, block, or otherwise interfere with movements of fishes, including ESA- or CESA-listed species, past the diffuser; and would not result in receiving water conditions within the initial zone of mixing or the greater San Pablo Bay that would cause adverse long-term population or community level impacts on any aquatic species. Moreover, the discharge impacts on receiving water constituent concentrations would not degrade the quality of physical San Pablo Bay aquatic habitats, including designated critical habitat for any ESA-listed aquatic species. Hence, the discharge-related effect on DO levels related to fish and BMIs is considered a **less-than-significant** impact. Additionally, discontinuing the use of the shallow water outfall for the Pinole-Hercules WPCP discharges would result in a **beneficial impact** by reducing DO effects to productive nearshore shallow water habitats in the vicinity of that outfall, where fish and BMI abundance may be higher.

Mitigation Measure: No mitigation measures are required.

IMPACT 3.4-6 **Potential for Thermal Impacts on Aquatic Organisms from Exposure to Elevated Water Temperatures in the Vicinity of the Diffuser.** *Elevated temperatures can have adverse impacts on fish and BMI passing or residing within the vicinity of the diffuser. Under Option 1, the project would incrementally increase the size of the initial zone of effluent mixing during the wet-weather discharge periods, resulting in a small incremental alteration of temperature gradients within the plume. Far-field conditions would not be measurably changed. Under Option 2, the temperature of the effluent at the RSD outfall is not expected to measurably change compared to existing conditions as a result the City of Hercules effluent contribution being eliminated and, therefore, would not measurably change the thermal conditions in the existing plume. Given the small incremental increase in the size of the plume, the large zones of passage around and over the plume, and the low likelihood of exposure durations to temperature conditions that could cause acute or chronic thermal impacts, project-related discharges to San Pablo Bay would not have adverse thermal impacts on fish or benthic macroinvertebrates moving past or residing near the diffuser.*

Option 1: New Larger Effluent Pipeline to RSD

This assessment addresses the potential impacts that the project-specific contribution to the thermal plume may have on actively swimming juvenile fish with an ability to avoid the plume; drifting eggs and fry passively drifting in the current with little to no swimming ability; benthic macroinvertebrates moving past the diffuser; and fish and BMI residing in the vicinity of the diffuser.

Fish species with actively swimming emigrants include Chinook salmon, steelhead, white sturgeon, green sturgeon, Pacific lamprey, and river lamprey (Wang 1986) and many of the resident marine fishes included in Table 3.4-1. Fish species with passively drifting young-of-the-year include many of the marine fishes in Table 3.4-1, particularly those that spawn in the open waters of estuaries (e.g., members of the families Engraulidae and Osmeridae). Many of these marine fish species may release eggs into the water column, which have the potential to drift through the plume.

Under existing conditions, the plume’s initial zone of mixing covers an area of approximately 0.8 acre. Under Option 1, wet-weather discharges could increase the area of the initial zone of mixing to 0.9 acre, which would extend approximately 170 feet from the diffuser and increase flows to the deepwater outfall by approximately 35%. Under Option 1, the temperature of the effluent is not anticipated to change appreciably as a direct result of moving the discharges from the shallow water outfall to Outfall 001. Moreover, the temperatures of discharges from both wastewater facilities are anticipated to be similar in the winter wet-weather discharge months. However, as described above, the larger volume of water discharged under such conditions would increase the size of the plume and would alter the thermal gradient within the plume; although temperatures at the far boundary of the initial zone of mixing would be the same. The RMA far-field model results indicate that the effluent discharge would not measurably change the percentage of effluent at the nearby RMP monitoring locations (see Chapter 3.6, “Hydrology and Water Quality,” for additional information) and, therefore, would not measurably affect far-field temperatures.

Data obtained from the U.S. Geological Survey’s Water Quality of San Francisco Bay North of Pinole Point station (Station ID 13), located approximately 2 miles northwest of the diffuser, for the period November 1999 to April 2009 indicate that daily average receiving water temperatures range from 49.7°F to 60.4°F during the wet-weather months of November through April (Table 3.4-12). These temperatures are well within the ranges for supporting aquatic life in San Pablo Bay. Effluent temperatures during this period ranged from 55.1°F to 80.7°F, based on data from November 2007 to April 2009. A mass balance calculation using the minimum monthly receiving water and maximum monthly effluent temperature was conducted to determine the worst-case temperature increase in receiving water temperatures that would occur at the far boundary of the initial zone of mixing and the resultant difference from background. This approach is conservative because, in most years, the minimum monthly San Pablo Bay temperatures are unlikely to co-occur with the maximum effluent temperatures.

Worst-case monthly temperature differences between the Pinole-Hercules WPCP effluent and San Pablo Bay ranged from 0.4°F to 0.9°F (Table 3.4-12).

Table 3.4-12
Summary of Temperatures in San Pablo Bay, Pinole-Hercules Effluent, and Worst-Case Temperature Differences at the Far Boundary of the Initial Zone of Mixing for the Period November through April under Option 1

Month	San Pablo Bay [1]			Pinole-Hercules WPCP Effluent [2]			Worst-case Temperature at Boundary of Initial Zone of Mixing (°F) [3]	Worst-case Difference from Background (°F) [4]
	Min (°F)	Avg (°F)	Max (°F)	Min (°F)	Avg (°F)	Max (°F)		
Nov	56.8	58.6	60.1	66.2	70.0	73.0	57.3	0.5
Dec	51.6	53.1	55.5	72.2	74.9	77.1	52.4	0.8
Jan	49.7	51.1	53.9	74.0	77.1	80.7	50.6	0.9
Feb	49.6	52.4	57.0	70.0	73.2	76.1	50.4	0.8
Mar	51.0	55.2	59.3	60.9	66.7	70.5	51.6	0.6
Apr	54.4	57.3	60.4	55.1	65.6	68.0	54.8	0.4

Note: DO = dissolved oxygen; WPCP = water pollution control plant.

1 San Pablo Bay DO data from U.S. Geological Survey Water Quality of San Francisco Bay North of Pinole Point station (Station ID 13) for period of November 1999 through April 2009.

2 Pinole-Hercules WPCP effluent DO data for period November 2007 through April 2009.

3 Calculated by mass-balance of minimum monthly receiving water and maximum monthly effluent temperatures; value would be the same under existing or project conditions; however, the area of the plume would differ.

4 Value would be the same under existing or project conditions; however, the area of the plume would differ.

Source: Data compiled by Robertson-Bryan Inc. in 2009

As a result of implementing the improvements proposed under Option 1, it is assumed that the effluent temperatures will be the same as the existing effluent temperatures because winter temperatures of wet-weather flows among the RSD and Pinole-Hercules effluents would be the same. However, the thermal gradient will extend over a greater distance from the diffuser under higher wet-weather flows as the increased effluent volume mixes with receiving water and the initial zone of mixing increases from 0.8 to 0.9 acre.

Given the large size of San Pablo Bay and the small size of the thermal plume, the majority of fish passing through the estuary would not encounter the plume. The majority of actively swimming fish, including adults and juvenile anadromous fishes migrating through San Pablo Bay, would pass the diffuser along the shorelines of San Pablo Bay and within the upper portion of the water column. Because the diffuser is located approximately 3,775 feet from the south shore and approximately 4 miles from the north shore of San Pablo Bay at a depth of at least 18 feet below mean low water surface, an ample zone of passage occurs on either side of the thermal plume. Also, given the depth of the plume and large dilution capacity of San Pablo Bay, temperatures within the plume are attenuated as effluent rises above the diffuser within the near-field mixing zone. Therefore, fish moving over the plume in the upper portion of the water column would not be exposed to the warmest part of the plume (i.e., within a few feet of the diffuser ports) and those that would encounter the plume would not be exposed to sufficiently elevated temperatures for a duration that would cause acute thermal impacts. As discussed above and illustrated in Table 3.4-12, the incremental increase in plume size and temperature contours within the plume that could occur seasonally as a result of the project would be negligible and would not measurably affect the ability of actively swimming fish to avoid any unfavorable temperatures within the plume. Therefore, Option 1 is not anticipated to have acute thermal impacts on actively swimming fish passing the diffuser.

Similarly, the duration in which fish eggs or juveniles with limited mobility and BMIs drifting through the plume would be exposed to elevated temperatures would only be increased by a few seconds during wet-weather discharges as a result of the project-specific incremental increase in the size of the plume. Even with the incremental increase in the size of the plume, those eggs and aquatic organisms that would encounter the plume would not be exposed to sufficiently elevated temperatures for a duration that would cause acute thermal impacts. Furthermore, the higher discharge velocities of the diffuser under such conditions would likely push any eggs or drifting juveniles away from the warmest parts of the diffuser, thereby reducing exposure times. Therefore, Option 1 is not anticipated to have acute thermal impacts on fish eggs or early life stages, or BMIs drifting through the plume.

Finally, the small incremental increase in the size of the initial zone of mixing from 0.8 to 0.9 acre, combined with the negligible worst-case increase in receiving water temperatures (i.e., 0.4 to 0.9°F) at the far boundaries (approximately 170 feet) of the initial zone of mixing are not anticipated to decrease the quality or quantity of habitat in the vicinity of the diffuser to an extent that it would measurably reduce the numbers of fish or BMI occurring in San Pablo Bay. Therefore, Option 1 is not anticipated to have chronic thermal impacts on the aquatic resources of San Pablo Bay.

Given the small incremental increase in the size of the plume, the large zones of passage around and over the plume, and the low likelihood of exposure durations to temperature conditions that could cause acute or chronic thermal impacts to BMI or fish, including any ESA- or CESA-listed species, potentially occurring in San Pablo Bay, the project is not anticipated to reduce the abundance of fish or BMIs in the project area, have adverse impacts on their long-term population levels, or substantially degrade water quality or habitat in San Pablo Bay. Consequently, the potential temperature impacts on fish and BMIs under Option 1 are considered a **less-than-significant** impact. Additionally, discontinuing the use of the shallow water outfall for the Pinole-Hercules WPCP discharges would result in a **beneficial impact** by eliminating an existing seasonal point of discharge of effluent, thereby reducing the potential for localized temperature effects in the vicinity of that outfall and the resultant potential for that discharge to alter migration patterns of fish moving through the nearshore areas.

Option 2: Pinole-Only Flows at Existing Plant

Under Option 2, the treated effluent would contain City of Pinole discharges only, thus resulting in wet-weather discharges to the deepwater outfall similar to existing discharge rates. The projected effluent temperature is not anticipated to change appreciably or measurably change the size or temperature gradients within the plume as a result of eliminating City of Hercules discharges. Consequently, the potential temperature impacts on fish and BMIs under Option 2 would be a **less-than-significant** impact. Additionally, discontinuing the use of the shallow water outfall for the Pinole-Hercules WPCP discharges would result in a **beneficial impact** by eliminating an existing seasonal point of discharge of effluent, thereby reducing the potential for localized temperature effects in the vicinity of that outfall and the resultant potential for that discharge to alter migration patterns of fish moving through the nearshore areas.

Mitigation Measure: No mitigation measures are required.

IMPACT 3.4-7	Potential for the Thermal Plume Downstream of the Diffuser to Block or Substantially Delay the Upstream Spawning Migrations of Fish. *Elevated temperatures combined with depressed DO levels can create a barrier to fish migration. Under Option 1, the project would incrementally increase the size of the initial zone of effluent mixing during the wet-weather discharge periods, resulting in a small incremental increase in temperature and DO contours within the plume. Under Option 2, the quality of the effluent discharge to the deepwater outfall may change compared to existing conditions as a result the City of Hercules effluent contribution being eliminated. However, under both options, the discharge would not reach sufficient temperature or DO thresholds to create a barrier to fish migration and substantial zones of passage, unaffected or minimally affected by the discharge, would occur on either side and above the diffuser. Thus, the project-related discharges of these constituents to San Pablo Bay would not adversely affect migrations of fish past the diffuser.*

Option 1: New Larger Effluent Pipeline to RSD

Anadromous fish potentially can be blocked or delayed if they encounter sufficiently elevated, fully mixed river temperature and DO conditions while migrating to or from (in the case of iteroparous species) upstream spawning areas (Bell 1986; Boles 1988). If a thermal plume or DO sag exists, immigrating adult fish will seek a zone where river conditions are more favorable and thus facilitate passage.

Hallock et al. (1970) reported that a temperature of 69.8°F and DO concentrations less than 5 mg/l created a thermal barrier to immigration of adult fall-run Chinook salmon in the Delta at Stockton. These authors concluded that adult Chinook salmon avoided water temperatures exceeding about 66°F when DO concentrations were less than 5 mg/l. This study and others show that low DO concentrations can substantially affect immigrating Chinook salmon behavioral responses to various water temperatures. Where low DO was not a problem, Dunham (1968 as cited in Boles 1988) reported that water temperatures approaching 76°F in the lower Klamath River had no observable effect on the upstream migration of adult Chinook salmon. Marine (1992) reported that adult Chinook salmon can tolerate short-term and transient temperature exposures to temperatures of 77–80.6°F during spawning migrations.

As reflected in Table 3.4-12, the combinations of worst-case effluent and receiving water temperatures resulting from the project-specific increase in wet-weather discharges would not create a mixing zone condition exceeding the literature values published above during the winter months (November–April) and the worst-case conditions would be confined to within a few feet of the 120-foot-long diffuser submerged 18 feet below the water surface in an area of San Pablo Bay that is approximately 4 miles wide. Thus, the effluent temperatures would not be anticipated to reach levels that would cause blockage or delay of migrating salmonids. In addition, minimum DO concentrations in San Pablo Bay have historically been 8.0 mg/l or higher (Table 3.4-9) during the November through April peak migration period for anadromous fishes. Consequently, given the sufficient winter DO levels combined with suitable temperatures in San Pablo Bay during the migration periods for anadromous salmonids, a thermal barrier to adult Chinook salmon and steelhead spawning migrations would not be expected to occur under any of the anticipated range of absolute temperatures that may occur during this period as a result of depressed DO levels in the effluent.

Furthermore, substantial zones of passage occur on either side of the thermal plume. Given the fact that the 120-foot-wide diffuser is located 3,775 feet from the southeastern shore of San Pablo Bay, a substantial zone of passage unaffected by the thermal plume would occur to the south of the diffuser and a zone of passage over 3 miles in width would occur to the north. In addition, because the diffuser is located at a depth of 18 feet below the low water mark, a zone of passage in which plume temperatures are rapidly attenuated exists above the diffuser. Consequently, fish moving upstream in the upper part of the water column (e.g., anadromous salmonids) would easily avoid any unfavorable temperatures within the plume by swimming around the plume, or over the warmest part of the plume. Likewise, fish species that move through the lower portion of the water column, such as white sturgeon, green sturgeon, Pacific lamprey, and river lamprey, could readily avoid unfavorable temperatures within the plume by swimming around the unfavorably warm portions of the plume as they approach the diffuser.

The change in the thermal plume resulting from Option 1 operations would not create a thermal barrier to upstream or downstream fish migration, including migrations of ESA- or CESA-listed fish species, based on:

- the 4-mile width of San Pablo Bay in the vicinity of the diffuser and the vast zones of passage that are unaffected or minimally affected by the effluent plume, which occur on either side of the diffuser under existing conditions,
- the negligible project-specific increase in the size of the plume during wet-weather storm events, and
- the estimated receiving water thermal and DO conditions.

Consequently, this impact is considered **less than significant**. Additionally, discontinuing the use of the shallow water outfall for the Pinole-Hercules WPCP discharges would result in a **beneficial impact** by eliminating an existing seasonal point of discharge of effluent, thereby reducing the potential for localized DO and temperature effects in the vicinity of that outfall and the resultant potential for that discharge to alter migration patterns of fish moving through the nearshore areas.

Option 2: Pinole-Only Flows at Existing Plant

Based on the CORMIX-determined dilution ratio of 42:1, the initial zone of mixing at the deepwater outfall diffuser would be similar to existing conditions (i.e., approximately 0.8 acre). Consequently the receiving water DO levels and temperatures would be expected to be similar to existing conditions. Hence, the discharge-related effect of Option 2 would be similar to existing conditions and would not be expected to reach levels that could create a barrier to fish migration, including migrations of ESA- or CESA-listed fish species. Moreover, as discussed under Option 1, substantial zones of passage that are unaffected, or minimally affected, by temperature and DO concentrations in the effluent plume would occur on either side of the diffuser as well as above the diffuser. Therefore, under Option 2, this impact would be **less than significant**.

Mitigation Measure: No mitigation measures are required.

3.5 GEOLOGY, SOILS, AND PALEONTOLOGICAL RESOURCES

3.5.1 ENVIRONMENTAL SETTING

GEOLOGY

Regional Geology

The project facilities are located within the Coast Ranges geomorphic province of California. This province is generally characterized by northwest-trending mountain ranges and intervening valleys that are controlled by right-lateral strike-slip faulting along the San Andreas Fault zone.

During the Cretaceous period of the Mesozoic era (approximately 65 to 144 millions years ago), sequences of lava flows, sand, mud, and siliceous ooze (a fine-grained deposit consisting primarily of the remains of radiolarians and diatoms) were deposited on the ocean floor on the Farallon plate, west of what was then the coast of California. At the same time, sand, mud, and gravel accumulated on the North American plate in a trench along the area that was then the coast of California and is now the Central Valley. Movement of the two plates along a convergent boundary resulted in the Farallon being dragged beneath (subducted) the North American Plate. As this occurred, the materials that made up the Farallon plate were jumbled together and crushed, and eventually lithified to form the rocks that make up the Franciscan Formation. Materials along the edge of the Pacific Plate at the subduction zone were scraped off and became lithified to form the rocks that make up the Great Valley sequence. In addition to the Farallon plate, portions of other crustal plates continued to move past what was the coast of California. When these plates collided with the coast, portions of them were accreted (became attached to) the edge of the continent. Scientists have divided the rocks in the Franciscan Formation into at least nine different terranes, each of which is thought to represent a different plate that collided with the edge of the continent. Because of their origins from different plates, the rocks within these terranes have a different composition. The period of accretion of the entire Franciscan Formation spans a time period of about 150 million years—from early Cretaceous to Eocene time.

Over millions of years, different portions of the San Francisco Bay area have experienced alternating cycles of uplift and subsidence. Those areas that were uplifted were then subjected to erosion, which weathered away the topmost layers of rock; when these uplifted areas later subsided, a new and younger sequence of sediments was deposited on the surface and eventually lithified to form a new sequence of rocks. Climatic changes over many millions of years have also played a role in the rock formations in the Bay area. During colder periods, the level of water in the Bay was lower, because large volumes of water were stored on the continent in the form of glaciers. During warmer periods, as the glaciers melted and the sea level rose, marine sediments were deposited around the margins of the Bay and wave erosion resulted in terrances that were cut into the adjacent mountains. These alternating periods of uplift and subsidence, erosion and deposition, gave rise to the Cenozoic (present day to 65 million years ago) sedimentary rocks found throughout the San Francisco Bay area. These Cenozoic sedimentary rocks are younger than, and are generally found on top of, the older basement rocks of the Franciscan Formation.

The geology of the San Francisco Bay Area is also heavily influenced by the San Andreas Fault zone. Approximately 28 million years ago, the convergent plate boundary (where the Farallon Plate moved toward the North American Plate resulting in subduction) along the California coast changed to become the right-lateral San Andreas Transform boundary (meaning the plates were now sliding past one another). As the Farallon Plate became subducted, more of the Pacific Plate came into contact with the North American Plate along this transform boundary. The transform boundary moved northward over time, and by approximately 12 million years ago, it extended into the San Francisco Bay Area. The transform boundary is presently observed as the San Andreas Fault and its roughly parallel subsidiary faults. These faults have cut the San Francisco Bay Area into elongated, northwest-trending blocks. As the Pacific (oceanic) plate west of the San Andreas Fault continues to move northwestward relative to the North American (continental) plate on the east side of the fault, strain develops along the boundary between the two plates. This strain results in an energy buildup, which is eventually released in the form of an earthquake. Earthquakes along faults throughout the San Francisco Bay area result in the continual movement and deformation of the rocks by folding and faulting.

Local Geology

The proposed facilities are located within the Mare Island U.S. Geological Survey (USGS) 7.5-Minute Quadrangle. The topography varies from a few feet above sea level at the Pinole-Hercules Water Pollution Control Plant (WPCP) and Rodeo Sanitary District (RSD) wastewater treatment plant to approximately 80 feet above sea level along the proposed pipeline route.

At the location of the project facilities, Cenozoic sedimentary rocks and recent Bay Mud are exposed at the surface, underlain by basement rocks of the Franciscan Formation. Exhibit 3.5-1 shows the surficial geologic formations at the project site based on mapping by Graymer, Jones, and Brabb (2002). The individual formations are discussed in detail below (based on Wagner and Bortugno [1999] and Graymer, Jones, and Brabb [2002]).

Estuarine Deposits, Bay Mud, Artificial Fill

The Pinole-Hercules WPCP and the proposed pipeline across and near the mouth of Pinole Creek would be located within artificial fill underlain by Holocene-age (i.e., the last 11,000 years) bay mud. As streams and rivers drain into San Pablo Bay, they carry with them fine-grained silt and clay that are suspended in the water. Estuarine currents produced by tidal action distribute these sediments throughout the Bay. During periods when the current is low, the sediments settle to the bottom of the Bay, where they form the water-saturated, fine-grained deposit called “bay mud.” This deposit consists of unconsolidated, water-saturated, clay that is rich in organic material. The bay mud is overlain by a thin veneer of artificial fill in the project vicinity.

Alluvial Fan Deposits

The proposed pipeline alignment would cross through several areas that consists of Pleistocene-age alluvial fan deposits. These are fan-shaped deposits that formed where streams in the project area slows and spread as they neared San Pablo Bay. Alluvial fan deposits typically consist of a mixture of sand, silt, and clay.

Pinole Tuff

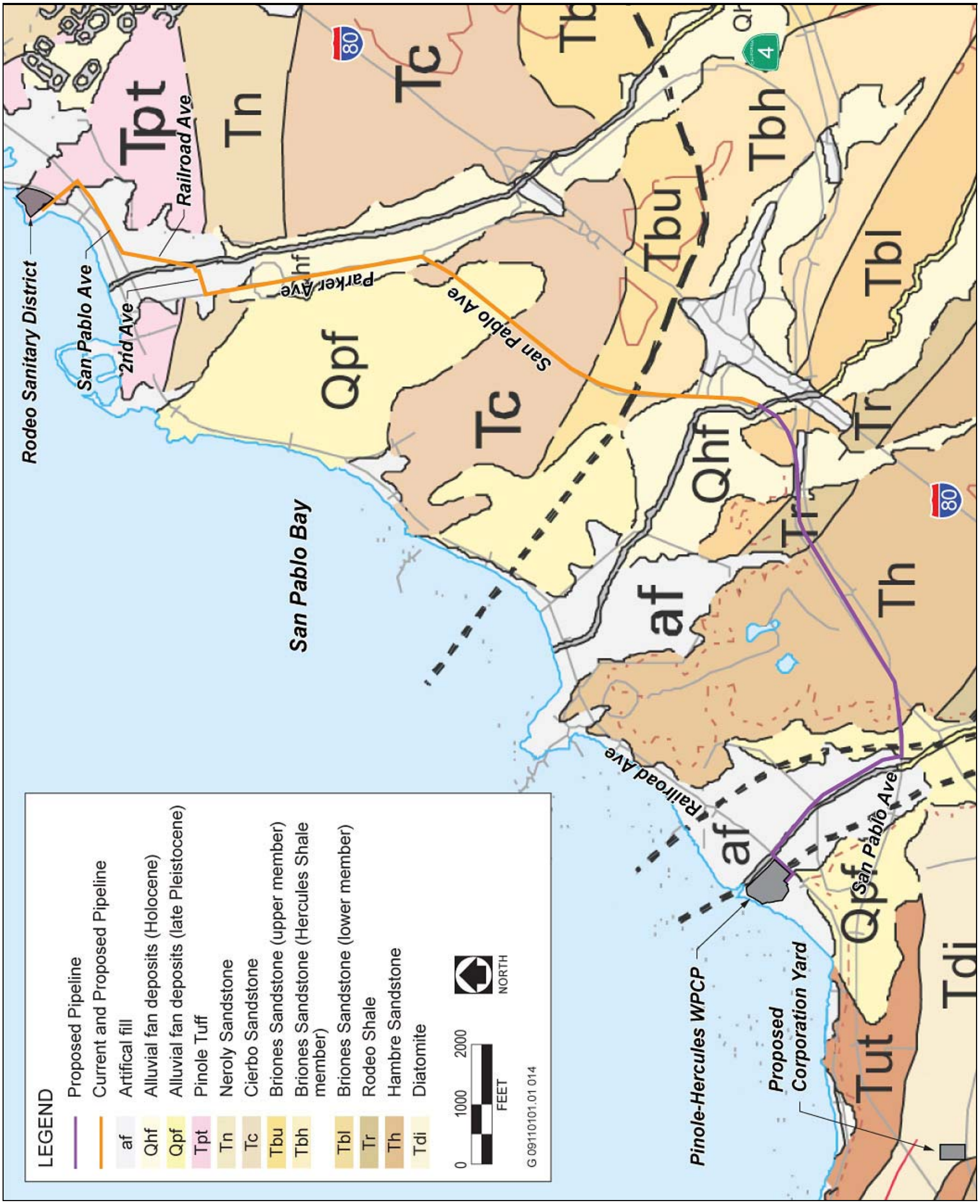
The RSD and a portion of the pipeline route near the RSD is underlain by the Pinole Tuff formation, which is approximately 5 million years old (early Pliocene age). In most places it consists of stratified tuff (compacted volcanic ash) composed of white to yellowish-white pumice ranging from dust-sized particles to fragments as much as 2 inches in diameter; the tuff is commonly interstratified with beds of poorly consolidated sand and gravel (Jenkins 1954).

San Pablo Group

This group of formations of marine origin includes the Miocene-age Neroly Sandstone, Cierbo Sandstone, and Briones Sandstone. Portions of the proposed pipeline would be installed within all three formations, which are described as follows: (1) the upper sandstone and shale member of the Briones Formation; (2) the Cierbo Sandstone, which consists of variously colored marine sandstone, minor amounts of conglomerate, tuff, and shale; and (3) the Neroly Sandstone, which consists of blue, volcanic-rich, shallow marine sandstone with minor amounts of shale, silstone, tuff, and andesitic conglomerate.

Monterey Group

This group of formations includes the Miocene-age Rodeo Shale, Hambre Sandstone, Tice Shale, Oursan Sandstone, Claremont Shale, Sobrante Sandstone, and small exposures of Oligence-age San Ramon Sandstone, all of which were deposited in marine environments. A portion of the pipeline would be constructed specifically within the Hambre Sandstone, which consists of massive, medium-grained sandstone.



Source: Graymer, Jones, and Brabb 2002; adapted by AECOM in 2009

Surficial Geologic Formations at the Project Facilities **Exhibit 3.5-1**

Diatomite

Diatomite is a chalk-like, soft, very fine-grained, siliceous sedimentary rock. Diatomite is made up of the fossilized, skeletal remains of microscopic organisms, mainly freshwater algae known as diatoms. This formation is of late- to mid-Miocene age.

REGIONAL SEISMICITY AND FAULT ZONES

Potential seismic hazards resulting from a nearby moderate to major earthquake can generally be classified as primary and secondary. The primary effect is fault ground rupture, also called surface faulting. Common secondary seismic hazards include ground shaking, liquefaction, and subsidence. Each of these potential hazards is discussed below.

Fault Ground Rupture

Surface rupture is an actual cracking or breaking of the ground along a fault during an earthquake. Structures built over an active fault can be torn apart if the ground ruptures. Surface ground rupture along faults is generally limited to a linear zone a few yards wide. The Alquist-Priolo Earthquake Fault Zoning Act (Alquist-Priolo Act) (see Section 3.5.3, “Regulatory Framework,” below) was created to prohibit the location of structures designed for human occupancy across the traces of active faults, thereby reducing the loss of life and property from an earthquake. The project site is not located in an Alquist-Priolo Earthquake Fault Zone (CGS 2003, Hart and Bryant 1999). The nearest known, active fault that is zoned under the Alquist-Priolo Act is the Hayward Fault, located approximately 3 miles west of the proposed corporation yard and approximately 3.55 miles west of the Pinole-Hercules WPCP. According to the *Hercules General Plan* (City of Hercules 1998), the northern end of the Pinole Creek Fault was originally included in an Alquist-Priolo Special Studies Zone, but was removed from the active category after further analysis.

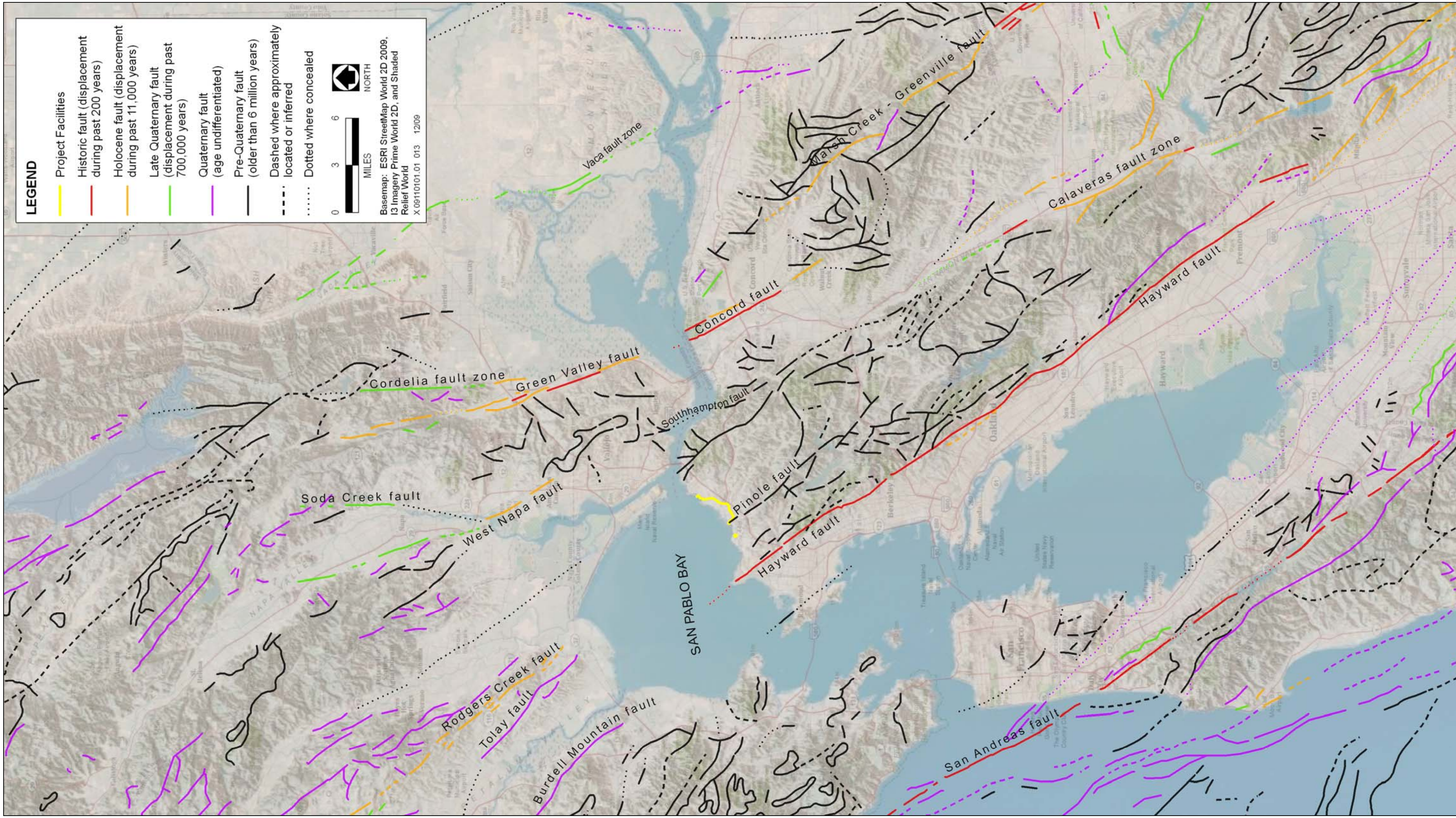
Seismic Ground Shaking

Ground shaking, motion that occurs as a result of energy released during faulting, could potentially result in the damage or collapse of buildings and other structures, depending on the magnitude of the earthquake, the location of the epicenter, and the character and duration of the ground motion. Other important factors to be considered are the characteristics of the underlying soil and rock and, where structures exist, the building materials used and the workmanship of the structures.

Faults in the Project Region

The proposed facilities are located in a seismically active region, as shown in Exhibit 3.5-2. The proposed facilities are located approximately 25 miles northeast of the San Andreas Fault, which is the principal component of the San Andreas Fault System. This fault system stretches over 600 miles, from Mendocino in the north to the Salton Sea in the south, and includes a number of faults in the project region such as the Rodgers Creek, Green Valley, Calaveras, and Hayward Faults, among others. The 1906 earthquake in San Francisco and the Loma Prieta earthquake in 1989 occurred along the San Andreas Fault. In the San Francisco Bay Area, a substantial portion of the movement within this fault system east of the San Andreas Fault occurs along the Hayward-Rodgers Creek and Calaveras Faults. The Concord Fault is also seismically active. The Hayward and Concord Faults are located approximately 3 miles west and 12 miles east of the project facilities, respectively. Active faults in the Bay area have generated a number of large magnitude earthquakes with associated strong seismic ground shaking during the last 200 years (i.e., Historic time).

In addition to the active faults discussed above and listed in Table 3.5-1, the Pinole Creek Fault lies immediately north of the Pinole-Hercules WPCP. According to Parsons et al. (2003), this fault may be the southernmost, onshore branch of the Rodgers Creek Fault. Jennings (1994) indicates that the Pinole Creek Fault has not been active in the last 1.4 million years.



Source: California Division of Mines and Geology 2000; adopted by AECOM in 2009

Regional Faults **Exhibit 3.5-2**

Table 3.5-1 Known Faults with Evidence of Activity During Holocene Time in the Project Region				
Fault Name	Approximate Distance from Project Site (miles)	Fault Type[1]	Maximum Moment Magnitude[2]	Slip Rate (mm/yr)
Class A Faults				
Hayward Fault (northern)	3	A	6.4	9.0
Rodgers Creek Fault	15	A	7.0	9.0
Hayward Fault (southern)	20	A	6.7	9.0
San Andreas Fault zone (North Coast south section)	25	A	7.4	24.0
San Andreas Fault zone (Peninsula section)	28	A	7.1	17.0
Class B Faults				
Concord Fault	10	B	6.2	4.0
West Napa Fault	10	B	6.5	1.0
Green Valley Fault	11	B	6.2	5.0
Greenville Fault zone (includes Clayton and Marsh Creek sections)	17	B	6.6	2.0
Calaveras Fault zone (northern section)	24	B	6.8	6.0

Notes: mm/yr = millimeters per year

[1] Faults with an “A” classification are capable of producing large magnitude (M) events (M greater than 7.0), have a high rate of seismic activity (e.g., slip rates greater than 5 millimeters per year), and have well-constrained paleoseismic data (e.g., evidence of displacement within the last 700,000 years). Class “B” faults are those that lack paleoseismic data necessary to constrain the recurrence intervals of large-scale events. Faults with a “B” classification are capable of producing an event of M 6.5 or greater.

[2] The moment magnitude scale is used by seismologists to compare the energy released by earthquakes. Unlike other magnitude scales, it does not saturate at the upper end, meaning that there is no particular value beyond which all earthquakes have about the same magnitude, which makes this scale a particularly valuable tool for assessing large earthquakes.

Sources: Cao et al. 2003, data compiled by EDAW in 2009

Faults in the project region with known or estimated activity during the Holocene are shown in Table 3.5-1. In addition, Table 3.5-1 identifies the faults’ approximate distance from the project site, fault type, maximum moment magnitude, and slip rate.

The intensity of ground shaking depends on the distance from the earthquake epicenter to the site, the magnitude of the earthquake, site soil conditions, and the characteristics of the source. Ground motions from seismic activity can be estimated by probabilistic method at specified hazard levels and by site-specific design calculations using a computer model.

The *Working Group on California Earthquake Probabilities* (2003) determined that the probability of one or more large (magnitude ≥ 6.7) damaging earthquakes in the San Francisco Bay Area in the next 30 years is approximately 62%. This probability was obtained from the combined results of modeling on the San Andreas, Hayward-Rodgers Creek, Calaveras, Concord-Green Valley, San Gregorio, Greenville, and Mt. Diablo Faults, where the Working Group projects that such large magnitude earthquakes are most likely to occur. The Hayward-Rodgers Creek Fault zone individually has the highest probability of producing an earthquake with a magnitude ≥ 6.7 in the San Francisco Bay Area in the next 30 years (i.e., approximately 27%). The probability for an earthquake of any magnitude on the Hayward-Rodgers Creek Fault zone in the next 30 years is approximately 40%. The *2007 Working Group on California Earthquake Probabilities* (2008) updated these predictions with revised modeling; however, the 2007 results were within the same 95% range of confidence level as the 2003 results for the San Francisco Bay Area as a whole and the Hayward-Rodgers Creek Fault zone.

The California Building Standards Code (CBC) specifies more stringent design guidelines where a project would be located adjacent to a Class A or B fault as designated by the California Probabilistic Seismic Hazard Maps. As shown in Table 3.5-1, the project facilities are located approximately 3 miles from the nearest Class A fault, and 10 miles from the nearest Class B fault.

Seismic Tsunamis and Seiches

Earthquakes may affect open bodies of water by creating tsunamis or seiches. Tsunamis (often called "tidal waves") are caused by abrupt ground movements on the ocean floor in connection with a major earthquake. A number of studies have been conducted regarding the potential for tsunamis in the San Francisco Bay Area, several of which are discussed in further detail below.

Tsunami evacuation planning maps that include the ocean side of the San Francisco peninsula, as well as the San Francisco Bay and San Pablo Bay areas, are available from the Association of Bay Area Governments (2009), and are based on modeling of potential earthquake sources and hypothetical extreme undersea, near-shore landslide sources. The maximum wave run-up was determined to be an elevation of 42 feet above mean sea level. Modeling was performed by the University of Southern California Tsunami Research Group (funded by the National Oceanic and Atmospheric Administration and the Governor's Office of Emergency Services). These maps show that the area in San Pablo Bay immediately adjacent to and west of the Pinole-Hercules WPCP could be subject to inundation from a tsunami.

Borrero et al. (2006) state that during historic times, 51 credible tsunamis have been recorded or observed in the San Francisco Bay region. Of these, only 5 produced wave heights that may have exceeded 1.6 ft within the Bay. The best-documented tsunami events are the 1946, 1960, and 1964 tsunamis generated by distant earthquakes in Aleutian Islands, Southern Chile, and Prince William Sound, Alaska respectively. In addition, three local tsunamis in the 19th century may also have generated waves in excess of 1.6 feet; however, none were recorded on tide gages and the height is estimated from eyewitness accounts only. (Borrero et al. 2006.)

In the Borrero et al. (2006) study, a variety of seismic sources with the potential to cause tsunamis in San Francisco Bay (including San Pablo Bay) were selected for modeling based on historic events, Pacific basin tectonics, and regional seismicity. Both near- and far-field sources were considered; far-field sources included large magnitude subduction zone earthquakes around the Pacific Rim while near-field sources included faults, step-over structures and potential landslide sources just offshore of the San Francisco Bay entrance and within the Bay itself.

According to the modeling results, the largest local event would be produced by the step-over rupture of the Hayward Fault to the Rogers Creek Fault beneath San Pablo Bay, which is approximately 3 miles from the project site. Assuming a moment magnitude earthquake of 6.61 occurring on the stepover, a tsunami with a wave height of 0.78 inches could be produced at the western entrance to the Carquinez Straits. Parsons et al. (2003) also modeled a potential tsunami caused by an earthquake on the Hayward-Rodgers Creek stepover, with a projected maximum wave height of approximately 4 inches. The largest tsunami wave heights at the western edge of the Carquinez Straits modeled by Borrero et al. were 21 inches from a magnitude 9.15 earthquake off the Aleutian Islands, and 14.5 inches from a magnitude 9.26 earthquake in Alaska. For planning purposes, to be conservative, at Rodeo, Borrerro et al. recommends assumption of a maximum wave height of approximately 19 inches and 31 inches from earthquakes generated by the Alaska and Aleutian Islands sources, respectively.

Using a different set of calculations, Ritter and Dupre (1972) also modeled potential tsunami inundation areas in the San Francisco Bay Area. Their results also showed that the Pinole-Hercules WPCP would be located within a tsunami inundation area (Ritter and Dupre 1972 as cited in Borrero et al. 2006).

A seiche is a sloshing of water in an enclosed or restricted water body, such as a basin, river, or lake, which is caused by earthquake motion; the sloshing can occur for a few minutes or several hours. An 1868 earthquake along the Hayward Fault with a magnitude of 6.0–6.5 is thought to have generated a seiche in San Pablo Bay (Parsons et al. 2003). The 1868 Hayward Fault earthquake reportedly caused a 19.7-foot surge of water at the Cliff House on the NW side of San Francisco, outside the Bay (Lander 1993, cited in Borrero et al. 2006). This was attributed to an earthquake-triggered landslide. According to Borrero et al., waves were reportedly recorded on a tide gage at Government Island (near Alameda) but the record has been lost, and it is unlikely that the 1868 event generated a substantial tsunami within the Bay. Seiches generated by earthquake surface waves have been known to produce tsunamis in closed bodies of water and bays. The large amplitude surface waves are believed to be amplified by basin geometry, exciting water oscillations, or seiches. To produce a substantial amount of seiching in a body of water, the forcing periods must be close to the natural period of the bay or one of the overtones. The characteristic periods and overtones for San Francisco Bay are much longer than surface wave periods and therefore non-tsunami induced seiches in San Francisco Bay are not considered to pose a substantial hazard. (Borrero et al. 2006.)

Ground Failure/Liquefaction

Soil liquefaction occurs when ground shaking from an earthquake causes a sediment layer saturated with groundwater to lose strength and take on the characteristics of a fluid, thus becoming similar to quicksand. Factors determining the liquefaction potential are soil type, the level and duration of seismic ground motions, the type and consistency of soils, and the depth to groundwater. Loose sands and peat deposits are susceptible to liquefaction, while clayey silts, silty clays, and clays deposited in freshwater environments are generally stable under the influence of seismic ground shaking. Liquefaction poses a hazard to engineered structures. The loss of soil strength can result in bearing capacity insufficient to support foundation loads, increased lateral pressure on retaining or basement walls, and slope instability.

Because a geotechnical investigation has not been prepared, the site-specific liquefaction potential at the location of the proposed facilities as required by the CBC has not been evaluated. However, based on a review of geologic maps and literature, it appears that the Pinole-Hercules WPCP could be subject to liquefaction because of the soil type, short distance from active seismic sources, and shallow groundwater table.

Subsidence, Settlement, and Soil Bearing Capacity

Subsidence of the land surface can be induced by both natural and human phenomena. Natural phenomena that can cause subsidence can result from tectonic deformations and seismically induced settlements; from consolidation, hydrocompaction, or rapid sedimentation; from oxidation or dewatering of organic-rich soils; and from subsurface cavities. Subsidence related to human activity can result from withdrawal of subsurface fluids or sediment. Pumping of water for residential, commercial, and agricultural uses from subsurface water tables causes more than 80% of the identified subsidence in the United States (Galloway et al. 1999). Lateral spreading is the horizontal movement or spreading of soil toward an open face, such as a streambank, the open side of fill embankments, or the sides of levees. The potential for failure from subsidence and lateral spreading is highest in areas where the groundwater table is high, where relatively soft and recent alluvial deposits exist, and where creek banks are relatively high. Soil bearing capacity is the ability of soil to support the loads applied to the ground; where the bearing capacity is too low to support proposed structures, subsidence and settlement may occur. Settlement is the gradual downward movement of an engineered structure due to compaction of unconsolidated material below the foundation. Settlement is generally highest in mud and loose, fine-grained sediments (i.e., clay and silt) that have a high water content. The total amount of settlement that may occur is dependent on the physical properties of the sediment, its thickness, laterally confining conditions (i.e., retaining walls or other buildings), and the size and distribution of the weight load from the structure.

Because a geotechnical evaluation has not yet been prepared, the site-specific potential for hazards from subsidence or settlement have not been investigated; however, according to the Natural Resources Conservation

Service (NRCS) soil survey data, the Joyce Muck (underneath the Pinole-Hercules WPCP) and the Cut and Fill Land-Millsholm Complex (at the proposed corporation yard) are subject to building limitations from subsidence and settlement, respectively.

SLOPE STABILITY

A landslide is the downhill movement of masses of earth material under the force of gravity. The factors contributing to landslide potential are steep slopes, unstable terrain, and proximity to earthquake faults. This process typically involves the surface soil and an upper portion of the underlying bedrock. Movement may be very rapid, or so slow that a change of position can be noted only over a period of weeks or years (creep). The size of a landslide can range from several square feet to several square miles. Because the project components would not be located in areas of steep slopes and the proposed pipeline would be buried underground, the hazard from landslides is considered low.

SOILS

Table 3.5-2 summarizes the generalized characteristics and Exhibit 3.5-3 shows the locations of the soil types of the project facilities.

General Soil Conditions

Based on a review of NRCS (2009) data, the Pinole-Hercules WPCP is underlain by recently deposited soil (Joyce Muck) with a high organic matter content. This soil is poorly drained, is subject to occasional flooding during high rain events, has a potential for subsidence, is saturated with water near the surface, and is highly corrosive to both steel and concrete.

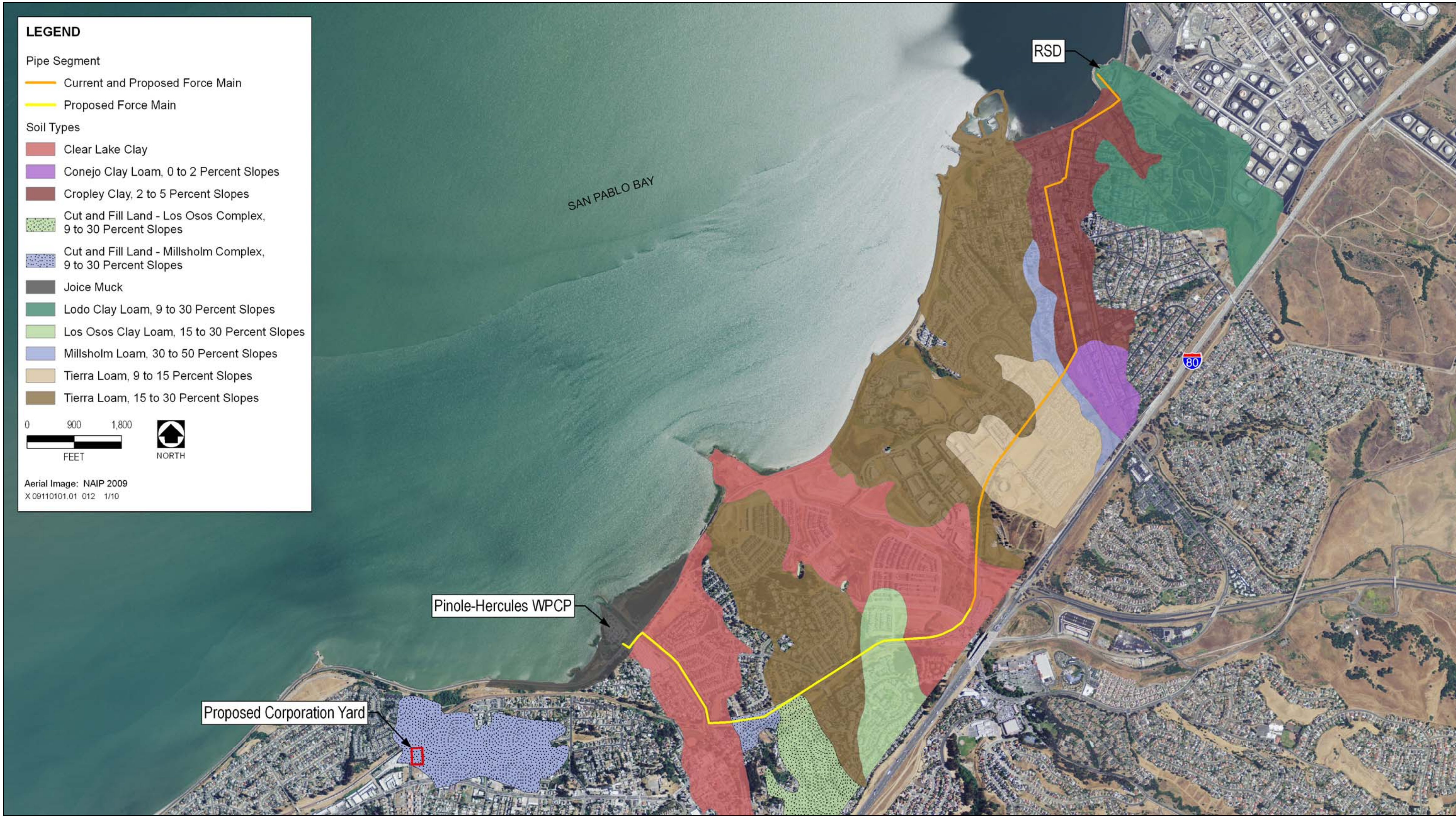
Soils along the proposed pipeline alignment have a shallow depth to bedrock, a low to moderate concrete corrosivity potential, and a moderate to high steel corrosivity potential.

Soil at the RSD is underlain by Lodo Clay Loam, which generally has a shallow depth to bedrock.

The proposed corporation yard is underlain by a mixture of Cut and Fill Land-Millsholm Complex, which has a shallow depth to bedrock. Also, approximately 75% of this soil type consists of a mixture of cut and fill dirt, which may pose a hazard for construction of buildings depending on the nature of the fill soils and the amount of compaction.

Expansive Soils

Expansive soils are composed largely of clays, which greatly increase in volume when saturated with water and shrink when dried. Because of this effect, building foundations may rise during the rainy season and fall during the dry season. If this expansive movement varies underneath different parts of a single building, foundations may crack, structural portions of the building may be distorted, and doors and windows may become warped so that they no longer function properly. The potential for soil to undergo shrink and swell is greatly enhanced by the presence of a fluctuating, shallow groundwater table. Changes in the volume of expansive soils can result in the consolidation of soft clays after the lowering of the water table or the placement of fill.



Source: NRCS 2007

Soil Types at the Project Facilities **Exhibit 3.5-3**

Table 3.5-2
Soil Characteristics of Proposed Facilities

Soil Map Unit Name	Shrink-Swell Potential[1]	Permeability[2]	Water Erosion Hazard[3]	Wind Erosion Hazard[4]	Drainage	Concrete Corrosivity	Steel Corrosivity	Limitations
Pinole-Hercules WPCP								
Joice Muck (Ja)	High	High	Low	2	Very poorly drained	High	High	**Buildings:** flooding; subsidence; high organic matter content; water saturation from 18 to 30 below the ground surface. **Shallow Excavations: water** saturation at shallow depth s; high organic matter content; frequent or occasional flooding.
Proposed Pipeline to RSD								
Clear Lake Clay (Cc)	High	Moderately low	Low	7	Poorly drained	Moderate	High	**Buildings**: flooding; shrink-swell potential **Shallow Excavations**: caving potential ; clay from 40-60% content; frequent or occasional flooding
Conejo Clay Loam, 0 to 2% Slopes	Moderate	Moderately low	Moderate	6	Well drained	Low	Moderate	**Buildings**: shrink-swell potential **Shallow Excavations**: caving potential
Cropley Clay, 2 to 5% Slopes	High	Moderately low	Low	7	Moderately well drained	Low	High	**Buildings**: shrink-swell potential **Shallow Excavations**: caving potential ; clay from 40 to 60% content
Cut and Fill Land-Los Osos Complex, 9 to 30% Slopes	High	--	--	--	--	--	High	**Buildings**: slopes >8% ; shrink-swell potential **Shallow Excavations**: slopes > 15%; caving potential
Cut and Fill Land-Millsholm Complex, 9 to 30% Slopes	Moderate	Moderately low	--	--	--	--	Moderate	**Buildings**: slopes >8% ; shrink-swell potential **Shallow Excavations**: cut and fill land (fill part) (75%): slopes >15% ; caving potential
Los Osos Clay Loam, 15 to 30% Slopes	Moderate	Moderately low	Moderate	6	Well drained	Moderate	High	**Buildings**: slopes > 8% ; shrink-swell potential **Shallow Excavations**: slopes >15%; bedrock (soft) from 20 to 40 below the surface ; caving; clay from 40 to 60% content
Millsholm Loam, 30 to 50% Slopes	Low	Moderately high	Moderate	5	Well drained	Moderate	High	**Buildings**: slopes > 8% ; bedrock (hard) < 20-inch depth **Shallow Excavations**: bedrock (hard) <40-inch depth ; slopes > 15% ; caving potential
Tierra Loam, 9 to 15% Slopes	Moderate	Moderately high	Moderate	6	Moderately well drained	Moderate	High	**Buildings**: slopes> 8% **Shallow Excavations**: slopes 8 to 15%; clay from 40 to 60% content; caving potential
Tierra Loam, 15 to 30% Slopes	Moderate	Moderately high	Moderate	6	Moderately well drained	Moderate	High	**Buildings**: slopes >8% **Shallow Excavations**: slopes >15%; clay from 40 to 60% content; caving potential
RSD								
Lodo Clay Loam, 9 to 30% Slopes	Moderate	Moderately low	Moderately low	6	Somewhat excessively drained	Low	Moderate	**Buildings**: slopes > 8% ; bedrock (hard) <20-inch depth ; shrink-swell potential **Shallow Excavations**: bedrock (hard) < 40-inch depth; slopes > 15%; caving potential
Proposed Corporation Yard								
Cut and Fill Land- Millsholm Complex, 9 to 30% Slopes	Moderate	Moderately low	--	--	--	--	Moderate	**Buildings**: slopes >8% ; shrink-swell potential **Shallow Excavations**: cut and fill land (fill part) (75%): slopes >15% ; caving potential

Notes:
---- = data not available
[1] Based on percentage of linear extensibility. Shrink-swell potential ratings of "moderate" to "very high" can result in damage to buildings, roads, and other structures.
[2] Based on standard U.S. Department of Agriculture (USDA) saturated hydraulic conductivity (Ksat) class limits; Ksat refers to the ease with which pores in a saturated soil transmit water.
[3] Based on the erosion factor "Kw whole soil," which is a measurement of relative soil susceptibility to sheet and rill erosion by water.
[4] The soils assigned to group 1 are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible.
Source: NRCS 2009

Based on a review of NRCS (2009) soil survey data, near-surface soils at the Pinole-Hercules WPCP are composed of Joyce Muck, which has a high shrink-swell potential. As shown on Exhibit 3.5-3, the soil types along the pipeline route consists of Clear Lake Clay, Cut and Fill Land-Millsholm Complex, Cut and Fill Land-Los Osos Complex, Tierra Loam, Los Osos Clay Loam, Millsholm Loam, Conejo Clay Loam, and Cropley Clay. With the exception of the Millsholm Loam, all of these soil types along the pipeline route have a moderate to high shrink-swell potential. The RSD is located within the Lodo Clay Loam, which has a moderate shrink swell potential. The proposed corporation yard is located within the Cut and Fill Land-Millsholm Complex, which has a moderate shrink-swell potential. Soils with a moderate to high shrink-swell potential means that they have a high clay content and therefore would be capable of exerting substantial expansion pressures on structural foundations and exterior flatwork. These soils would be expected to undergo volume changes with increasing or decreasing soil moisture content.

PALEONTOLOGICAL RESOURCES

Paleontological Resource Inventory Methods

A stratigraphic inventory was completed to develop a baseline paleontological resource inventory of the project site and surrounding area by rock unit and to assess the potential paleontological productivity of each rock unit. Research methods included a review of published and unpublished literature and a search for recorded fossil sites at the University of California Museum of Paleontology (UCMP). These tasks complied with Society of Vertebrate Paleontology guidelines (1995).

Stratigraphic Inventory

Geologic maps and reports covering the geology of the project site and surrounding area were reviewed to determine the exposed rock units and to delineate their respective aerial distributions in the project area.

Paleontological Resource Inventory

Published and unpublished geological and paleontological literature were reviewed to document the number and locations and previously recorded fossil sites from rock units exposed in and near the project site and vicinity, as well as the types of fossil remains each rock unit has produced. The literature review was supplemented by an archival search conducted at the UCMP in Berkeley, California, on September 12, 2009.

Paleontological Resource Field Survey

Portions of the ground surface were completely obscured by vegetation; in those areas where the ground surface was visible, no evidence of paleontological resources was present during a reconnaissance-level field survey conducted by EDAW in 2009.

Paleontological Resource Assessment Criteria

The potential paleontological importance of the project site can be assessed by identifying the paleontological importance of exposed rock units within the project site. Because the areal distribution of a rock unit can be easily delineated on a topographic map, this method is conducive to delineating parts of the project site that are of higher and lower sensitivity for paleontological resources and to delineating parts of the project site that may require monitoring during construction.

A paleontologically important rock unit is one that has a high potential paleontological productivity rating and is known to have produced unique, scientifically important fossils. The potential paleontological productivity rating of a rock unit exposed at the project site refers to the abundance/densities of fossil specimens and/or previously recorded fossil sites in exposures of the unit in and near the project site. Exposures of a specific rock unit at the project site are most likely to yield fossil remains representing particular species in quantities or densities similar to those previously recorded from the unit in and near the project site.

An individual vertebrate fossil specimen may be considered unique or significant if it is identifiable and well preserved and it meets one of the following criteria:

- a type specimen (i.e., the individual from which a species or subspecies has been described);
- a member of a rare species;
- a species that is part of a diverse assemblage (i.e., a site where more than one fossil has been discovered) wherein other species are also identifiable, and important information regarding life history of individuals can be drawn;
- a skeletal element different from, or a specimen more complete than, those now available for its species; or
- a complete specimen (i.e., all or substantially all of the entire skeleton is present).

For example, identifiable vertebrate marine and terrestrial fossils are generally considered scientifically important because they are relatively rare. The value or importance of different fossil groups varies, depending on the age and depositional environment of the rock unit that contains the fossils, their rarity, the extent to which they have already been identified and documented, and the ability to recover similar materials under more controlled conditions, such as part of a research project. Marine invertebrate fossil specimens are generally common, well developed, and well documented. They would generally not be considered a unique paleontological resource.

The tasks listed below were completed to establish the paleontological importance of each rock unit exposed at or near the project site.

- The potential paleontological productivity of each rock unit was assessed, based on the density of fossil remains previously documented within the rock unit.
- The potential for a rock unit exposed at the project site to contain a unique paleontological resource was considered.

Paleontologic Resource Inventory Results

Stratigraphic Inventory

Regional and local surficial geologic mapping and correlation of the various geologic units in the project site and vicinity have been provided at a scale of 1:100,000 by Graymer Jones and Brabb (2002) and 1:250,000 by Wagner and Bortugno (1999).

Paleontological Resource Inventory and Assessment by Rock Unit

Estuarine Deposits/Bay Mud/Artificial Fill/Alluvial Fan Deposits (Holocene)

By definition, in order to be considered a fossil, an object must be more than 11,000 years old. Because these formations consist of Holocene-age sediments that are less than 11,000 years old, unique paleontological resources would not be present.

Alluvial Fan Deposits (Pleistocene)/Pinole Tuff/San Pablo Group/Monterey Group

The Pleistocene epoch, known as the “great ice age,” began approximately 1.8 million years ago. Surveys of late Cenozoic land mammal fossils in northern California have been provided by Hay (1927), Lundelius et al. (1983), Jefferson (1991a, 1991b), Savage (1951), and Stirton (1939). On the basis of his survey of vertebrate fauna from the nonmarine late Cenozoic deposits of the San Francisco Bay region, Savage (1951) concluded that two major divisions of Pleistocene-age fossils could be recognized: the Irvingtonian (older Pleistocene fauna) and the Rancholabrean (younger Pleistocene and Holocene fauna). These two divisions of Quaternary Cenozoic vertebrate fossils are widely recognized today in the field of paleontology. The age of the later Pleistocene, Rancholabrean fauna was based on the presence of bison and on the presence of many mammalian species that are inhabitants of the same area today. In addition to bison, larger land mammals identified as part of the Rancholabrean fauna include mammoths, mastodons, camels, horses, and ground sloths.

The San Francisco Bay area during the Miocene (approximately 10 to 24 million years ago) resembled the modern African savanna. The water body in the Bay Area at that time would have been the open Pacific Oean, rather than the San Francisco Bay as it exists today. This epoch also included the active volcanoes in the rising Berkeley Hills. Examples of the flora and fauna from the Miocene include elm and poplar trees, horses, camels, antelope, sabre-toothed cats, and relatives of our modern day elephants.

A search of the UCMP database indicates that numerous vertebrate fossils have been recovered in the immediate vicinity of the project facilities and throughout Contra Costa County, within the same formations that are present along the proposed pipeline alignment. For example, locality V-524 in Rodeo yielded one specimen of a Pleistocene-age Colombian mammoth. Localities V-1355, -1201, -4005, and -6211 at Lone Tree Point in Rodeo yielded fossil remains of a white seabass, bison, horse, pronghorn antelope, deer, and approximately 19 other unidentified vertebrate fossils. Locality V-1361 (same as V-67106), in Pinole, yielded eight specimens of Pleistocene-age bison, horse, and mammoth. Localities V-2570, -3425, and -3837 at Pinole Junction yielded over 800 Miocene-age specimens of various species such horse, antelope, *Borophagus* (hyena-like dog), narrow-mouthed sloth, sabertooth salmon, wolverine, sabre-toothed cat, camel, rabbit, and rat. Vocality V-302 in Hercules yielded one specimen of Pleistocene-age bison. Locality V-6552 in Pinole yielded four Miocene-age specimens of horse and rhinoceros. Locality V-6642 in Rodeo yielded three Pleistocene-age specimens of unidentified mammals and a bird (the western grebe). Locality V-65399 in Rodeo yielded one Miocene-age specimen of dolphin. Locality V-65660 in Pinole yielded 12 Pleistocene-age specimens of horses.

The widespread occurrence (over 800 specimens) of vertebrate fossil remains in the same sediments that underlie the proposed pipeline alignment from localities in the immediate vicinity of the alignment suggests there is a potential for uncovering additional similar fossil remains during construction-related earthmoving activities.

Diatomite

This formation consists primarily of the Miocene-age fossiziled remains of diatoms, which are single-celled algae that have silica in their cell walls. As discussed above, the value or importance of different fossil groups varies, depending on the age and depositional environment of the rock unit that contains the fossils, their rarity, the extent to which they have already been identified and documented, and the ability to recover similar materials under more controlled conditions, such as part of a research project. Fossilized diatoms are well known and well studied, and therefore would not be considered a unique paleontological resource under CEQA.

3.5.2 REGULATORY FRAMEWORK

FEDERAL PLANS, POLICIES, REGULATIONS, AND LAWS

Earthquake Hazards Reduction Act

In October 1977, the U.S. Congress passed the Earthquake Hazards Reduction Act to reduce the risks to life and property from future earthquakes in the United States through the establishment and maintenance of an effective earthquake hazards reduction program. To accomplish this goal, the act established the National Earthquake Hazards Reduction Program (NEHRP). This program was substantially amended in November 1990 by the National Earthquake Hazards Reduction Program Act (NEHRPA), which refined the description of agency responsibilities, program goals, and objectives.

The mission of NEHRP includes improved understanding, characterization, and prediction of hazards and vulnerabilities; improved building codes and land use practices; risk reduction through post earthquake investigations and education; development and improvement of design and construction techniques; improved mitigation capacity; and accelerated application of research results. The NEHRPA designates the Federal Emergency Management Agency as the lead agency of the program and assigns several planning, coordinating, and reporting responsibilities. Other NEHRPA agencies include the National Institute of Standards and Technology, National Science Foundation, and USGS.

STATE PLANS, POLICIES, REGULATIONS, AND LAWS

Alquist-Priolo Earthquake Fault Zoning Act

The Alquist-Priolo Act (California Public Resources Code [PRC] Sections 2621–2630) was passed in 1972 to mitigate the hazard of surface faulting to structures designed for human occupancy. The main purpose of the law is to prevent the construction of buildings used for human occupancy on the surface trace of active faults. The law addresses only the hazard of surface fault rupture and is not directed toward other earthquake hazards. The Alquist-Priolo Act requires the State Geologist to establish regulatory zones known as Earthquake Fault Zones around the surface traces of active faults and to issue appropriate maps. The maps are distributed to all affected cities, counties, and state agencies for their use in planning efforts. Before a project can be permitted in a designated Alquist-Priolo Earthquake Fault Zone, cities and counties must require a geologic investigation to demonstrate that proposed buildings would not be constructed across active faults.

Seismic Hazards Mapping Act

The Seismic Hazards Mapping Act of 1990 (PRC Sections 2690–2699.6) addresses earthquake hazards from nonsurface fault rupture, including liquefaction and seismically induced landslides. The act established a mapping program for areas that have the potential for liquefaction, landslide, strong ground shaking, or other earthquake and geologic hazards. The act also specifies that the lead agency for a project may withhold development permits until geologic or soils investigations are conducted for specific sites and mitigation measures are incorporated into plans to reduce hazards associated with seismicity and unstable soils.

National Pollutant Discharge Elimination System Permit

In California, the State Water Resources Control Board administers regulations promulgated by the U.S. Environmental Protection Agency (55 Code of Federal Regulations 47990) requiring the permitting of stormwater-generated pollution under the National Pollutant Discharge Elimination System (NPDES). In turn, the State Water Resources Control Board's jurisdiction is administered through nine regional water quality control boards. Under these Federal regulations, an operator must obtain a general permit through the NPDES Stormwater Program for all construction activities with ground disturbance of 1 acre or more. The general permit requires the implementation of best management practices to reduce sedimentation into surface waters and to control erosion. One element of compliance with the NPDES permit is preparation of a storm water pollution prevention plan that addresses control of water pollution, including sediment, in runoff during construction. (See Section 3.6, "Hydrology and Water Quality," for more information about the NPDES and storm water pollution prevention plans.)

California Building Standards Code

The California Building Standards Commission is responsible for coordinating, managing, adopting, and approving building codes in California. In July 2007, the California Building Standards Commission adopted and published the 2006 International Building Code as the 2007 CBC. This new code became effective on January 1, 2008, and updated all the subsequent codes under the California Code of Regulations (CCR) Title 24. Sutter County has adopted the 2007 CBC. The State of California provides minimum standards for building design through the 2007 CBC (CCR, Title 24). Where no other building codes apply, Chapter 29 of the 2007 CBC regulates excavation, foundations, and retaining walls. The CBC applies to building design and construction in the state and is based on the Federal Uniform Building Code used widely throughout the country (generally adopted on a state-by-state or district-by-district basis). The CBC has been modified for California conditions with numerous more detailed or more stringent regulations.

The state earthquake protection law (California Health and Safety Code Section 19100 et seq.) requires that structures be designed to resist stresses produced by lateral forces caused by wind and earthquakes. The 2007 CBC replaces the previous "seismic zones" (assigned a number from 1 to 4, where 4 required the most earthquake-resistant design) with new Seismic Design Categories A through F (where F requires the most earthquake-resistant design) for structures designed for a project site. With the shift from seismic zones to seismic design, the CBC philosophy has shifted from "life safety design" to "collapse prevention," meaning that structures are designed for prevention of collapse for the maximum level of ground shaking that could reasonably be expected to occur at a site. Chapter 16 of the CBC specifies exactly how each seismic design category is to be determined on a site-specific basis through the site-specific soil characteristics and proximity to potential seismic hazards.

Chapter 18 of the CBC regulates the excavation of foundations and retaining walls. This chapter regulates the preparation of a preliminary soil report, engineering geologic report, geotechnical report, and supplemental ground-response report. Chapter 18 also regulates analysis of expansive soils and the determination of the depth to groundwater table. For Seismic Design Category C, Chapter 18 requires analysis of slope instability, liquefaction, and surface rupture attributable to faulting or lateral spreading. For Seismic Design Categories D, E, and F, Chapter 18 requires these same analyses plus an evaluation of lateral pressures on basement and retaining walls, liquefaction and soil strength loss, and lateral movement or reduction in foundation soil-bearing capacity. It also requires addressing mitigation measures to be considered in structural design. Mitigation measures may include ground stabilization, selection of appropriate foundation type and depths, selection of appropriate structural systems to accommodate anticipated displacements, or any combination of these measures. The potential for liquefaction and soil strength loss must be evaluated for site-specific peak ground acceleration magnitudes and source characteristics consistent with the design earthquake ground motions. Peak ground acceleration must be determined from a site-specific study, the contents of which are specified in CBC Chapter 18.

Finally, Appendix Chapter J of the 2007 CBC regulates grading activities, including drainage and erosion control and construction on unstable soils, such as expansive soils and areas subject to liquefaction.

REGIONAL AND LOCAL PLANS, POLICIES, REGULATIONS, AND LAWS

Contra Costa County General Plan 2005–2020

The following goals and policies of the *Contra Costa County General Plan 2005–2020* (Contra Costa County 2005) regarding geology and soils are applicable to the project.

Safety Element

- **Goal 10-A:** To protect human life and reduce the potential for serious injuries from earthquakes; and to reduce the risks of property losses from seismic disturbances which could have severe economic and social consequences for the County as a whole.

- **Goal 10-B:** To reduce to a practical minimum injuries and health risks resulting from the effects of earthquake ground shaking on structures, facilities, and utilities.

- **Goal 10-C:** To protect persons and property from the life-threatening, structurally, and financially disastrous effects of ground rupture and fault creep on active faults, and to reduce structural distress caused by soil and rock weakness due to geologic faults.

- **Goal 10-D:** To reduce to a practical minimum the potential for life loss, injury, and economic loss due to liquefaction-induced ground failure, levee failure, large lateral land movements toward bodies of water, and consequent flooding; and to mitigate the lesser consequences of liquefaction.

Seismic Hazard Policies

- **Policy 10-1:** Contra Costa County, as part of an area with high seismicity, shall recognize that a severe earthquake hazard exists and shall reflect this recognition in its development review and other programs.

- **Policy 10-2:** Significant land use decisions (General Plan amendment, rezoning, etc.) shall be based on a thorough evaluation of geologic-seismic and soils conditions and risk.

- **Policy 10-3:** Because the region is seismically active, structures for human occupancy shall be designed to perform satisfactorily under earthquake conditions (see Table 10-6).

- **Policy 10-4:** In areas prone to severe levels of damage from ground shaking (i.e., Zone IV on Map 10-4 [of the General Plan]), where the risks to life and investments are sufficiently high, geologic-seismic and soils studies snail be required as a precondition for authorizing public or private construction.

- **Policy 10-5:** Staff review of applications for development permits and other entitlements, and review of applications to other agencies which are referred to the County, shall include appropriate recommendations for seismic strengthening and detailing to meet the latest adopted seismic design criteria.

- **Policy 10-6:** Structures for human occupancy, and structures and facilities whose loss would substantially affect the public safety or the provision of needed services, shall not be erected in areas where there is a high risk of severe damage in the event of an earthquake.

Groundshaking Policies

- **Policy 10-8:** Ground conditions shall be a primary consideration in the selection of land use and in the design of development projects.

- **Policy 10-9:** In areas susceptible to high damage from ground shaking (i.e., Zone IV on Map 10-4 [in the General Plan]), geologic-seismic and soils studies shall be required prior to the authorization of major land developments and significant structures (public or private).

- **Policy 10-10:** Policies regarding liquefaction shall apply to other ground failures which might result from groundshaking but which are not subject to such well-defined field and laboratory analysis.

Faults and Fault Displacement Policies

- **Policy 10-11:** Classify as active those faults which have ruptured the ground surface during Holocene geologic time, roughly the last 10,000 years. Classify as potentially active faults which displace Quaternary geologic units, those formed during approximately the last 2 to 3 million years.

- **Policy 10-12:** Prohibit construction of structures for human occupancy, and structures whose loss would affect the public safety or the provision of needed services, over the trace of an active fault.

- **Policy 10-13:** In areas where active or inactive earthquake faults have been identified, the location and/or design of any proposed buildings, facilities, or other development shall be modified to mitigate possible danger from fault rupture or creep.

- **Policy 10-14:** Preparation of a geologic report shall be required as a prerequisite before authorization of public capital expenditures or private development projects in areas of known or suspected faulting.

- **Policy 10-15:** To the extent practicable, the construction of structures requiring a high degree of safety and other critical structures shall not be allowed in an active or potentially active fault zone.

- **Policy 10-16:** When such a critical structure must be located in a fault zone, the structure shall be carefully sited, designed, and constructed to withstand the anticipated earthquake stresses.

Liquefaction Policies

- **Policy 10-18:** This General Plan shall discourage urban or suburban development in areas susceptible to high liquefaction dangers and where appropriate subject to the policies in 10–20 below, unless satisfactory mitigation measures can be provided, while recognizing that there are low intensity uses such as water-related recreation and agricultural uses that are appropriate in such areas.

- **Policy 10-19:** To the extent practicable, the construction of critical facilities, structures involving high occupancies, and public facilities shall not be sited in areas identified as having a high liquefaction potential, or in areas underlain by deposits classified as having a high liquefaction potential.

- **Policy 10-20:** Any structures permitted in areas of high liquefaction danger shall be sited, designed and constructed to minimize the dangers from damage due to earthquake-induced liquefaction.

- **Policy 10-21:** Approvals to allow the construction of public and private development projects in areas of high liquefaction potential shall be contingent on geologic and engineering studies which define and delineate potentially hazardous geologic and/or soils conditions, recommend means of mitigating these adverse conditions; and on proper implementation of the mitigation measures.

Conservation Element

- **Goal 8-P:** To encourage the conservation of soil resources to protect their long-term productivity and economic value.

- **Policy 8-63:** The County shall protect soil resources within its boundaries.

- **Policy 8-64.** Erosion control procedures shall be established and enforced for all private and public construction and grading projects.

- **Policy 8-65:** In the absence of more detailed site-specific studies, determinations of soil suitability for particular land uses shall be made according to the Soil Conservation Service's "Soil Survey of Contra Costa County."

Contra Costa County Grading Ordinance

The Contra Costa County Grading Ordinance (County Code, Title 7, Article 716-2.2) sets forth regulations for control of excavating, grading, and earthwork construction, including fills or embankments and related work. According to Article 716-4.206, a grading permit is not required for the following activities that would apply to the project:

(a) An excavation below finished grade for basements and footing of structures authorized by a valid building permit or trench excavations for the purpose of installing underground utilities, if to be backfilled to natural grade.

(c) Improvement of watercourses and construction of drainage, irrigation and domestic water supply systems and facilities performed under the supervision of the flood control district, an agency of the federal or state government, a water or sanitation district, or an irrigation or reclamation district.

City of Pinole General Plan

The following goals and policies of the *City of Pinole General Plan* (City of Pinole 1995) regarding geology and soils are applicable to the project.

Health and Safety Element

- ► **Goal HS1: Community Health and Safety.** Minimize the potential for loss of live, injury, damage to property, economic and social dislocation and unusual public expense due to natural and man-made hazards.

- ► **Goal HS2: Protection from natural and Man-made Hazards.** Protect the community from the risk of flood damage and minimize hazards of soil erosion, weak and expansive soils, potentially hazardous soils materials, other hazardous materials, geologic instability, and seismic activity.

- ► **Goal HS3: Prepare for Emergency Situations.** Ensure government agencies, citizens, and businesses are prepared for an effective response and recovery in the event of emergencies or disasters.

  - **Policy HS1.1: Location of Future Development.** Permit development only in those areas where potential danger to the health, safety, and welfare of the residents of the community can be adequately mitigated.

  - **Policy HS1.2: Development Review.** Require appropriate studies to assess indentified hazards and assure that impacts are adequately mitigated.

  - **Policy HS2.1: Geotechnical Review.** Require geotechnical studies for development proposals; such studies should determine the actual extent of geotechnical hazards, optimum location for structures, the advisability of special structural requirements, and the feasibility and desirability of a proposed facility in a specified location.

- **Policy HS2.2: Soils and Geologic Review.** Require soil and geologic review of development proposals in accordance with City procedures to assess potential seismic hazards, liquefaction, land sliding, mud sliding, erosion, sedimentation and settlement in order to determine if these hazards can be adequately mitigated.

- **Policy HS2.3: Minimize Geological Hazards.** Require all geologic hazards be adequately addressed and mitigated through project development. Development proposed within areas of potential geological hazards shall not be endangered by, nor contributed to, the hazardous conditions on the site or on adjoining properties.

- **Policy HS2.4: Seismic Safety.** Assure existing and new structures are designed to protect people and property from seismic hazards.

- **Policy HS2.10: Erosion.** Provide appropriate control measures in conjunction with proposed development in areas susceptible to erosion.

- **Policy HS3.5: Public Facilities.** Locate and design emergency buildings and vital utilities, communication systems, and other public facilities so that they remain operational during and after an emergency or disaster.

City of Pinole Grading Ordinance

The purpose of the City of Pinole Grading Ordinance (City Code, Title 15, Chapter 15.36) is to regulate grading on private property in order to control erosion; control sedimentation; protect water quality of watercourses, water bodies, and wetlands; safeguard health, safety, and the public welfare; and to establish administrative procedures and enforcement procedures to carry out these regulations. A project applicant must prepare and submit for approval an erosion and sediment control plan as part of the application for a grading permit. Other requirements include:

- Submittal of a survey by a licensed land surveyor or registered civil engineer delineating the boundary lines of the site.

- An inspector working under the supervision of a registered civil engineer must be on the site during grading operations.

- The disposal site for any material removed from the grading site must be approved by the director of public services.

- The extent of unprotected slopes allowed at any one time and the time said slopes are allowed to remain unprotected are regulated by the City’s grading ordinance, unless noted otherwise on the permit.

A project applicant must submit a permit application, a site map and grading plan, a soils and geological reconnaissance report, an approved erosion and sediment control plan, a time schedule for completion of the work, and payment of appropriate fees.

City of Hercules General Plan

The following objectives, policies, and programs from the *Hercules General Plan* (City of Hercules 1998) regarding geology and soils are applicable to the project.

Objective 1: Consider potential seismic, geologic, flood and fire hazards and introduce adequate safety measures in development plans and proposals.

- **Policy 2B:** Projects proposed for all critical facilities including schools, high-population facilities (such as shopping malls) and industries using or generating significant amounts of hazardous materials within areas subject to very strong earthquake ground shaking or ground failure shall conduct geotechnical studies and structural design evaluations.

- **Program 2B.2:** For development excluding critical facilities and schools, the alternative site feasibility assessment will be an optional requirement of the City (an alternatives site evaluation may be required under CEQA). A rigorous geotechnical evaluation and structural design analyses will be required to ensure that the proposed structures perform adequately in major earthquakes without creating a safety hazard to occupants or people in surrounding areas.

- **Policy 2D:** The administration of subdivision and grading ordinances should allow for flexibility in the review and approval of construction plans to permit sound engineering design in the solution of specific geotechnical problems. Site-specific geotechnical investigations shall be required for every new development.

    - **Program 2D.3:** Further investigations of possible fault traces should be made in the vicinity of the Pinole Traces and Pinole Ridge. Setbacks from located fault traces should be based on geological engineering recommendations.

City of Hercules Grading Ordinance

The purposes of the City of Hercules Grading Ordinance (City Code, Title 7, Chapter 2) are to protect life, limb and property, to promote and enhance the general public welfare and a superior community environment, and insofar as it is economically feasible, to ensure the maximum possible preservation of the natural scenic character of major portions of the City, by establishing minimum standards and requirements relating to land grading, excavations and fills, and procedures by which these standards and requirements may be enforced. Article 7-2.302 states that a grading permit must be obtained, with the following exceptions that would apply specifically to the project:

(e) An excavation below finished grade for basements and footing of structures authorized by a valid building permit or trench excavations for the purpose of installing underground utilities, if to be backfilled to natural grade.

(g) Improvement of watercourses and construction of drainage, irrigation, and domestic water supply systems and facilities performed under the supervision of the Flood Control District, an agency of the Federal or State Government, a water or sanitation district, or an irrigation or reclamation district.

Professional Paleontological Standards

The Society of Vertebrate Paleontology (1995, 1996), a national scientific organization of professional vertebrate paleontologists, has established standard guidelines that outline acceptable professional practices in the conduct of paleontological resource assessments and surveys, monitoring and mitigation, data and fossil recovery, sampling procedures, specimen preparation, analysis, and curation. Most practicing professional paleontologists in the nation adhere to the Society of Vertebrate Paleontology assessment, mitigation, and monitoring requirements, as specifically spelled out in its standard guidelines.

3.5.3 Environmental Impacts and Mitigation Measures

Thresholds of Significance

The thresholds for determining the significance of impacts for this analysis are based on the environmental checklist in Appendix G of the State CEQA Guidelines. The project was determined to result in a significant impact related to geology and soils if it would do any of the following:

- expose people, property, or structures to potential substantial adverse impacts, including the risk of loss, injury, or death involving:
  - rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault;
  - strong seismic ground shaking;
  - seismic-related ground failure, including liquefaction; or
  - landslides;
- result in substantial soil erosion or the loss of topsoil;
- be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse;
- be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property;
- have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water; or
- result in inundation by seiche, tsunami, or mudflow.

Based on the environmental checklist in Appendix G of the State CEQA Guidelines, a project would have a significant impact on paleontological resources if it would directly or indirectly destroy a unique paleontological resource or site. A "unique paleontological resource or site" is one that is considered significant under the professional paleontological standards described below.

An individual vertebrate fossil specimen may be considered unique or significant if it is identifiable and well preserved, and it meets one of the following criteria:

- a type specimen (i.e., the individual from which a species or subspecies has been described);
- a member of a rare species;
- a species that is part of a diverse assemblage (i.e., a site where more than one fossil has been discovered) wherein other species are also identifiable, and important information regarding life history of individuals can be drawn;
- a skeletal element different from, or a specimen more complete than, those now available for its species; or
- a complete specimen (i.e., all or substantially all of the entire skeleton is present).

The value or importance of different fossil groups varies depending on the age and depositional environment of the rock unit that contains the fossils, their rarity, the extent to which they have already been identified and documented, and the ability to recover similar materials under more controlled conditions (such as for a research project). Marine invertebrates are generally common; the fossil record is well developed and well documented, and they would generally not be considered a unique paleontological resource. Identifiable vertebrate marine and terrestrial fossils are generally considered scientifically important because they are relatively rare.

ANALYSIS METHODOLOGY

Evaluation of potential geology and soils impacts for the project relied on NRCS soil survey data ("Web Soil Survey"), and published geologic literature and maps. The information obtained from these sources was reviewed and summarized to present the existing conditions and to identify potential environmental impacts, based on the thresholds of significance presented in this section. Impacts associated with geology and soils that could result from project construction and operational activities were evaluated qualitatively based on site conditions; expected construction practices; materials, locations, and duration of project construction and related activities; and a field visit.

In its standard guidelines for assessment and mitigation of adverse impacts on paleontological resources, the Society of Vertebrate Paleontology (1995) established three categories of sensitivity for paleontological resources: high, low, and undetermined. Areas where fossils have been previously found are considered to have a high sensitivity and a high potential to produce fossils. Areas that are not sedimentary in origin and that have not been known to produce fossils in the past typically are considered to have low sensitivity. Areas that have not had any previous paleontological resource surveys or fossil finds are considered to be of undetermined sensitivity until surveys and mapping are performed to determine their sensitivity. After reconnaissance surveys, observation of exposed cuts, and possibly subsurface testing, a qualified paleontologist can determine whether the area should be categorized as having high or low sensitivity. In keeping with the significance criteria of the Society of Vertebrate Paleontology (1995), all vertebrate fossils are generally categorized as being of potentially significant scientific value.

ISSUES NOT DISCUSSED FURTHER IN THIS EIR

Septic Tanks—The project does not include the use of septic tanks; therefore there would be no impact, and this issue is not discussed further in this EIR.

IMPACT ANALYSIS

IMPACT 3.5-1	**Possible Risks to People and Structures Caused by Surface Fault Rupture.** *Proposed facilities would not be located within or adjacent to a fault zoned under the Alquist-Priolo Earthquake Fault Zone Act, and the Pinole Creek Fault is not considered to be active by California Geological Survey (CGS).*

Option 1: New Larger Effluent Pipeline to RSD

The project site is not located in an Alquist-Priolo Earthquake Fault Zone (CGS 2003, Hart and Bryant 1999). The nearest known, active fault that is zoned under the Alquist-Priolo Act is the Hayward Fault, located approximately 3 miles west of the proposed corporation yard and approximately 3.55 miles west of the Pinole-Hercules WPCP. Surface ground rupture along faults is generally limited to a linear zone a few yards wide, and is most likely to occur along faults that have been zoned as active by CGS. Therefore, the impact to project-related facilities from surface fault rupture caused by the Hayward Fault is considered **less than significant**.

The proposed pipeline would be suspended on a bridge over Pinole Creek, and therefore the pipeline would cross the Pinole Creek Fault. Furthermore, project-related improvements at the Pinole-Hercules WPCP would occur immediately adjacent to the Pinole Creek Fault. According to the *Hercules General Plan* (1998), the northern end of the Pinole Creek Fault was originally included in an Alquist-Priolo Special Studies Zone, but was removed from the active category after further analysis. Jennings (1994) indicates that there has been no evidence of displacement on this fault in the last 1.6 million years. Therefore, this impact is considered **less than significant**.

Option 2: Pinole-Only Flows at Existing Plant

Under Option 2, although a new pipeline would not be constructed, improvements at the Pinole-Hercules WPCP would occur immediately adjacent to the Pinole Creek Fault. However, according to the *Hercules General Plan* (1998), the northern end of the Pinole Creek Fault was originally included in an Alquist-Priolo Special Studies Zone, but was removed from the active category after further analysis. Jennings (1994) indicates that there has been no evidence of displacement on this fault in the last 1.6 million years. Therefore, this impact is considered **less than significant**.

Mitigation Measure: No mitigation measures are required.

IMPACT 3.5-2 Possible Risks to People and Structures Caused by Strong Seismic Ground Shaking. *Proposed facilities would be constructed in a seismically active area, and project implementation would expose people and structures to risks caused by strong seismic ground shaking.*

Option 1: New Larger Effluent Pipeline to RSD

The project facilities would be located in a seismically active area. The corporation yard would be located approximately 3 miles from the Hayward Fault, and the Pinole-Hercules WPCP and pipeline alignment would be located approximately 3.5 miles from the Hayward Fault, which is classified as active by the USGS and the California Geological Survey. There is a 40% probability that an earthquake will occur on the Hayward-Rodgers Creek Fault zone in the next 30 years. There is a 27% probability that the Hayward-Rodgers Creek Fault zone will produce an earthquake with a magnitude ≥ 6.7 in the next 30 years. (Working Group on California Earthquake Probabilities 2003.) The CBC specifies more stringent design guidelines where a project would be located adjacent to a Class A or B fault as designated by the California Probabilistic Seismic Hazard Maps. The project facilities would be located approximately 3 miles from the nearest Class A fault (Hayward), and 10 miles from the nearest Class B faults (Concord and West Napa). Although the Pinole Creek Fault has not shown evidence of displacement in the last 1.4 million years (Jennings 1994), the proposed pipeline alignment would cross this known fault. Because a geotechnical evaluation has not yet been prepared, the site-specific seismic calculations required by the CBC have not been performed. Without proper seismic design, people and structures at the project facilities would be exposed to hazards caused by strong seismic strong shaking; therefore, this impact is considered **potentially significant**.

Option 2: Pinole-Only Flows at Existing Plant

Under Option 2, although neither the proposed pipeline nor the new corporation yard would be constructed, improvements would still occur at the Pinole-Hercules WPCP. For the same reasons described under Option 1 above, without proper seismic design, people and structures at the project facilities would be exposed to hazards caused by strong seismic strong shaking; therefore, this impact is considered **potentially significant**.

Mitigation Measure 3.5-1a: Prepare Site-Specific Geotechnical Report per CBC Requirements and Implement Appropriate Recommendations.

Applies to: Options 1 and 2

Before building permits are issued and construction activities begin any project development phase, the City of Pinole shall hire a licensed geotechnical engineer to prepare a final geotechnical subsurface investigation report for the proposed facilities, which shall be submitted for review and approval to the City of Pinole Planning Department. The final geotechnical engineering report shall address and make recommendations on the following:

- site preparation;
- soil bearing capacity;
- appropriate sources and types of fill;
- potential need for soil amendments;
- structural foundations, including retaining-wall design;
- grading practices;
- soil corrosion of concrete and steel;
- erosion/winterization;
- seismic ground shaking;
- liquefaction;
- subsidence; and
- expansive/unstable soils.

In addition to the recommendations for the conditions listed above, the geotechnical investigation shall include subsurface testing of soil and groundwater conditions, and shall determine appropriate foundation designs that are consistent with the version of the CBC that is applicable at the time building and grading permits are applied for. All recommendations contained in the final geotechnical engineering report shall be implemented by the City of Pinole. Special recommendations contained in the geotechnical engineering report shall be noted on the grading plans and implemented as appropriate before construction begins. Design and construction of all new project development shall be in accordance with the CBC.

Mitigation Measure 3.5-1b: Monitor Earthwork during Ground-Disturbing Activities.

Applies to: Options 1 and 2

All earthwork shall be monitored by a qualified geotechnical or soils engineer retained by the City of Pinole. The geotechnical or soils engineer shall provide oversight during all excavation, placement of fill, and disposal of materials removed from and deposited on both on- and off-site construction areas.

Implementation of Mitigation Measures 3.5-1a and 3.5-1b would reduce the potentially significant impact of possible damage to people and structures from strong seismic ground shaking under both Options 1 and 2 to a **less-than-significant** level by requiring that the design recommendations of a geotechnical engineer to reduce damage from seismic events be incorporated into buildings, structures, and infrastructure as required by the CBC, and that a geotechnical or soils engineer provide on-site monitoring to make sure that earthwork is being performed as specified in the plans. Examples of the types of engineering recommendations that could be made could include, but are not limited to, the use of steel earthquake straps and/or earthquake tiedowns to increase structural stability during strong seismic ground shaking.

IMPACT 3.5-3 Construction-Related Erosion. *Construction activities during project implementation would involve grading and movement of earth in soils subject to wind and water erosion hazard.*

Option 1: New Larger Effluent Pipeline to RSD

As shown in Table 3.5-3, soils underlying the project components have a low to moderate wind and water erosion hazard, with the exception of the Joyce Muck (which underlies the Pinole-Hercules WPCP), which has a high wind erosion hazard. Project implementation would involve grading and construction activities for building foundations, and trenching activities over a distance of more than 4 miles. Conducting these activities would result in the temporary disturbance of soil and would expose disturbed areas to winter storm events. Rain of sufficient intensity could dislodge soil particles from the soil surface. If the storm is large enough to generate runoff, localized erosion could occur. In addition, soil disturbance during the summer as a result of construction activities could result in soil loss because of wind erosion. Therefore, direct impacts associated with construction-related erosion are considered **potentially significant.** Additional direct and indirect impacts from soil erosion, such as sediment transport, water contamination, and potential loss of habitat, are evaluated in Sections 3.4, "Fisheries and Aquatic Resources," 3.6, "Hydrology and Water Quality," and 3.9, "Terrestrial Biology," respectively.

Option 2: Pinole-Only Flows at Existing Plant

Under Option 2, ground-disturbing activities would be limited to a very small area of land and solely within the existing Pinole-Hercules WPCP. Because of the small area of land that would be disturbed, both the direct and indirect impacts associated with construction-related erosion are considered **less than significant**.

Mitigation Measure 3.5-3: Prepare and Implement a Grading and Erosion Control Plan.

Applies to: Option 1

Before grading permits are issued, the City of Pinole shall retain a California Registered Civil Engineer to prepare a grading and erosion control plan. The plan shall be consistent with the City's Grading Ordinance and the state's NPDES permit, and shall include the site-specific grading associated with development for all project components.

The plan referenced above shall include the location, implementation schedule, and maintenance schedule of all erosion and sediment control measures, and a description of the location and methods of storage and disposal of construction materials. Erosion and sediment control measures could include the use of detention basins, berms, swales, wattles, and silt fencing, and covering or watering of stockpiled soils to reduce wind erosion. Stabilization on slopes could include construction of retaining walls and reseeding with vegetation after construction. Stabilization of construction entrances to minimize trackout (control dust) is commonly achieved by installing filter fabric and crushed rock to a depth of approximately 1 foot. The City of Pinole shall ensure that the construction contractor is responsible for securing a source of transportation and deposition of excavated materials.

Implementation of Mitigation Measure 3.6-3a (discussed in Section 3.6, "Hydrology and Water Quality") would also help reduce erosion-related impacts.

Implementation of Mitigation Measure 3.5-4 along with Mitigation Measure 3.6-3a (discussed in Section 3.6, "Hydrology and Water Quality"), would reduce potentially significant construction-related erosion impacts under Option 1 to a **less-than-significant** level because a grading and erosion control plan with specific erosion and sediment control measures such as those suggested above or listed in Mitigation Measure 3.6-3a would be prepared, approved by the City of Pinole Planning Department, and implemented.

IMPACT 3.5-4	Potential Geologic Hazards Related to Liquefaction, Subsidence, and Unstable Soil. *Construction of project components could be subject to hazards from liquefaction, subsidence, and construction in potentially unstable soils.*

Option 1: New Larger Effluent Pipeline to RSD

Under 1, substantial improvements would occur at the Pinole-Hercules WPCP, which is located on a layer of artificial fill underlain by Bay mud. Based on a review of published geological maps and literature, there is a potential that soils at the Pinole-Hercules WPCP could be subject to liquefaction and/or subsidence in the event of an earthquake because the site is located on artificial fill underlain by Bay mud, the potential seismic sources are a short distance away, and the groundwater table is shallow. The proposed corporation yard is underlain by a mixture of Cut and Fill Land-Millsholm Complex, approximately 75% of which consists of a mixture of cut and fill dirt, which may pose a hazard for construction of buildings depending on the nature of the fill soils and the amount of compaction (i.e., unstable soil). Because a site-specific geological evaluation has not yet been performed, and based on a review of geologic maps and published literature, the potential geologic hazards from liquefaction, subsidence, and construction on unstable soils are considered a **potentially significant** impact.

Option 2: Pinole-Only Flows at Existing Plant

Under Option 2, improvements would still occur at the Pinole-Hercules WPCP, which is located on a layer of artificial fill underlain by Bay mud. As stated above, construction in the Bay mud may pose a hazard to buildings from liquefaction and/or subsidence. Because a site-specific geological evaluation has not yet been performed, and based on a review of geologic maps and published literature, the potential geologic hazards from liquefaction and subsidence are considered a **potentially significant** impact.

Mitigation Measure: Implement Mitigation Measure 3.5-1a and 3.5-1b.

Applies to: Options 1 and 2

Implementation of Mitigation Measures 3.5-1a and 3.5-1b would reduce potential geologic hazards from construction related to liquefaction and subsidence to a **less-than-significant** level because a licensed geotechnical engineer would performed a site-specific geotechnical investigation that would include a determination of liquefaction potential as required by the California Building Standards Code, as well as evaluation of subsidence potential and soil bearing strength, and all recommendations made by the engineer regarding building and foundation design would be implemented. Examples of the types of recommendations that could be made could include, but are not limited to, construction of building foundations on pilings that have been anchored in bedrock, or removal of soil and replacement with compacted fill. Furthermore, all earthwork would be monitored by a soils or geotechnical engineer to make sure that project plans and specifications are complied with.

IMPACT 3.5-5	Potential Damage to Structures and Infrastructure from Construction in Expansive Soils. *Portions of the project site are underlain by soils that have a moderate to high potential for expansion when wet and may result damage to structures.*

Option 1: New Larger Effluent Pipeline to RSD

Expansive soils shrink and swell as a result of moisture change. These volume changes can result in damage over time to building foundations, underground utilities, and other subsurface facilities and infrastructure if they are not designed and constructed appropriately to resist the damage associated with changing soil conditions. Volume changes of expansive soils also can result in the consolidation of soft clays following the lowering of the water table or the placement of fill. Placing buildings or constructing infrastructure on or in unstable soils can result in structural failure. Based on a review of NRCS soil survey data as shown in Table 3.5-2, most of the project elements would be constructed in soils with a moderate to high shrink-swell potential, indicating the soils are expansive. Soil expansion, including volume changes during seasonal fluctuations in moisture content, could adversely affect interior slabs-on-grade, landscaping hardscapes, and underground pipelines. Therefore, this impact is considered **potentially significant**.

Option 2: Pinole-Only Flows at Existing Plant

Under Option 2, improvements would only occur at the Pinole-Hercules WPCP, which is located within the Joyce Muck. As shown in Table 3.5-2 above, the Joyce Muck has a high shrink-swell potential. Therefore, the potential geologic hazard from construction in soil with a high shrink-swell is considered a **potentially significant** impact.

Mitigation Measure: Implement Mitigation Measures 3.5-1a and 3.5-1b.

Applies to: Options 1 and 2

Implementation of Mitigation Measures 3.5-1a and 3.5-1b would reduce the potentially significant impact of damage to people and structures from construction in expansive soils under both Options 1 and 2 to a **less-than-significant** level by requiring that the design recommendations of a geotechnical engineer to reduce damage from expansive soils be incorporated into buildings, structures, and infrastructure as required by the CBC, and that a geotechnical or soils engineer provide on-site monitoring to make sure that earthwork is being performed as specified in the plans. Examples of the types of recommendations that could be made could include, but are not limited to, foundation design that incorporates the use of a post-tensioned slab, or removal of soil and replacement with compacted fill.

IMPACT 3.5-6 Potential Geologic Hazard from Construction in Corrosive Soils. *Most of the soils within which the project components would be constructed are moderately to highly corrosive of concrete and steel, which could subject project facilities to a shorter useful lifespan.*

Option 1: New Larger Effluent Pipeline to RSD

Soil corrosivity is an electrochemical process that results in corrosion of concrete and/or steel in contact with soil. Excessive corrosion can shorten the usable lifespan of the concrete or steel materials used in construction. As shown in Table 3.5-2, NRCS soil survey data indicates that most of the soil types within which project components would be constructed have a moderate to high corrosion potential of both concrete and steel. Excessive corrosion could shorten the useful lifespan of project facilities. Therefore, this impact is considered **potentially significant**.

Option 2: Pinole-Only Flows at Existing Plant

Under Option 2, improvements would only occur at the Pinole-Hercules WPCP, which is located within the Joyce Muck. As shown in Table 3.5-2 above, the Joyce Muck has a high corrosivity potential for both concrete and steel. Therefore, the potential geologic hazard from construction in soil with a high corrosivity potential is considered a **potentially significant** impact.

Mitigation Measure: Implement Mitigation Measure 3.5-1a.

Applies to: Options 1 and 2

Implementation of Mitigation Measure 3.5-1a would reduce the potentially significant impact of damage to structures from construction in corrosive soils under both Options 1 and 2 to a **less-than-significant** level by requiring that a licensed geotechnical engineer perform a site-specific corrosivity evaluation, and requiring that the design recommendations of a geotechnical engineer to reduce damage from corrosive soils be incorporated into project-related buildings, structures, and infrastructure. Examples of the types of recommendations that could be made include, but are not limited to, the use of materials that are less subject to corrosion (for example, PVC pipe instead of steel).

IMPACT 3.5-7 — Potential Risks to People or Structures from Seiche or Tsunami. *Construction of proposed improvements at the Pinole-Hercules WPCP would not change the susceptibility of the plant to damage from tsunamis, and would not result in any new employees whose safety could be jeopardized by a tsunami.*

Option 1: New Larger Effluent Pipeline to RSD

According to Borrero et al. (2006), 51 credible tsunamis may have been recorded or observed in the San Francisco Bay region during the last 200 years, although only five produced wave heights that may have exceeded 1.6 feet within the Bay. According to the tsunami evacuation maps prepared by ABAG (2009), the Pinole-Hercules WPCP could be subject to the effects of a tsunami generated by a large magnitude earthquake. Wave heights would depend on the magnitude of the earthquake and its source, and may range from 0.78 inches to 31 inches (Borrerro et al. 2006; Parsons et al. 2003) in the project vicinity. The potential damage that could be caused would depend on the wave heights and the velocity of the waves. The Pinole-Hercules WPCP was constructed in its present location at the edge of San Pablo Bay in the 1960s, and therefore has been subject to tsunami hazard from its inception (before tsunami modeling or tsunami hazard planning was prepared for the Bay Area). Construction of the proposed improvements at the plant would not change the susceptibility of any structures at the Pinole-Hercules WPCP to damage from a tsunami, and because no additional employees would be necessary during the project's operation phase, project implementation would not subject any additional people to tsunami hazards. If a tsunami were to occur with enough force to wash away the bridge over Pinole Creek, rupture of the proposed pipeline would not present a hazard to the environment because the pipeline would be carrying treated wastewater. Finally, there is no way of knowing whether or not a tsunami with enough force to damage structures at the plant or to present a safety hazard to current employees would ever be generated during the lifetime of the WPCP. Therefore, this impact is considered **less than significant**.

Option 2: Pinole-Only Flows at Existing Plant

Under Option 2, a much smaller suite of improvements would be constructed at the Pinole-Hercules WPCP, and a new pipeline would not be constructed. Construction of the proposed improvements at the plant would not change the susceptibility of any structures at the Pinole-Hercules WPCP to damage from a tsunami, and because no additional employees would be necessary during the project's operation phase, project implementation would not subject any additional people to tsunami hazards. Furthermore, there is no way of knowing whether or not a tsunami with enough force to damage structures at the plant or to present a safety hazard to current employees would ever be generated during the lifetime of the WPCP. Therefore, this impact is considered **less than significant**.

Mitigation Measures: No mitigation measures are required.

IMPACT 3.5-8 — Potential Damage of or Destruction to of Previously Unknown Unique Paleontological Resources during Construction-Related Activities. *The proposed pipeline alignment is underlain by paleontologically sensitive rock formations. Therefore, construction activities along the alignment could damage or destroy previously unknown, unique paleontological resources at the project site.*

Option 1: New Larger Effluent Pipeline to RSD

Corporation Yard

The proposed corporation yard is underlain by Miocene-age diatomite. This formation consists primarily of the fossilized remains of diatoms, which are single-celled algae with silica in their cell walls. Fossilized diatoms are well known and well studied, and therefore would not be considered a unique paleontological resource under CEQA. Therefore, ground-disturbing activities at the proposed corporation yard would have **no impact** on unique paleontological resources.

Pinole-Hercules WPCP

The Pinole-Hercules WPCP is underlain by Holocene-age Bay mud and artificial fill. By definition, in order to be considered a fossil, an object must be more than 11,000 years old. Because these formations consist of Holocene-age sediments that are less than 11,000 years old, unique paleontological resources would not be present. Therefore, ground-disturbing activities at the Pinole-Hercules WPCP would have **no impact** on unique paleontological resources.

Pipeline to RSD

As shown in Exhibit 3.5-1, the proposed pipeline alignment to RSD is underlain by several rock formations, which are discussed in detail above in the Environmental Setting. The Holocene-age alluvial fan deposits are too young to contain fossil resources and the artificial fill, by its very nature, would not contain fossils. However, based on a review of published literature and a database search at UCMP, over 800 Pleistocene- and Miocene-age vertebrate fossils have been recovered from numerous localities in the immediate vicinity of the proposed pipeline alignment, from the same sediments that underlie the proposed alignment. Additional fossils have been recovered from over 100 localities in Contra Costa County from these same sediments.

Because of the large number of fossils that have been recovered from the Pleistocene alluvial fan deposits, Pinole tuff, San Pablo Group, and Monterey Group, they are considered paleontologically sensitive rock units under the Society of Vertebrate Paleontology guidelines (1995), thus suggesting that there is a potential for uncovering additional similar fossil remains during project-related earthmoving activities in these formations. Therefore, the potential for damage to previously unknown unique paleontological resources during ground-disturbing activities along the proposed pipeline alignment is considered a **potentially significant** impact.

Option 2: Pinole-Only Flows at Existing Plant

Under Option 2, the only facilities that would be constructed would be located at the Pinole-Hercules WPCP, which is underlain by Holocene-age Bay mud and artificial fill. By definition, in order to be considered a fossil, an object must be more than 11,000 years old. Because these formations consist of Holocene-age sediments that are less than 11,000 years old, unique paleontological resources would not be present. Therefore, ground-disturbing activities under Option 2 would have **no impact** on unique paleontological resources.

Mitigation Measure 3.5-8: Conduct Construction Personnel Education, Monitor Earthwork, Stop Work if Paleontological Resources are Discovered, Assess the Significance of the Find, and Prepare and Implement a Recovery Plan as Required.

Applies to: Option 1 (Pipeline Alignment Only)

To minimize potential adverse impacts on previously unknown potentially unique, scientifically important paleontological resources during earthmoving activities along the proposed pipeline alignment, the City of Pinole shall do the following:

- Before the start of any earthmoving activities along the proposed pipeline alignment, the City of Pinole shall retain a qualified paleontologist or archaeologist to train all construction personnel involved with earthmoving activities, including the project superintendent, regarding the possibility of encountering fossils, the appearance and types of fossils likely to be seen during construction, and proper notification procedures should fossils be encountered.

- The City of Pinole shall hire a qualified paleontologist to provide monitoring during all earthmoving activities along the proposed pipeline alignment, except in those areas underlain by Holocene alluvial fan deposits and artificial fill as shown in Exhibit 3.5-1.

- If paleontological resources are discovered during earthmoving activities, the construction crew shall immediately cease work in the vicinity of the find and notify the on-site paleontologist and the City of Pinole. The paleontologist shall evaluate the resource and prepare a recovery plan in accordance with Society of Vertebrate Paleontology guidelines (1996). The recovery plan may include, but is not limited to, an intensive field survey in the vicinity of the find, sampling and data recovery, museum storage coordination for any specimen recovered, and a report of findings. All feasible recommendations contained in the recovery plan shall be implemented before construction activities can resume at the site where the paleontological resources were discovered.

Implementation of Mitigation Measure 3.5-8 would reduce potentially significant impacts related to damage or destruction of unique paleontological resources to a **less-than-significant** level under Option 1 because construction workers would be alerted to the possibility of encountering paleontological resources, and in the event that resources were encountered, fossil specimens would be recovered and recorded and would undergo appropriate curation.

3.6 HYDROLOGY AND WATER QUALITY

3.6.1 ENVIRONMENTAL SETTING

HYDROLOGY

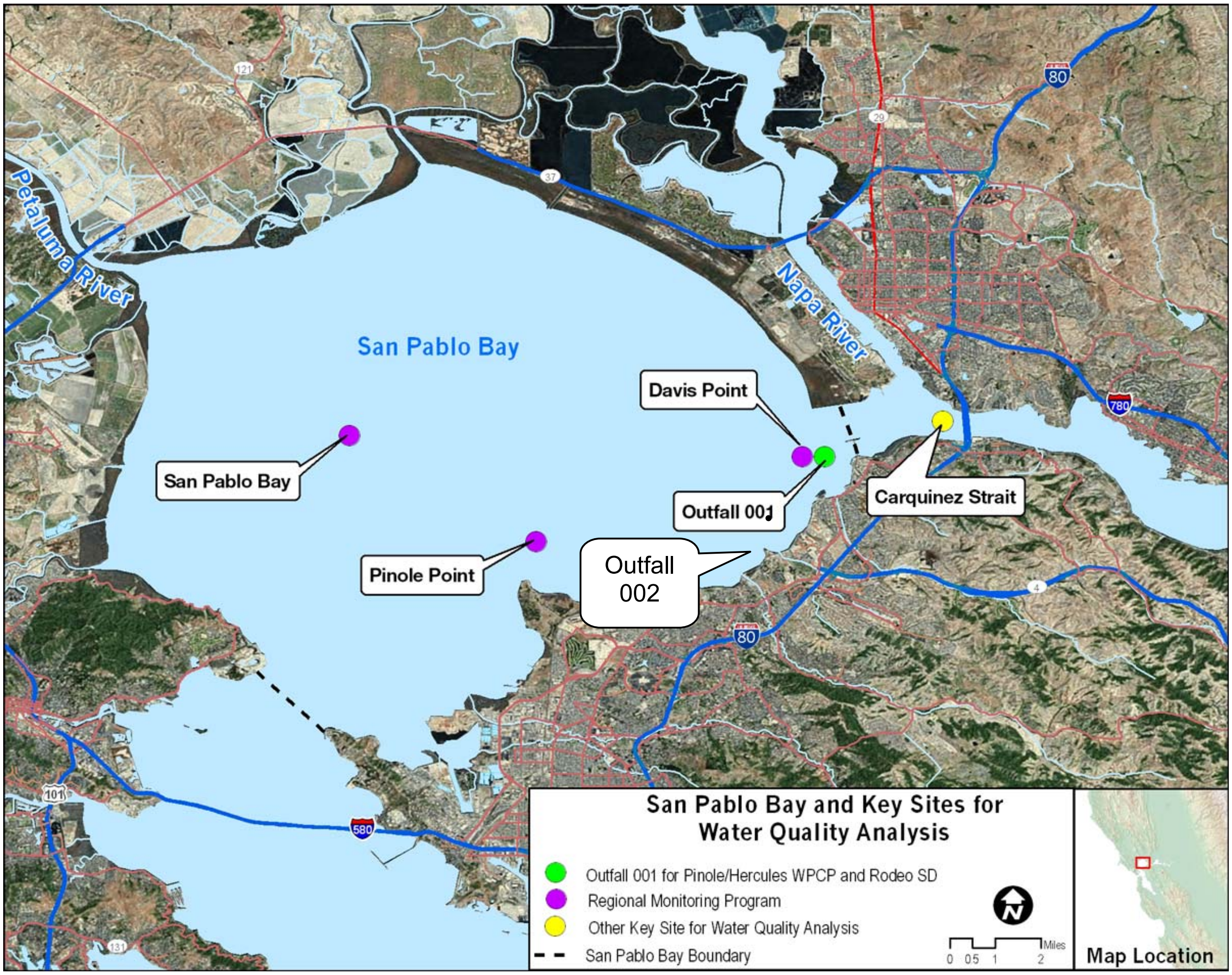
The project area includes portions of San Pablo Bay, which is a shallow tidal estuary spanning 68,349 acres that composes the northern part of the greater San Francisco Bay, and inland areas in the cities of Pinole, Hercules, and Rodeo adjacent to San Pablo Bay (see Exhibit 2-1 in Chapter 2, "Project Description"). San Pablo Bay's water boundaries are roughly the mouth of the Carquinez Strait to the east and a border drawn between Point San Pablo and Santa Venicia. The Sacramento–San Joaquin Delta (Delta) contributes freshwater flow into San Pablo Bay, as do many smaller streams that flow from inland areas surrounding San Pablo Bay. Diurnal tides result in an average change in water surface elevation of about 6 feet, and the twice-daily exchange of water in the bay results in large and variable changes in water current and circulation patterns. Inflow to the bay from the Delta typically follows a seasonal pattern with high flows between December and March, declining flows from April through May, and low inflows from July through October.

San Pablo Bay is primarily a mud-bottom bay, reflecting its characteristic as a catchment for fine sediments. The existing deepwater effluent Outfall 001 and diffuser for the Pinole-Hercules Water Pollution Control Plant (WPCP) and Rodeo Sanitation District (RSD) wastewater treatment plant (WWTP) is located approximately 3,000 feet offshore at a depth of approximately 18 feet below mean lower low water; the Pinole-Hercules WPCP's shallow-water Outfall 002 is about 30 feet offshore at a depth of 2 feet below mean lower low water (Exhibit 3.6-1).

The region has a Mediterranean climate with cool wet winters and relatively warmer dry summers, with average annual rainfall of approximately 22 inches. The topography of the project area is hilly, with elevations ranging from sea level at the San Pablo Bay shoreline to approximately 150 feet above sea level inland where project construction activities would occur. The municipal water supply for the cities of Pinole, Hercules, and Rodeo is provided by the East Bay Municipal Utility District, which in turn obtains water supplies from the Delta and the Mokelumne River watershed in the Sierra Nevada. Local groundwater is not used for municipal supply and the project area is not within a groundwater basin identified by the California Department of Water Resources (DWR) (2003). Limited sources of shallow, localized groundwater may occur in permeable soils.

Four small creeks draining the Santa Ynez Mountains in northwestern Contra Costa County may be affected by the project under Option 1: Pinole Creek, Refugio Creek, Ohlone Creek, and Rodeo Creek (see Exhibits 3.9-1 through 3.9-4 in Section 3.9, "Terrestrial Biology"). Because Ohlone Creek is part of the Refugio Creek watershed, it is described under Refugio Creek. Except where indicated by other references, the information describing these creeks was obtained from the *Contra Costa County Watershed Atlas* (Contra Costa County 2003). The lower reaches of the Pinole Creek, Refugio Creek, and Rodeo Creek channels have had some channelization, realignments, and straightening, and Rodeo Creek and Pinole Creek are contained in concrete trapezoidal channels in the lower-most reaches before they flow into San Pablo Bay. The project area is largely urbanized with developed storm drainage facilities that discharge runoff to San Pablo Bay. The Contra Costa County Flood Control and Water Conservation District (CCCFCWCD) manages flood water and stormwater throughout the county and coordinates with the city governments for infrastructure improvements and management activities within city limits.

The lower reaches of the streams in the project area streams are known to carry occasional large flows during major storm and runoff events. The defined stream-channel carrying capacity and projected 100-year flood flows of Rodeo Creek and Refugio Creek are unknown. Sediment carried by these streams can deposit in San Pablo Bay and impair the channels' ability to discharge peak flows, resulting in increased stream water surface elevations upstream in the lower watershed during storm events. Except for localized flooding and standing water, which may occur during brief, intense storms when runoff exceeds storm sewer capacity, creek flows along Pinole Creek would probably be contained within the existing creek bank during a 100-year storm (City of Pinole 2009). The Pinole-Hercules WPCP is potentially subject to flooding from Pinole Creek when tidal surge and heavy rain runoff occurs. CCFCWCD indicated in response to the notice of preparation for this project that the WPCP is not located within a FEMA-designated 100-year floodplain; however, the plant may be subject to occasional floodwater via high flows in Pinole Creek that could overtop several locations of the levee that have insufficient height to contain a 100-year flow. CCCWFCD periodically conducts dredging operations in Pinole Creek to remove sediment and maintain flood protection.



Source: Appendix F

San Pablo Bay and Key Regional Program Monitoring Sites in Project Vicinity **Exhibit 3.6-1**

WATER QUALITY

Overview

As described previously, most freshwater inflow to San Pablo Bay is from the Delta, although local rivers and creeks, such as the Napa River, also provide freshwater inflow. Because most freshwater comes from the Delta, the amount and timing of precipitation events in the Delta watershed have a major effect on freshwater inflows, which in turn can substantially affect circulation patterns and, thus, water quality conditions in San Pablo Bay.

Salinity is a primary water quality constituent in San Pablo Bay that is governed by the daily tidal action and exchange of ocean saltwater and freshwater inflows from the Delta and inland streams. Other major water quality constituents include contaminants that enter the bay from Delta inflows, surrounding streams, runoff from lands and shoreline areas immediately adjacent to the bay, and atmospheric deposition. Contaminant sources are highly variable and include industrial discharges, industrial and municipal WWTPs, stormwater runoff from urbanized areas, and natural background loads from undeveloped land. Many water quality constituents are also affected by physical properties (e.g., temperature, turbidity) or biological factors (e.g., pathogens, algae growth), and metabolic activities of algae and other aquatic organisms (e.g., oxygen demand, pH effects).

As described below in Section 3.6.2, "Regulatory Framework," water quality conditions throughout San Francisco Bay are monitored under the San Francisco Estuary Institute's Regional Monitoring Program (RMP). The program monitors contaminant concentrations in water, sediments, and fish and shellfish tissue in the San Francisco Bay and the Delta. Water quality monitoring through the RMP is focused on a suite of constituents that reflect known contaminant problems and potential adverse effects on beneficial uses of bay waters. Three RMP monitoring stations are located near the deepwater Outfall 001 and a DWR site in the Carquinez Strait. The RMP sites relatively close to Outfall 001 are listed below and shown in Exhibit 3.6-1, with the Davis Point station being located closest to the outfall:

- Davis Point (BD40)
- Pinole Point (BD30)
- San Pablo Bay (BD20)

Ambient receiving-water data for these constituents are summarized in Table 3.6-1 (Davis Point), Table 3.6-2 (Pinole Point), and Table 3.6-3 (San Pablo Bay). From March 1993 through August 2001, sampling was conducted at these fixed locations in San Pablo Bay. Starting in 2002, the RMP changed to a random sampling location strategy for water quality.

Analysis of these data indicates that water quality in the vicinity of Outfall 001 exhibits a high level of compliance with ambient federal water quality criteria and state water quality objectives (collectively called "criteria" in this discussion). At all sites, water quality was in compliance with the criteria for ammonia and all metals (other than mercury) 100% of the time. Sites were in compliance with the mercury criteria 70–83% of the time. In contrast, all of the sites were out of compliance with pesticide and polychlorinated biphenyl (PCB) criteria during the majority of the time. Total suspended solids (TSS) monitoring is done by the RMP; however, no water quality criteria have been promulgated for the bay. Criteria for dissolved ammonia are based on objectives contained in the *Water Quality Control Plan for the San Francisco Bay Basin* (Basin Plan) (San Francisco Bay RWQCB 2007). The objectives are dependent on site-specific conditions for pH, temperature, and salinity. Using the available RMP monitoring data, ammonia objectives were calculated for each day where pH, temperature, and salinity data were available and the average of the calculated objective for each of these days was applied.

Clean Water Act Section 303(d) Listings for San Pablo Bay

The 2006 Clean Water Act (CWA) Section 303(d) list for the San Francisco Bay was approved by the U.S. Environmental Protection Agency (EPA) in 2007 (SWRCB 2007). Listings for San Pablo Bay found in the approved 303(d) list are summarized in Table 3.6-4. The CWA requires that a total maximum daily load (TMDL) be developed for each constituent on the CWA Section 303(d) list when water quality standards are not met. A TMDL is the amount of loading of a constituent from all sources that a water body can receive and still meet water quality standards. TMDLs have been, or are being, developed that address San Francisco Bay as a whole. The San Francisco Bay mercury TMDL was adopted by EPA at the beginning of 2008. The San Francisco Bay TMDL for PCBs was adopted by the State Water Resources Control Board (SWRCB) in October 2009 and is pending approval by EPA. A selenium TMDL is under development for North San Francisco Bay.

Table 3.6-1
Summary of Regional Monitoring Program Data at Davis Point (BD40) for March 1993—August 2001

Constituent	Units	Aquatic Life Criterion[a]	Human Health Criterion[b]	Number of Samples	Max. Value Detected	Number of Samples Above Lowest Applicable Criterion	Percent of Time Below Lowest Applicable Criterion
Conventionals							
Ammonia, total (as N)	mg/l	1.49[c]	NA	25	0.160	0	100%
Total suspended solids	mg/l	NA	NA	25	443.29	NA	NA
Metals							
Copper, dissolved	µg/l	3.1	1,300	25	2.565	0	100%
Mercury, total	µg/l	0.025	0.051	24	0.09	5	79%
Nickel, dissolved	µg/l	8.2	4,600	25	3.75	0	100%
Selenium, total	µg/l	5.0 [d]	NA	23	0.495	0	100%
Zinc, dissolved	µg/l	81	NA	25	2.582	0	100%
Pesticides							
4,4'-DDT, total	pg/l	1.0	0.59	20	497	20	0%
4,4'-DDD, total	pg/l	NA	0.84	18	810	18	0%
4,4'-DDE, total	pg/l	NA	0.59	21	1,827.26	21	0%
Chlordane, total	pg/l	4.0	0.59	19	337.4	19	0%
Dieldrin, total	pg/l	1.9	0.14	21	294	21	0%
Other							
PCBs, total	pg/l	30	0.17	20	1,827.4	20	0%

Notes: µg/l = micrograms per liter; DDD = dichlorodiphenyldichloroethane; DDE = dichlorodiphenyldichloroethylene; DDT = dichlorodiphenyltrichloroethane; mg/l = milligrams per liter; PCB = polychlorinated biphenyl; pg/l = picograms per liter.

[a] Aquatic life objectives listed are most restrictive of freshwater and saltwater criteria from the California Toxics Rule.

[b] Human health criteria listed are for organism consumption only as defined in the California Toxics Rule.

[c] Water quality objective is defined in the *Water Quality Control Plan for the San Francisco Bay Basin*, and is dependent on temperature, pH, and salinity.

[d] Promulgated in the National Toxics Rule.

NA = No federal water quality criterion or state water quality objective, applicable to San Pablo Bay, has been promulgated for this constituent. As such, summary statistics are not calculated.

Source: Data compiled by Robertson-Bryan Inc. in 2009

Table 3.6-2
Summary of Regional Monitoring Program Data at Pinole Point (BD30) for March 1993—August 2001

Constituent	Units	Aquatic Life Criterion[a]	Human Health Criterion[b]	Number of Samples	Max. Value Detected	Number of Samples Above Lowest Applicable Criterion	Percent of Time Below Lowest Applicable Criterion
Conventionals							
Ammonia, total (as N)	mg/l	1.33[c]	NA	25	0.152	0	100%
Total suspended solids	mg/l	NA	NA	25	177.766	NA	NA
Metals							
Copper, dissolved	µg/l	3.1	1300	25	2.3	0	100%
Mercury, total	µg/l	0.025	0.051	24	0.0455	4	83%
Nickel, dissolved	µg/l	8.2	4,600	25	3.6	0	100%
Selenium, total	µg/l	5.0[d]	NA	24	0.394	0	100%
Zinc, dissolved	µg/l	81	NA	25	1.233	0	100%
Pesticides							
4,4'-DDT, total	pg/l	1.0	0.59	18	729	17	6%
4,4'-DDD, total	pg/l	NA	0.84	18	578.89	18	0%
4,4'-DDE, total	pg/l	NA	0.59	20	990	20	0%
Chlordane, total	pg/l	4.0	0.59	19	478.3	19	0%
Dieldrin, total	pg/l	1.9	0.14	21	336.512	21	0%
Other							
PCBs, total	pg/l	30	0.17	20	2,803.5	20	0%

Notes: µg/l = micrograms per liter; DDD = dichlorodiphenyldichloroethane; DDE = dichlorodiphenyldichloroethylene; DDT = dichlorodiphenyltrichloroethane; mg/l = milligrams per liter; PCB = polychlorinated biphenyl; pg/l = picograms per liter

[a] Aquatic life objectives listed are most restrictive of freshwater and saltwater criteria from the California Toxics Rule.

[b] Human health criteria listed are for organism consumption only as defined in the California Toxics Rule.

[c] Water quality objective is defined in the *Water Quality Control Plan for the San Francisco Bay Basin*, and is dependent on temperature, pH, and salinity.

[d] Promulgated in the National Toxics Rule.

NA = No federal water quality criterion or state water quality objective, applicable to San Pablo Bay, has been promulgated for this constituent. As such, summary statistics are not calculated.

Source: Data compiled by Robertson-Bryan Inc. in 2009

Table 3.6-3
Summary of Regional Monitoring Program Data at San Pablo Bay (BD20) for March 1993—August 2001

Constituent	Units	Aquatic Life Criterion[a]	Human Health Criterion[b]	Number of Samples	Max. Value Detected	Number of Samples Above Lowest Applicable Criterion	Percent of Time Below Lowest Applicable Criterion
Conventionals							
Ammonia, total (as N)	mg/l	1.33[c]	NA	25	0.161	0	100%
Total suspended solids	mg/l	NA	NA	25	242.102	NA	NA
Metals							
Copper, dissolved	µg/l	3.1	1300	25	2.54	0	100%
Mercury, total	µg/l	0.025	0.051	24	0.088	7	70%
Nickel, dissolved	µg/l	8.2	4,600	25	3.73	0	100%
Selenium, total	µg/l	5.0[d]	NA	24	0.33	0	100%
Zinc, dissolved	µg/l	81	NA	25	1.277	0	100%
Pesticides							
4,4'-DDT, total	pg/l	1.0	0.59	18	416	18	0%
4,4'-DDD, total	pg/l	NA	0.84	18	670	19	0%
4,4'-DDE, total	pg/l	NA	0.59	20	1,159	21	0%
Chlordane, total	pg/l	4.0	0.59	19	344	19	0%
Dieldrin, total	pg/l	1.9	0.14	21	237	18	10%
Other							
PCBs, total	pg/l	30	0.17	20	3,343.7	21	0%

Notes: µg/l = micrograms per liter; DDD = dichlorodiphenyldichloroethane; DDE = dichlorodiphenyldichloroethylene; DDT = dichlorodiphenyltrichloroethane; mg/l = milligrams per liter; PCB = polychlorinated biphenyl; pg/l = picograms per liter

[a] Aquatic life objectives listed are most restrictive of freshwater and saltwater criteria from the California Toxics Rule.

[b] Human health criteria listed are for organism consumption only as defined in the California Toxics Rule.

[c] Water quality objective is defined in the *Water Quality Control Plan for the San Francisco Bay Basin*, and is dependent on temperature, pH, and salinity.

[d] Promulgated in the National Toxics Rule.

NA = No federal water quality criterion or state water quality objective, applicable to San Pablo Bay, has been promulgated for this constituent. As such, summary statistics are not calculated.

Source: Data compiled by Robertson-Bryan Inc. in 2009

Table 3.6-4
Clean Water Act Section 303(d) Listings for San Pablo Bay and TMDL Schedule

Constituent/ Stressor	Potential Sources	TMDL End Date[a]
Metals		
Mercury	Municipal point sources, resource extraction, atmospheric deposition, natural sources, nonpoint source	EPA approved 2008
Nickel	Unknown	[b]
Selenium	Industrial point sources, agriculture, natural sources, exotic species	In progress
Pesticides		
DDT	Nonpoint source	2008, estimated
Chlordane	Nonpoint source	2008, estimated
Dieldrin	Nonpoint source	2008, estimated
Other		
Dioxin compounds	Atmospheric deposition	2019
Furan compounds	Atmospheric deposition	2019
PCBs	Unknown nonpoint source	EPA approval pending
PCBs (dioxin-like)	Unknown nonpoint source	EPA approval pending
Exotic species	Ballast water	2019

Notes: DDT = dichlorodiphenyltrichloroethane; EPA = U.S. Environmental Protection Agency; PCB = polychlorinated biphenyl; TMDL = total maximum daily load

[a] Estimated TMDL end dates are based on the CWA Section 303(d) list approved by EPA on June 28, 2007.

[b] Since EPA approved the 2006 303(d) list in 2007, nickel has been recommended for delisting.

Source: Data compiled by Robertson-Bryan Inc. in 2009

Existing Effluent Quality

Effluent discharges to San Pablo Bay from the Pinole-Hercules WPCP are regulated by the San Francisco Bay Regional Water Quality Control Board (RWQCB) under a National Pollutant Discharge Elimination System Permit (NPDES) permit. The NPDES permit regulates the allowable concentrations and loadings of constituents that have the potential to affect beneficial uses of the receiving water. These regulated constituents, and the reason for their inclusion in the NPDES permit, are shown in Table 3.6-5.

Table 3.6-6 includes summary data for October 2003 to May 2008 about these constituents that have been monitored in effluent from the Pinole-Hercules WPCP. The table compares these constituents to effluent limitations specified in the NPDES permit for the Pinole-Hercules WPCP (Order No. R2-2007-0024) and the mercury watershed permit for the plant (Order No. R2-2007-0077). The final effluent from the Pinole-Hercules WPCP is generally in compliance with the NPDES-permitted effluent limitations set to protect ambient water quality and minimize total loads to San Pablo Bay. No dichlorodiphenyltrichloroethane (DDT) and DDT derivatives, chlordane, dieldrin, and PCBs have been detected in the effluent from the Pinole-Hercules WPCP.

Table 3.6-5
Constituents Regulated by the NPDES Permit for the Pinole-Hercules WPCP

Constituent	Reason for Inclusion in NPDES Permit
Conventionals	
Ammonia	Projected reasonable potential to cause exceedance of water quality criterion
CBOD	Secondary treatment effluent limitation for Clean Water Act compliance
Chlorine residual	Water quality–based effluent limitation for Basin Plan compliance
Oil and grease	Water quality–based effluent limitation for Basin Plan compliance
pH	Secondary treatment effluent limitation for Clean Water Act compliance
Total coliform	Water quality–based effluent limitation for Basin Plan compliance
TSS	Secondary treatment effluent limitation for Clean Water Act compliance
Metals	
Copper	Water quality–based effluent limitation for Basin Plan compliance
Mercury	Water quality–based effluent limitation for Basin Plan compliance/303(d) list for San Pablo Bay
Nickel	Included in the Clean Water Act Section 303(d) list for San Pablo Bay
Selenium	Included in the Clean Water Act Section 303(d) list for San Pablo Bay
Pesticides	
4,4'-DDT	Included in the Clean Water Act Section 303(d) list for San Pablo Bay
4,4'-DDE	DDE is a breakdown product of DDT
4,4'-DDD	DDD is a breakdown product of DDT
Chlordane	Included in the Clean Water Act Section 303(d) list for San Pablo Bay
Dieldrin	Included in the Clean Water Act Section 303(d) list for San Pablo Bay
Other	
Cyanide	Water quality–based effluent limitation for Basin Plan compliance
Dioxin/furan compounds	Included in the Clean Water Act Section 303(d) list for San Pablo Bay

Notes: Basin Plan = *Water Quality Control Plan for the San Francisco Bay Basin*; CBOD = carbonaceous biochemical oxygen demand; DDD = dichlorodiphenyldichloroethane; DDE = dichlorodiphenyldichloroethylene; DDT = dichlorodiphenyltrichloroethane; NPDES = National Pollutant Discharge Elimination System; TSS = total suspended solids
Source: Data compiled by Robertson-Bryan Inc. in 2009

Table 3.6-6
Summary of Constituents Monitored in the Pinole-Hercules WPCP Final Effluent (2003–2008)
Compared to Effluent Limitations Specified in its NPDES Permit and Mercury Watershed Permit

Constituent	Units	# of samples	Percent detected	Measured Concentration (Mean) [a]	Maximum Detected Value	Effluent Limitations			Probability of Compliance
						Maximum Daily	Weekly Average	Monthly Average [b]	
Conventionals									
Ammonia (as N)	mg/l	28	100%	8.04	21.6	NA	NA	NA	NA
CBOD [c]	mg/l	642	100%	11.9	33	NA	40	25	96%
Oil and grease	mg/l	109	38%	2.06	6	20	NA	10	100%
Total coliform [d]	MPN/100 ml	–	–	25.3	>1,600	10,000 [e]	240 [f]	NA	100%
TSS [c]	mg/l	1,222	100%	18.8	274	NA	45	30	92%
Metals									
Copper, total	µg/l	56	100%	7.0	15	37	NA	20	100%
Mercury, total	µg/l	56	100%	0.0102	0.042	NA	0.072	0.066	100%
Nickel, total	µg/l	20	100%	5.6	9.1	NA	NA	NA	NA
Selenium, total	µg/l	21	86%	1.16	4	NA	NA	NA	NA
Zinc, total	µg/l	20	100%	36.8	57	NA	NA	NA	NA
Pesticides									
4,4'-DDT	µg/l	8	0%	ND	ND	NA	NA	NA	NA
4,4'-DDE	µg/l	7	0%	ND	ND	NA	NA	NA	NA
4,4'-DDD	µg/l	8	0%	ND	ND	NA	NA	NA	NA
Chlordane	µg/l	8	0%	ND	ND	NA	NA	NA	NA
Dieldrin	µg/l	8	0 %	ND	ND	NA	NA	NA	NA
Other									
Cyanide	µg/l	64	81%	3.5	11	43	NA	20	100%
Dioxin congeners	pg/l	4	25%	0.013	0.050	0.028	NA	0.014 [g]	75%
PCBs	µg/l	8	0%	ND	ND	NA	NA	NA	NA

Notes: CBOD = carbonaceous biochemical oxygen demand; DDD = dichlorodiphenyldichloroethane; DDE = dichlorodiphenyldichloroethylene; DDT = dichlorodiphenyltrichloroethane; µg/l = micrograms per liter; mg/l = milligrams per liter; MPN/100 ml = most probable number per 100 milliliters; NA = not applicable and/or no effluent limit prescribed; ND = not detected; NPDES = National Pollutant Discharge Elimination System; PCB = polychlorinated biphenyl; TSS = total suspended solids

– = Data not available.

a Mean is calculated by fitting nondetect values to regression of detected values.

b Where two effluent limitations are given, the most stringent is applied.

c In addition to the effluent limitations given, the arithmetic mean of the CBOD and TSS values, by concentration, for effluent samples collected during a calendar month shall not exceed 15% of the arithmetic mean of the respective values for influent samples collected during the same calendar month.

d Total coliform data reported in NPDES permit (CA0037796; Order No. R2-2007-0024) for January 2002 through December 2005.

e Effluent limitation for total coliform bacteria as an instantaneous maximum value in effluent.

f Effluent limitation for total coliform bacteria as a moving median value in any five consecutive effluent samples.

g Average concentration of dioxin congeners based on detected congeners only.

Source: Data compiled by Robertson-Bryan Inc. in 2009

3.6.2 Regulatory Framework

Federal Plans, Policies, Regulations, and Laws

Federal Emergency Management Agency—National Flood Insurance Program

The Federal Emergency Management Agency (FEMA) administers the National Flood Insurance Program (NFIP) for municipal urbanized areas. FEMA administers the NFIP through the Federal Insurance Administration and produces flood insurance rate maps for communities. The NFIP has adopted, as a desired level of protection, an expectation that developments should be protected from floodwater damage from a flood that has an average frequency of occurrence of once in 100 years, although such a flood may occur in any given year. Participants in the NFIP must satisfy certain mandated floodplain management criteria. Cities are required to adhere to floodplain management policies that represent sound land use practices.

Clean Water Act and Associated Programs

The federal CWA establishes the basic structure for regulating discharges of pollutants to navigable waters within the United States. The law authorizes EPA to set point-source effluent limitations for industry and publicly owned treatment works and requires states (or EPA in the event of a state default) to set water quality standards for contaminants in surface waters. The CWA authorizes EPA to delegate many permitting, administrative, and enforcement aspects of the law to states. In such cases, EPA still retains oversight responsibilities. California administers the CWA through the SWRCB and its nine RWQCBs. Central San Francisco Bay and San Pablo Bay are located within the jurisdiction of the San Francisco Bay RWQCB (Region 2). The NPDES permit program and the requirement to develop TMDLs for impaired water bodies are particularly relevant to wastewater generated by the cities of Pinole and Hercules. These programs are discussed below.

NPDES Permit Program

The CWA requires wastewater dischargers to obtain a permit that establishes effluent limitations and specifies monitoring and reporting requirements. The NPDES program regulates the discharge of waste to waters of the United States and requires wastewater dischargers to regulate nondomestic waste discharged to sewers through activities such as pretreatment programs and/or sewer use ordinances. NPDES permits include the following terms and conditions:

- effluent discharge limitations,
- prohibitions,
- receiving water limitations,
- compliance monitoring and reporting requirements, and
- other special study or compliance provisions.

Sections 401 and 404 of the Clean Water Act

Waters of the United States, including wetlands, are subject to U.S. Army Corps of Engineers jurisdiction under Section 404 of the CWA. Section 404 regulates the filling and dredging of waters of the United States. A Section 404 permit is required for activities involving excavation of, or placement of fill material into, waters of the United States or adjacent wetlands. In addition, a water quality certification (or waiver) pursuant to Section 401 of the CWA is required for Section 404 permit actions. The San Francisco Bay RWQCB administers the water quality certification process.

Section 303(d) Impaired Waters List

Section 303(d) of the CWA requires states to develop lists of water bodies (or sections of water bodies) that do not meet water quality standards after implementation of minimum required levels of treatment by point-source dischargers (i.e., municipalities and industries). The intent of the 303(d) list is to identify water bodies that require future development of a TMDL to maintain water quality. Section 303(d) requires states to develop a TMDL for each of the listed pollutants and water bodies. The current approved CWA Section 303(d) list (2006) for California identifies Central San Francisco Bay and San Pablo Bay as water quality–impaired for several constituents, discussed previously and identified in Table 3.6-4, above.

National Toxics Rule and California Toxics Rule

In 1992, pursuant to the CWA, EPA promulgated the National Toxics Rule (NTR) to establish numeric criteria for priority toxic pollutants for California. The NTR established water quality standards for 42 pollutants not covered at that time under California's statewide water quality regulations. As a result of a court-ordered revocation of California's statewide water quality control plan for priority pollutants in September 1994, EPA initiated efforts to promulgate additional numeric water quality criteria for California. In May 2000, EPA issued the California Toxics Rule (CTR), which promulgated numeric criteria for priority pollutants. The CTR documentation (Volume 65, page 31682 of the *Federal Register* [65 FR 31682], May 18, 2000) "carried forward" the previously promulgated standards of the NTR, thereby providing a single document listing California's fully adopted and applicable water quality criteria for 126 priority pollutants.

Federal Antidegradation Policy

The federal antidegradation policy is designed to protect existing water uses and the level of water quality necessary to protect existing uses, and provide protection for higher quality and national water resources. The federal policy directs states to adopt a statewide antidegradation policy that includes the following primary provisions (Title 40, Section 131.12 of the Code of Federal Regulations [40 CFR 131.12]):

1. Existing in-stream water uses and the level of water quality necessary to protect the existing uses shall be maintained and protected.

2. Where the quality of waters exceed levels necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water, that quality shall be maintained and protected unless the State finds, after full satisfaction of the intergovernmental coordination and public participation provisions of the State's continuing planning process, that allowing lower water quality is necessary to accommodate important economic or social development in the area in which the waters are located.

3. Where high quality waters constitute an outstanding National Resource, such as waters of National and State parks and wildlife refuges and waters of exceptional recreational or ecological significance, that water quality shall be maintained and protected.

STATE PLANS, POLICIES, REGULATIONS, AND LAWS

Porter-Cologne Water Quality Control Act

Under the Porter-Cologne Act, California must adopt water quality policies, plans, and objectives to ensure that the state's beneficial uses for water are reasonably protected. The law requires the nine RWQCBs to adopt water quality control plans and establish water quality objectives, and authorizes the SWRCB and RWQCBs to issue and enforce permits containing requirements for the discharge of waste to surface waters and land. The water quality standards provisions of the state's water quality control plans (i.e., designation of beneficial uses and adoption of water quality objectives to protect beneficial uses, and adoption of an antidegradation policy) meet the requirements of Section 303 of the federal CWA, which requires the states to adopt water quality standards.

Water Quality Control Plan for the San Francisco Bay

The Basin Plan was originally adopted by the San Francisco Bay RWQCB in 1975 and is amended regularly (San Francisco Bay RWQCB 2007). The Basin Plan contains descriptions of the legal, technical, and programmatic bases for water quality regulation in the region. The Basin Plan describes the beneficial uses of major surface waters and their tributaries and the corresponding water quality objectives required to protect these beneficial uses. The existing beneficial uses that have been identified for Central San Francisco Bay and San Pablo Bay are listed in Table 3.6-7.

Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California

The *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California* (commonly referred to as the Statewide Implementation Plan) applies to discharges of toxic pollutants into California's inland surface waters, enclosed bays, and estuaries. Effective since April 28, 2000, the policy describes methods for setting effluent limitations in NPDES permits for NTR and CTR standards and priority pollutant objectives established in basin plans. The policy also establishes certain monitoring requirements and provisions for controlling chronic toxicity, and includes special provisions for certain types of discharges.

Table 3.6-7
Existing Beneficial Uses of Central San Francisco Bay and San Pablo Bay

Beneficial Use	Description
Ocean, Commercial, and Sport Fishing (COMM)	Uses of water for commercial or recreational collection of fish, shellfish, or other organisms, including organisms for human consumption or bait.
Estuarine Habitat (EST)	Uses of water that support estuarine ecosystems, including preservation or enhancement of habitats, vegetation, fish, shellfish, or wildlife.
Industrial Service Supply (IND)	Uses of water for industrial activities that do not depend primarily on water quality, including cooling water supply, hydraulic conveyance, and fire protection.
Fish Migration (MIGR)	Uses of water that support habitats necessary for migration, acclimatization between freshwater and saltwater, and protection of aquatic organisms that are temporary inhabitants of waters within the region.
Navigation (NAV)	Uses of water for shipping, travel, or other transportation by private, military, or commercial vessels.
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 designated under federal and/or state federal law as rare, threatened, or endangered.
Water Contact Recreation (REC1)	Uses of water for recreational activities involving body contact with water where ingestion of water is reasonably possible.
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.
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.
Fish Spawning (SPWN)	Uses of water that support high-quality aquatic habitats suitable for reproduction and early development of fish.
Wildlife Habitat (WILD)	Uses of water that support wildlife habitats, including the preservation and enhancement of vegetation and prey species used by wildlife, such as waterfowl.

Source: San Francisco Bay RWQCB 2007

Resolution No. 68-16 (Statement of Policy with Respect to Maintaining High Quality Waters in California)

The goal of SWRCB Resolution No. 68-16 is to maintain high-quality waters where they exist in the State. The resolution includes the following statements:

1. Whenever the existing quality of water is better than the quality established in policies as of the date on which such policies become effective, such existing high quality will be maintained until it has been demonstrated to the State that any change will be consistent with maximum benefit to the people of the State, will not unreasonably affect present and anticipated beneficial use of such water, and will not result in water quality less than that prescribed in the policies.

2. Any activity which produces or may produce a waste or increased volume or concentration of waste and which discharges or proposes to discharge to existing high quality waters will be required to meet waste discharge requirements which will result in the best practicable treatment or control of the discharge necessary to assure that (a) a pollution or nuisance will not occur and (b) the highest water quality consistent with maximum benefit to the people of the State will be maintained.

The SWRCB has interpreted Resolution No. 68-16 to be consistent with and incorporate the federal antidegradation policy. The SWRCB's Administrative Policy Update 90-004 provides an implementation plan for both federal and state antidegradation policies for surface waters.

Statewide NPDES General Permit for Construction Activity (Order No. 2009-0009-DWQ)

The SWRCB permits all regulated construction activities under the NPDES General Permit for Storm Water Discharges Associated with Construction Activity (Order No. 2009-0009-DWQ, NPDES No. CAR000002) adopted September 2, 2009. Every construction project that disturbs 1 or more acres of land surface, or that is part of a common plan of development or sale that disturbs more than 1 acre of land surface, requires coverage under this permit. To obtain coverage under the permit, the applicant must submit permit registration documents—a notice of intent and a storm water pollution prevention plan (SWPPP)—and the appropriate permit fee to the SWRCB before the construction activity. The permit specifies minimum construction best management practices (BMPs) for stormwater quality required for projects based on a risk-level determination. Risk-level determinations are based on the sensitivity of the receiving water to sediment and the potential of the project site to contribute to erosion and sediment transport. Because the project area does not discharge to sediment-sensitive water bodies (i.e., neither streams nor watersheds are CWA Section 303(d)–listed as impaired by sediment), the project would not automatically be determined to be a Risk Level 3 project. As such, minimum requirements would not include numeric effluent limits, but may include numeric action limits (Risk Level 2), along with other specific minimum BMPs.

Regional and Local Plans, Policies, Regulations, and Ordinances

San Francisco Estuary Institute Regional Monitoring Program

Water quality conditions throughout the San Francisco Bay are monitored under the RMP. The RMP, a collaborative effort between the San Francisco Estuary Institute, the San Francisco Bay RWQCB, and the regulated discharger community, is an ongoing program that was initiated in 1993. The program monitors contaminant concentrations in water, sediments, and fish and shellfish tissue in San Francisco Bay and the Delta. Water quality monitoring through the RMP is focused on a suite of constituents that reflect known contaminant problems and potential adverse effects on beneficial uses of bay waters. The cities of Pinole and Hercules, and the community of Rodeo, contribute to funding of the RMP, and RMP data are considered to best represent ambient receiving water conditions in San Pablo Bay. The objectives of the program are as follows:

- Describe patterns and trends in contaminant concentration and distribution.
- Describe general sources and loadings of contamination to San Francisco Bay.
- Measure contaminant effects on selected parts of the San Francisco Bay ecosystem.
- Compare monitoring information to relevant water quality objectives and other guidelines.
- Synthesize and distribute information from a range of sources to present a more complete picture of the sources, distribution, fates, and effects of contaminants in the San Francisco Bay ecosystem.

Results of the RMP are assembled in an online database (http://www.sfei.org).

Contra Costa County General Plan

The following goals and policies of the *Contra Costa County General Plan 2005–2020* (Contra Costa County (2005) associated with water resources are applicable to the project.

Public Facilities/Services Element—Drainage and Flood Control

- **Goal 7-O:** To protect and enhance the natural resources associated with creeks and the Delta, and their riparian zones, without jeopardizing the public health, safety, and welfare.
- **Goal 7-P:** To protect creeks and riparian zones identified as valuable from damage caused by nearby development activity.
- **Goal 7-Q:** To employ alternative drainage systems improvements which rely on increased retention capacity to lessen or eliminate the need for structural modifications to watercourses, whenever economically feasible.
    - **Policy 7-45:** On-site water control shall be required of major new developments so that no significant increase in peak flows occur compared 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 expected from the development or the project is implementing an adopted drainage plan.
    - **Policy 7-56:** All residential and non-residential uses proposed in areas of special flood hazards, as shown on FEMA maps, shall conform to the requirements of County Floodplain management applied to all ordinances, approved entitlements (land use permits, tentative, final, and parcel maps, development plan permits, and variances) and ministerial permits (building and grading permits).

Conservation Element

- **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.
- **Goal 8-U:** To maintain the ecology and hydrology of creeks and streams and provide an amenity to the public, while at the same time preventing flooding, erosion and danger to life and property.
- **Goal 8-W:** To employ alternative drainage management system improvements which rely on increased retention capacity to lessen or eliminate the need for structural modifications to watercourses, whenever economically possible.

- **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 8-78:** Where feasible, existing natural waterways shall be protected and preserved in their natural state, and channels which already are modified shall be restored. A natural waterway is defined as a waterway which can support its own environment of vegetation, fowl, fish and reptiles, and which appears natural.

- **Policy 8-79:** Creeks and streams determined to be important and irreplaceable natural resources shall be retained in their natural state whenever possible to maintain water quality, wildlife diversity, aesthetic values, and recreation opportunities.

- **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.

Safety Element

- **Goal 10-G:** To ensure public safety by directing development away from areas which may pose a risk to life from flooding, and to mitigate flood risks to property.

  - **Policy 10-34:** In mainland areas affected by creeks, development within the 100-year floodplain shall be limited until a flood management plan can be adopted, which may include regional and local facilities if needed. The riparian habitat shall be protected by providing a cross section of channel suitable to carry the 100-year flow.

  - **Policy 10-35:** In mainland areas along the rivers and bays affected by water backing up into the watercourse, it shall be demonstrated prior to development that adequate protection exists either through levee protection or change in elevation.

  - **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 the Delta or along the waterfront.

Additionally, Division 914 under Title 9, "Subdivisions of the Contra Costa County Code," lists requirements for on-site and off-site stormwater collection, conveyance of stormwater from a subdivision, and minimum capacities to which the drainage facilities should be designed. For example, the project would involve construction of "minor drainage facilities," as defined under the Contra Costa County (County) Code (i.e., those serving a watershed area less than 1 square mile). Such facilities should have the capacity with sufficient freeboard to contain a 10-year frequency of average recurrence interval runoff. The County Code restricts stormwater disposal into the County's stormwater conveyance facilities and requires protection of natural watercourses.

Contra Costa County Storm Water Management Program

The Contra Costa County Clean Water Program (CCCWP) is a cooperative entity consisting of the County, CCCFCWCD, and 16 incorporated cities. The San Francisco Bay RWQCB issued the municipal stormwater NPDES permit (CAS0029912, revised Order No. R2-2003-022) to the CCCWP, containing requirements to prevent stormwater pollution and to protect and restore creek and wetland habitat. The CCCWP prepared its Stormwater Management Plan in 1999 (CCCWP 1999) which describes its implementation responsibilities under the permit for construction and development control, municipal maintenance, illicit connection controls, public outreach and education, and inspection and monitoring activities. The San Francisco Bay RWQCB recently renewed the Municipal Regional Permit (MRP) on October 14, 2009 (NPDES stormwater permit CAS612008; Order No. R2-2009-0074). The MRP consolidates and updates stormwater pollution prevention requirements for Bay Area municipalities, with most new requirements being phased in through 2012. The permittees are required to impose stringent requirements to control runoff from new development and redevelopment projects within their jurisdictions. Provision C.3 of the permit requires permittees and the County to implement BMPs to reduce pollutants in stormwater discharges to the maximum extent practicable and establishes specific thresholds and criteria. The C.3 requirements are intended not only to reduce short-term construction-related stormwater runoff and resultant pollution but also to reduce the long-term adverse effects of new development and redevelopment projects by requiring permanent runoff-control measures as a part of such projects. The CCCWP's Stormwater C.3 Guidebook, 4th ed. (CCCWP 2008) provides the original implementation program for the C.3 rules, and the CCCWP has released an update to address the new C.3 rules contained in the new MRP (CCCWP 2009).

Pursuant to the Stormwater Management Plan and the Stormwater C.3 Guidebook, the CCCWP requires projects generating stormwater to implement feasible Low Impact Development (LID) treatment and source-control measures, runoff-flow control, and site design/landscape characteristics to maximize infiltration (where appropriate), provide retention or detention, slow runoff, and minimize impervious land coverage, so that postdevelopment pollutant loads from the site are reduced to the maximum extent practicable. Projects that discharge directly to a CWA Section 303(d)–listed water body must implement the control measures addressed in the C.3 provision to the maximum extent practicable to ensure that postproject runoff does not exceed preproject levels for such listed pollutants. In addition, a project sponsor must prepare operation and maintenance plans and execute agreements to ensure that the stormwater treatment devices are maintained in perpetuity. Projects creating and/or replacing at least 10,000 square feet of impervious surface are required to install stormwater treatment systems that are designed and sized to remove pollutants from stormwater runoff. In addition to treating stormwater runoff, projects creating and/or replacing at least 1 acre (43,560 square feet) of impervious surface must also control the volume and rate at which runoff is released so that the project does not increase erosion in the receiving waterways. A key new C.3 provision of the MRP requires permittees to require new development and redevelopment projects to implement infiltration, harvesting and reuse, or evapotranspiration measures to treat runoff where feasible before resorting to biotreatment systems, and requires the permittees to develop criteria by May 1, 2011 for determining the feasibility of such measures.

Under the C.3 requirements, the project sponsor must submit a stormwater control plan in accordance with the CCCWP *Stormwater C.3 Guidebook*. This requirement is in addition to the erosion and sediment control and pollution prevention measures required during construction. The stormwater control plan must identify potential sources of stormwater pollutants in the development and corresponding BMPs for each potential source.

City of Pinole General Plan

The following goals and policies of the *City of Pinole General Plan* (City of Pinole 1995) that address water quality and flooding are applicable to the project.

Open Space Element

- **Goal OS1: Preserve Natural Resources.** Preserve natural resources which provide important habitat, ecological or archeological value, and maintain clean air and water quality.

  - **Policy OS1.7: Water Quality.** Maintain, at a minimum, the water quality levels established by the Environmental Protection Agency (EPA) and achieve the highest possible level of water quality reasonable for an urban environment in City creeks.

Health and Safety Element

- **Goal HS2: Protection from Natural and Man-Made Hazards.** Protect the community from the risk of flood damage and minimize hazards of soil erosion, weak and expansive soils, potentially hazardous soils materials, other hazardous materials, geologic instability and seismic activity.

  - **Policy HS2.8: Flood Hazards.** Assure existing and new structures are designed to protect people and property from the threat of potential flooding. New development shall be designed to provide protection from potential impacts of flooding during the "1% chance" or "100-year" flood.

  - **Policy HS2.10: Erosion.** Provide appropriate control measures in conjunction with proposed development in areas susceptible to erosion.

Hercules General Plan

The following performance standard and policy in the *Hercules General Plan* (City of Hercules 1998) intended to protect people and development from flooding are applicable to the project.

Growth Management Element

- **Performance Standard III.E.7: Flood Control.** All new structures shall be located outside the Flood Zones A and B as designated by the Flood Insurance Rate Maps; or insure that the finished floor elevation is at least one foot above the flood elevation as determined by FEMA. Development of any property shall not significantly increase the flooding potential at downstream areas, or otherwise significantly impact or aggravate a flooding problem at downstream properties.

3.6.3 ENVIRONMENTAL IMPACTS

THRESHOLDS OF SIGNIFICANCE

The thresholds for determining the significance of impacts for this analysis are based on the environmental checklist in Appendix G of the State CEQA Guidelines. The project was determined to result in a significant impact related to hydrology and water quality if it would do any of the following:

- 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 that would reduce the production rate of preexisting nearby wells to levels that would no longer support existing land uses or planned uses for which permits have been granted;

- 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 that would result in increased frequency and magnitude of flooding that would pose significant risks to human life or property;

- place within a 100-year flood hazard area structures that would impede or redirect flood flows;

- 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;

- create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff;

- substantially alter the existing drainage pattern of the site or area, including through alteration of the course of a stream or river, in a manner that would result in substantial erosion or siltation on- or off-site;
- increase levels of any priority pollutant or other water quality parameter in a water body, such that the water body would be expected to exceed state or federal numeric or narrative water quality criteria, or other relevant effect thresholds identified for this assessment, by frequency, magnitude, and geographic extent that would result in adverse effects to one or more beneficial uses;
- result in substantial, permanent degradation of existing water quality that would cause adverse effects to one or more beneficial use of a water body; or
- result in inundation by seiche, tsunami, or mudflow.

ANALYSIS METHODOLOGY

This impact assessment evaluates the effects of the project on groundwater, drainage, flooding, and water quality from construction and operation of the project components. The methodology for assessing each type of potential impact is described below.

Groundwater Impacts

The project components are not located in a groundwater basin designated by DWR (2003). The project does not involve the construction or removal of any groundwater wells, or the use of additional groundwater, nor would it change existing groundwater uses. As such, impacts of the project on groundwater have been evaluated qualitatively.

Drainage and Flooding Impacts

The assessment of potential drainage and flooding impacts was conducted considering the existing stormwater drainage and FEMA flood maps. The incremental increase in runoff that would result from the project was qualitatively compared to existing runoff from the site to determine the degree to which the increased discharge would affect drainage and flooding.

Construction-Related Water Quality Impacts

Water quality impacts associated with temporary construction activities were assessed in a qualitative manner. The potential short-term construction-related effects of grading and land disturbance were assessed based on the probability of seasonal exposure to rainfall and runoff, routes of exposure for contaminants to enter surface water, and the magnitude and duration of construction relative to the potential water quality parameters expected to be affected by the activity.

Operational Water Quality Impacts

For this EIR, a project-specific impact assessment methodology was developed to assess the key question of whether potential changes to the wet-weather effluent discharge at Outfall 001 (i.e., either effluent quantity or quality) would result in downstream water quality changes of sufficient magnitude, frequency, and geographic extent to cause significant adverse impacts to the beneficial uses of San Pablo Bay. Appropriately addressing this question is complex, because water quality effects involve numerous constituents of interest (many having adopted water quality standards and some without standards), multiple beneficial uses of San Pablo Bay waters that could be affected by changes in water quality, and numerous locations of interest throughout San Pablo Bay downstream from the outfall diffuser.

Under Option 1, a new parallel force main to carry the increased wet-weather flow would be constructed to RSD. Wet-weather discharges from the deepwater Outfall 001 would increase from the current maximum of 12.8 million gallons per day (mgd) to a maximum of 17.09 mgd on an average day basis. The total 17.09-mgd discharge would consist of the entire 14.59-mgd wet-weather capacity of the upgraded Pinole-Hercules WPCP, and the existing discharge of 2.5 mgd from RSD (which would not change from existing conditions).

The dilution achieved at Outfall 001 was evaluated using the EPA-approved near-field mixing zone model CORMIX (Appendix F), which is suitable for environmental impact assessment of regulatory mixing zones resulting from continuous point-source discharges. CORMIX Version 5.0GT was applied in this case, including HYDRO2: Version 5.0.2.0 (produced in October 2008), and the discharge was modeled under flow conditions and the diffuser modification proposed for Option 1. The CORMIX modeling was used to determine that the dilution ratio (i.e., receiving water:effluent discharge) in the initial zone of mixing of the effluent and receiving water would decrease from 42:1 under existing conditions to 32:1 under Option 1. The current combined dry-weather effluent discharge rate at Outfall 001 of 5.20 mgd (4.06 mgd from the Pinole-Hercules WPCP and 1.14 mgd from RSD) would not be changed.

Under Option 2, only the City of Pinole flows would be treated at the existing plant. Thus, the future scenario for Option 2 assumes a combined maximum wet-weather discharge rate at Outfall 001 of 12.8 mgd on an average daily basis (10.3 mgd from the Pinole-only effluent and 2.5 mgd from the RSD effluent). This is equivalent to the current combined permitted wet-weather discharge capacity of the two plants at the deepwater Outfall 001. Therefore, the dilution ratio in the initial zone of mixing at Outfall 001 under Option 2 would remain unchanged from existing conditions at 42:1. Under Option 2, the dry-weather effluent discharge would decrease from the current 5.20 mgd to 2.89 mgd. Because the potential constituent discharges under dry-weather conditions would be reduced relative to existing conditions, the related effects of dry-weather discharges on water quality would also be reduced. Therefore, these water quality effects are not evaluated further in this assessment.

Discharge conditions, dilution ratios, and characteristics of the initial zone of mixing for Option 1 and Option 2 are summarized in Table 3.6-8.

Table 3.6-8
Projected Flows and Dilution for Combined Effluent for Option 1 and Option 2

		Option 1		Option 2	
	Units	Wet Weather	Dry Weather	Wet Weather	Dry Weather
Wet-weather Outfall 001 discharge rate	mgd	17.09	5.2	12.8	2.89
Dilution ratio (receiving water:effluent)	NA	32:1	278:1	42:1	502:1
Area of initial zone of mixing	Acres	0.9	0.5	0.8	0.5
Volume of initial zone of mixing	Acre-feet	15	8	13	8

Notes: mgd = million gallons per day; NA = not applicable
Source: Data compiled by Robertson-Bryan Inc. in 2009

The assessment of potential water quality effects resulting from project discharges to San Pablo Bay at the deepwater Outfall 001 addressed the changes to effluent quality expected to occur upon completion of the treatment improvements. All constituents that have been monitored at the Pinole-Hercules WPCP, based on data collected from January 2003 through May 2008, and available data collected for RSD for February 2001 through March 2006, were evaluated in determining constituents to be assessed. Outfall 001 is currently used to discharge the combined effluent from RSD as well as the effluent from the Pinole-Hercules WPCP. Therefore, the quality of the effluent discharged at Outfall 001 was calculated from a mass balance of the flow and constituent concentrations of each plant's effluent. Combined effluent quality was determined for Option 1 and Option 2 from the mass balance of the flows described in Table 3.6-8 and effluent constituent concentrations. For Option 1, acute wet-weather values are the maximum projected combined-effluent concentrations from the Pinole-Hercules WPCP and the RSD effluent data for the wet-weather months of January–May. Option 1 chronic values are the average projected combined-effluent concentrations from monitoring data for all months of the year.

For Option 2, the projected Pinole-only effluent quality was calculated by applying the average plant removal efficiency, based on 2003–2009 data, to Pinole-only influent data collected in 2006–2009. Option 2 acute wet-weather values are the maximum projected combined-effluent concentrations from calculated Pinole-only effluent and RSD effluent data. Option 2 chronic values are the average projected combined-effluent concentrations from calculated Pinole-only effluent and RSD effluent data. Constituents present in RSD effluent were considered in the assessment of projected effluent quality under Option 2, if treating only the city of Pinole wastewater would decrease dilution of a constituent enough for effluent concentrations to increase and exceed an applicable water quality criterion. In some instances, projected chronic (average) effluent concentrations are greater than projected acute (maximum) concentrations because the entire data set was used to calculate the chronic values and the acute (maximum) value was determined using only data collected from January through May. This approach accurately reflects maximum measured wet-weather concentrations at the Pinole-Hercules WPCP and RSD that are lower than concentrations during dry-weather periods, presumably as a result of dilution from high inflows. The approach conservatively considers the potential for higher long-term average concentrations when wet-weather flows, and the associated dilution from inflows, are not present.

Table 3.6-9 summarizes the projection (using the mass-balance procedure) of the concentrations of constituents in the combined effluent that would be discharged from the deepwater Outfall 001 under Option 1 (Pinole-Hercules WPCP/RSD effluent) and Option 2 (Pinole-only/RSD effluent). Table 3.6-9 also shows the results of the mass-balance assessment for constituents detected in the Pinole-Hercules WPCP or RSD effluent and considered for further analysis as potential constituents of concern. Constituents were determined to be potential constituents of concern and were carried forward for impact assessment if:

- the projected effluent concentrations under Option 1 or Option 2 would exceed an applicable objective/criterion;
- the constituent bioaccumulates in the tissues of aquatic organisms, and thus could potentially accumulate in tissues at any water concentration; or
- the constituent is CWA Section 303(d)–listed for San Pablo Bay.

Table 3.6-9
Projected Constituent Concentrations in Combined Effluent under Options 1 and 2 and Applicable Water Quality Objectives

Constituent	Units	Combined Effluent Concentrations				Applicable Receiving Water Quality Criterion		
		Option 1		Option 2		Aquatic Life		Human Health [e]
		Max. (Acute)[a]	Mean (Chronic)[b]	Max. (Acute)[a]	Mean (Chronic)[b]	Acute [c]	Chronic [d]	
Conventionals								
Ammonia (as N)	mg/l	18.7	8.3	6.6	9.5	5.67 [f]	1.49 [f]	NA
CBOD[g]	mg/l	32	11	15	18	40 [h]	25 [i]	NA
Oil and grease	mg/l	5.1	2.2	1.6	2.4	20 [j]	10 [i]	NA
pH	Std. Units	6.0–9.0 [k]	NA	6.0–9.0 [k]	NA	6.0–9.0	NA	NA
Total coliform	MPN/100 ml	>1,600	29	>1,600	31	NA	NA	70 [l]
TSS[f]	mg/l	72	17	43	25	45 [h]	30 [i]	NA

Table 3.6-9
Projected Constituent Concentrations in Combined Effluent under Options 1 and 2 and Applicable Water Quality Objectives

Constituent	Units	Combined Effluent Concentrations				Applicable Receiving Water Quality Criterion		
		Option 1		Option 2		Aquatic Life		Human Health [e]
		Max. (Acute)[a]	Mean (Chronic)[b]	Max. (Acute) [a]	Mean (Chronic) [b]	Acute [c]	Chronic [d]	
Metals								
Copper, total	μg/l	8.6	6.4	5.2	13.3	9.4 [m]	6.0 [m]	NA
Mercury, total	μg/l	0.0188	0.0095	0.0039	0.00026	2.1 [n]	0.025 [n]; 0.03 mg/kg [o]	0.051; 0.2 mg/kg [p]
Nickel, total	μg/l	7.5	5.2	1.8	3.1	62.4 [i]	11.9 [i]	4,600
Selenium, total	μg/l	2.1	1.1	0.47	1.0	20 [q]	5 [q]	NA
Other								
Cyanide	μg/l	6.2	3.4	1.6	2.9	9.4 [m]	2.9 [m]	220,000
Dioxins (total)	mg/l TEQ	0.043	0.011	0.040	0.010	NA	NA	0.014

Notes: μg/l = micrograms per liter; CBOD = carbonaceous biochemical oxygen demand; mg/kg = milligrams per kilogram; mg/l = milligrams per liter; MPN/100 ml = most probable number per 100 milliliters; NA = not applicable; TEQ = sum of dioxin congeners converted to toxic equivalent values with *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California* (SWRCB 2005); TSS = total suspended solids.

[a] Projected maximum effluent concentration based on measured data from wet-weather discharge months of January–May for years 2003–2008.

[b] Projected mean effluent concentration based on all measured data collected through the year. Mean is calculated by fitting nondetect values to regression of detected values.

[c] Acute criterion based on maximum concentration over a short averaging period (e.g., 1 hour), unless otherwise noted.

[d] Chronic criterion based on continuous concentration over a longer averaging period (e.g., 4 days), unless otherwise noted.

[e] California Toxics Rule criterion for protection of human health from consumption of organisms based on allowable continuous concentration over a long-term average period, unless otherwise noted.

[f] Basin Plan objective dependent on salinity, temperature, and pH.

[g] In addition to the effluent limitations given, the arithmetic mean of the CBOD and TSS values, by concentration, for effluent samples collected during a calendar month shall not exceed 15% of the arithmetic mean of the respective values for influent samples collected during the same calendar month.

[h] Average weekly effluent limitation in the National Pollutant Discharge Elimination System (NPDES) permits based on the *Water Quality Control Plan for the San Francisco Bay Basin* (Basin Plan) policy.

[i] Average monthly effluent limitation in the NPDES permits based on the San Francisco Bay RWQCB's interpretation of discharge concentrations considered protective of narrative Basin Plan objectives, and associated policy for wastewater effluent limitations identified in Basin Plan Table 4-2.

[j] Maximum daily effluent limitation in the NPDES permits based on the Basin Plan policy described above.

[k] NPDES effluent limitations restrict effluent pH to between 6.0 and 9.0, and pH is a factor directly controlled through treatment processes and chemical addition. Therefore, projected effluent pH set equal to minimum and maximum measured values in Pinole-Hercules Water Pollution Control Plant and Rodeo Sanitary District wastewater treatment plant data.

[l] Basin Plan objective for protection of shellfish harvesting based on median continuous concentration.

[m] Site-specific objective established in Basin Plan by the San Francisco Bay Regional Water Quality Control Board (RWQCB) for San Pablo Bay.

[n] Basin Plan objective.

[o] Fish tissue objective established in mercury total maximum daily load (TMDL) for San Francisco by the San Francisco Bay RWQCB for San Pablo Bay based on average wet-weight concentration measured in whole fish 3–5 centimeters in length.

[p] Fish tissue objective established in mercury TMDL for San Francisco by the San Francisco Bay RWQCB for San Pablo Bay based on average wet-weight concentration measured in the edible portion of trophic level 3 and trophic level 4 fish.

[q] Basin Plan objectives established based on criteria in the National Toxics Rule.

Source: Data compiled by Robertson-Bryan Inc. in 2009

Applicable Water Quality Objectives/Criteria

It is important to provide definitions for the terms "standards," "numerical and narrative Basin Plan water quality objectives," "CTR criteria," and "U.S. EPA recommended criteria" as they relate to this assessment. As defined by U.S. EPA, water quality standards consist of: 1) the designated uses of a water segment, 2) the water quality criteria (referred to as "objectives" by the State) necessary to support those uses, and 3) an antidegradation policy that protects existing uses and high water quality. The Basin Plan identifies numeric and narrative water quality objectives, together with the beneficial uses assigned to water bodies and the State antidegradation policy. As such, the Basin Plan contains some of the water quality standards for the region's water bodies. Basin Plan objectives are required to go through the standards setting process, which includes public participation and State and federal agency review and approval. Consequently, Basin Plan objectives are legally applicable and enforceable. Through an EPA-lead water quality standards setting process, the CTR promulgated numeric water quality criteria for priority toxic pollutants for California. Hence, the CTR criteria, together with the beneficial uses assigned to water bodies and the State antidegradation policy, constitute additional regional water quality standards (beyond those specified in the Basin Plan and other statewide or regional water quality control plans). Finally, the U.S. EPA periodically recommends ambient water quality criteria to States for their consideration in adopting State standards. As stated by U.S. EPA, "U.S. EPA recommended criteria" (also referred to as 304(a)(1) criteria) *"…are not regulations, and do not impose legally binding requirements on EPA, States, tribes or the public."* Therefore, in this document, such U.S. EPA recommended criteria and other non-enforceable numeric values are referred to as "advisory" to distinguish them from adopted objectives/criteria.

For the purpose of assessing impacts to aquatic life uses, the maximum effluent concentration for a given constituent was compared to the most stringent applicable chronic aquatic life objective/criterion, or other relevant effect threshold (e.g., EPA recommended criterion) if no adopted objectives/criteria exist for the constituent, or if adopted objectives/criteria do not provide the most scientifically relevant effect threshold for assessment purposes. If the maximum effluent concentration was below the most stringent chronic criterion, no further assessment was performed. Conversely, if the maximum effluent concentration exceeded the most stringent chronic criterion, a detailed scientific assessment that considered dilution, organisms exposed, exposure durations, and constituent-specific toxicity characteristics was performed and findings compared to thresholds of significance for making CEQA impact determinations. Similarly, in assessing effects on beneficial uses affecting human health, the average effluent concentration was compared to the applicable human health objective, and the same basic assessment approach outlined above (for the aquatic life uses) was implemented.

Endocrine disrupting compounds (EDC) and nutrients are of concern for San Pablo Bay, because they may be present in wastewater discharges at levels that could be associated with effects that are regulated in the Basin Plan with narrative objectives; hence, these constituents are evaluated further.

Consideration of Mixing Zone

The U.S. EPA allows water quality criteria to be exceeded in areas of initial effluent mixing near outfalls (i.e., in "mixing zones"), as long as specified conditions are met. The Regional Water Board has discretion to allow mixing zone based on a discharge-specific determination. The SIP allows for mixing zones, consistent with the U.S. EPA guidance, as long as the mixing zone allowance does not:

1. compromise the integrity of the entire water body;
2. cause acutely toxic conditions to aquatic life passing through the mixing zone;
3. restrict the passage of aquatic life;
4. adversely impact biologically sensitive or critical habitats, including, but not limited to, habitat of species listed under federal or State endangered species laws;

5. produce undesirable or nuisance aquatic life;
6. result in floating debris, oil, or scum;
7. produce objectionable color, odor, taste, or turbidity;
8. cause objectionable bottom deposits;
9. cause nuisance;
10. dominate the receiving water body; or
11. overlap a mixing zone from different outfalls; or be allowed at or near any drinking water intake.

Potential water quality impacts resulting from the exceedance of an applicable objective/criterion, or another relevant effect threshold, in the initial zone of mixing near Outfall 001 were evaluated by comparing constituent concentrations under the project conditions to existing conditions. Dilution of effluent discharged from Outfall 001, mixing characteristics of the plume near the outfall, organisms exposed, exposure durations, and constituent-specific toxicity characteristics were considered in determining whether any exceedance of an applicable objective/criterion, or another relevant effect threshold, in the initial zone of mixing would adversely affect one or more beneficial use of San Pablo Bay, thereby producing substantial scientific evidence upon which to base impact determinations.

The initial zone of mixing is defined as the area where effluent initially mixes with, and is diluted by, San Pablo Bay water as a result of the high discharge velocities from the diffuser ports in combination with tidal flow. Constituent concentrations within the initial zone of mixing were calculated from a mass balance of the background receiving water concentration at Davis Point (i.e., the closest RMP monitoring location; Table 3.6-1) and the projected combined effluent concentration (Table 3.6-9) using the applicable dilution ratio determined from the CORMIX modeling (Table 3.6-8).

Potential water quality impacts in the greater San Pablo Bay beyond the initial zone of mixing (i.e., in the far field) were assessed using existing data in conjunction with a water quality mathematical model. A two-dimensional hydrodynamic model developed by Resource Management Associates (RMA) was used to simulate the effects of the project discharges to San Pablo Bay and the estuary system. The RMA model extends from the Golden Gate Bridge to tributaries of the Delta to fully capture inputs to and outputs from San Pablo Bay. Historical tide data from the National Oceanic and Atmospheric Administration and the DWR flow data for 2000–2006 were evaluated to determine critical Net Delta Outflow (NDO) conditions. The "moderate" NDO regime was determined to have the largest effect on dispersion of discharges from Outfall 001. The moderate NDO regime reflects the 50th percentile NDO, which occurred between April 8 and May 16, 2002. During 2000–2006, the 29-day running-average NDO was lower than this period approximately 50% of the time. The RMA model was used to determine the percentage of combined effluent from the Pinole-Hercules WPCP and RSD that would occur at a given location in San Pablo Bay. These percentage effluent results were then used to predict incremental changes in concentrations of constituents of concern in receiving water.

The CEQA significance of anticipated water quality effects were determined based on how water quality changes would degrade water quality and affect beneficial uses, and comparing such findings to the thresholds of significance as the basis for making impact determinations. The anticipated water quality effects were based on an evaluation of the project-related water quality changes caused by the effluent discharge at Outfall 001 compared to the existing conditions. The elimination of the existing wet weather effluent discharges from Outfall 002 was considered under both Option 1 and Option 2. Under Option 1, the project-related increase in wet-weather discharge of chemical constituents from Outfall 001 and associated changes in constituent concentrations within the initial zone of mixing and the incremental increase in the size of the mixing zone needed to meet applicable objectives/criteria were evaluated. Under Option 2, the effluent discharge rate at Outfall 001 would not change; however, the incremental project-related changes in effluent quality were evaluated, which could change the constituent concentrations within the initial zone of mixing and the size of the mixing zone for certain constituents. Under both Option 1 and Option 2, the incremental changes in water quality in the initial zone of mixing, and in the far-field, were evaluated by comparing the resultant receiving-water constituent concentrations to appropriate water quality objectives/criteria or other relevant effect thresholds, as necessary. If the project-related effect on water quality did not result in any exceedance of applicable water quality objectives/criteria or other relevant effect thresholds, then the constituent concentration or level in the receiving water was found to not adversely affect beneficial uses. In the event that project-related effects on water quality near Outfall 001 resulted in higher constituent concentrations within portions of the initial zone of mixing and/or the geographic extent of constituent-specific mixing zones increased in size, then this condition was assessed for its potential to adversely affect beneficial uses based on receptor exposure and the effects of such exposure. In addition, if water quality objectives/criteria would always be met, yet water quality would be degraded somewhat relative to existing conditions, the relative degree of water quality degradation that would occur under the project also was assessed for effects on beneficial uses.

Issues Not Discussed Further in this EIR

The current combined dry-weather effluent discharge rate at Outfall 001 of 5.20 mgd (4.06 mgd from the Pinole-Hercules WPCP and 1.14 mgd from RSD) would not be changed. Because the quantity and quality of effluent under dry-weather conditions would be the same as or better than those under existing conditions as a result of the proposed Pinole-Hercules WPCP improvements, the water quality effects of dry-weather discharges under the project would be similar or improved. Therefore, the effects of project operations on water quality associated with dry-weather effluent discharges are not evaluated further in this EIR.

As discussed above, Table 3.6-9 summarizes the projected (using the mass-balance procedure) concentrations of constituents in the combined effluent that would be discharged from the deepwater Outfall 001 under Option 1 (Pinole-Hercules WPCP/RSD effluent) and Option 2 (Pinole-only/RSD effluent). Where levels of a constituent detected in the Pinole-Hercules WPCP or RSD consistently complied with applicable water quality objectives/criteria that are considered protective of beneficial uses, and the constituent is not known to be accumulated or transformed through the aquatic foodchain, the project's effluent discharges were determined to not adversely affect water quality or beneficial uses, and the constituent was not evaluated further.

Nickel and pH were not assessed further because they are not bioaccumulative and there would be no potential for exceedance of applicable water quality criteria. In addition, nickel has been proposed for removal from the CWA Section 303(d) list based on the recent adoption of site-specific objectives for San Francisco Bay. Resulting nickel and pH levels under Option 1 and Option 2 would not differ substantially from levels under existing conditions; thus, receiving water quality affected by the effluent discharges would not be substantially degraded for these constituents.

IMPACT ANALYSIS

IMPACT 3.6-1	Long-Term Operational Impacts on Hydrology and Drainage. *Option 1 includes the relocation and construction of a new corporation yard, which would create new paved impervious surfaces that would increase the amount of stormwater runoff within the city of Pinole. Additional stormwater runoff may contribute to localized drainage-related problems such as erosion, damage to stormwater drainage facilities or ditches and natural swales from increased runoff rates, or localized inundation of property and structures from increased drainage volumes.*

Option 1: New Larger Effluent Pipeline to RSD

Under Option 1, the corporation yard would be relocated to Pinole Shores Drive, between the Union Pacific Railroad tracks and San Pablo Avenue. Construction of new facilities for the corporation yard would include new paved areas and other impervious surfaces. Construction of impervious surfaces would reduce groundwater infiltration during rain events and could increase stormwater runoff rates or volumes from the site to adjacent lands and water bodies. Construction activities at the Pinole-Hercules WPCP site are not expected to have any effect on drainage because the improvements are not expected to add substantial amounts of impervious cover. Moreover, a storm drain system is already in place at the plant that routes stormwater runoff to the headworks, where stormwater passes through the plant’s treatment systems and is discharged to San Pablo Bay from the existing outfall. Installation of the pipeline would not result in construction of any new impervious surfaces.

Additional impervious surface associated with the new corporation yard would reduce the existing localized recharge of precipitation to groundwater that occurs through the soil. However, the area of additional pavement would be small (approximately 4 acres). Furthermore, the project would not require construction of any wells or use of groundwater, and shallow trenches dug during pipeline construction would not be expected to substantially intercept or alter groundwater flow. Additionally, as noted above in Section 3.6.1, “Environmental Setting,” and “Analysis Methodology,” the area is not known to have an important groundwater supply. Therefore, the project is not expected to have any measurable effect on groundwater hydrology.

According to County Title 9 (Section 911-2.010), for a site area less than 1 square mile (640 acres), a 10-year design storm should be used to evaluate a site’s stormwater drainage. Consequently, the project-related change in stormwater runoff was calculated for a 10-year 24-hour storm at the site proposed for the relocated corporation yard. Using the Rational Method employed by CCCFCWCD, runoff from the site is expected to increase from 0.09 cubic feet per second (cfs) to 0.15 cfs, resulting in an increase of 0.06 cfs. No City of Pinole (City) stormwater conveyance facilities that serve the immediate area are located near the site proposed for the corporation yard.

Additional stormwater runoff can contribute to localized drainage-related problems such as erosion, damage to stormwater drainage facilities or ditches and natural swales from increased runoff rates, or localized inundation of property and structures from increased drainage volumes. However, no detailed drainage analyses or engineering of necessary stormwater management and conveyance features have been conducted for the project. Therefore, the specific effects of additional drainage that could occur in the project area are uncertain. Consequently, this impact would be **potentially significant**.

Option 2: Pinole-Only Flows at Existing Plant

Option 2 would include only construction activity at the site of the existing Pinole-Hercules WPCP, and would disturb less than 1 acre of land, which is not expected to result in any measurable change in stormwater runoff. Therefore, Option 2 is not expected to create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems, or to cause increased erosion. Consequently, this impact would be **less than significant**.

Mitigation Measure 3.6-1a: Prepare Site Drainage Plans

Applies to: Option 1 (Corporation Yard Only)

The City shall develop plans for stormwater drainage at the site of the new corporation yard that are consistent with site design and drainage system guidelines provided by CCCWP and associated implementation of the San Francisco Bay RWQCB new MRP adopted in October 2009. The plans shall establish drainage performance criteria for off-site drainage, in consultation with City engineering staff, such that project-related drainage is consistent with City-determined facility designs, discharge rates, erosion protection, and routing to drainage channels, which could be accomplished by, but is not limited to, the following techniques:

- minimizing directly connected impervious areas;
- maximizing permeability of the site;
- stormwater quality controls such as infiltration, detention/retention, and/or biofilters; and
- basins, swales, and pipes in the system design.

The storm drain system at the corporation yard shall be designed to manage both quality and volume of runoff. The plans shall be developed in accordance with the "Standard Plans for Drainage" provided by the County (Contra Costa County 2008).

Mitigation Measure 3.6-1b: Prepare and Implement a Stormwater Control Plan

A stormwater control plan shall be prepared to comply with CCCWP's Stormwater Management Plan and C.3 Stormwater Guidebook. The stormwater control plan shall detail permanent stormwater management facilities. Storm drain facilities shall be designed in accordance with the site design and drainage system guidelines provided by CCCWP, which include, but are not limited to, the following:

- minimizing directly connected impervious areas;
- maximizing permeability of the site;
- stormwater quality controls such as infiltration, detention/retention, and/or biofilters; and
- basins, swales, and pipes in the system design.

The storm drain system shall be designed to manage both quality and volume of runoff. The stormwater control plan shall be submitted to CCCWP for review and approval consistent with the requirements of the NPDES permit.

Implementation of Mitigation Measures 3.6-1a and 3.6-1b would reduce potentially significant drainage and water quality impacts from relocation of the corporation yard under Option 1 to a **less-than-significant** level, because it would require that stormwater runoff from the construction activities and impervious surfaces be appropriately controlled and treated, and any offsite drainage would be appropriately routed to existing or created drainage features such that offsite properties would not be adversely affected. Furthermore, a stormwater control plan would be prepared such that facilities would be designed in compliance with CCCWP guidelines, which would minimize the project-related volume and quality of runoff.

IMPACT 3.6-2	Long-Term Operational Impacts from Flooding and Related Hazards. *Option 1 includes the relocation and construction of a new corporation yard, which would create new paved impervious surfaces that would increase the amount of stormwater runoff within the city of Pinole. Additional stormwater runoff of approximately 0.06 cfs may contribute to localized inland flooding during periods of peak runoff. Under Option 1, suspension of the force main on the existing bridge over Pinole Creek, if constructed such that it encroaches below the creeks' normal high-water surface elevation, could create additional impediments to peak channel flows, causing or contributing to flood hazards or inland flooding. Under both Option 1 and Option 2, additional wastewater treatment facilities would be constructed at the existing plant, inland of the Pinole Creek levee, which is potentially subject to flooding from overtopping of levees at a frequency greater than 1% per year, thereby contributing to exposure of facilities to flood hazards.*

Option 1: New Larger Effluent Pipeline to RSD

As described above under Impact 3.6-1, relocation and construction of the new corporation yard would include new paved areas and other impervious surfaces. Additional impervious surfaces would increase stormwater runoff by approximately 0.06 cfs relative to existing conditions. The potential increase in on-site stormwater drainage from impervious surfaces could incrementally contribute to localized inland flooding during peak wet-weather events.

Construction of the above-ground force main crossing over Pinole Creek (i.e., attachment to the existing bridge), if constructed so that it encroaches below the creeks' high-water surface elevation, could create additional impediments to channel flows. Encroachment of the pipeline below the current peak surface-water elevation would further restrict channel conveyance capacity, thereby exposing the pipeline and bridge structures to flood damage and/or causing or contributing to backwater in the channel upstream of the pipeline. Additional restriction of channel flows and backwater could cause or contribute to levee overtopping during peak flows.

The Pinole-Hercules WPCP is located, and the proposed corporation yard at the Pinole Shores Drive site would be located, within a FEMA-designated Zone X. Zone X is determined to be outside the 500-year flood and protected by a levee from the 100-year flood. However, as noted by CCCFCWCD in its comments on the notice of preparation for the project, the Pinole-Hercules WPCP may be exposed to flows from overtopping of the Pinole Creek levee. Therefore, the plant improvements proposed under Option 1 may be exposed to inland flooding or other flood hazards such as erosion and debris. Because of the potential for the project-related drainage and encroachments into areas that currently may be exposed to flooding during peak runoff events, this impact would be **potentially significant**.

Option 2: Pinole-Only Flows at Existing Plant

The potential exposure of facility improvements at the Pinole-Hercules WPCP to inland flooding and flood-related hazards under Option 2 is similar to the potential exposure under Option 1. Option 2 would not include the construction of a new corporation yard or pipeline; therefore, the related flooding effects would not occur under Option 2. However, Option 2 would include the construction of a 450,000-gallon underground concrete storage tank, associated piping, etc. Because of these project-related facility improvements at the Pinole-Hercules WPCP would be constructed in areas that may be exposed to flooding during peak runoff events, this impact would be **potentially significant**.

Mitigation Measure: Implement Mitigation Measure 3.6-1.

Mitigation Measure 3.6-2: Avoid Encroachment of Pipelines onto Peak Channel Flows and Minimize Exposure of Facilities to Flooding

Applies to: Option 1

Further, the City shall design and construct new treatment facilities at the Pinole-Hercules WPCP to provide appropriate flood protection such that plant operations are not adversely affected by inland flooding and inundation. The City shall consult with CCCFCWCD on the design of stream crossings for the new pipeline such that the minimum elevation of the pipeline would be above the predicted surface-water elevation of the 100-year peak flow.

Applies to: Option 2

The City shall require construction contractors to design and construct new treatment facilities at the Pinole-Hercules WPCP to provide appropriate flood protection measures to ensure that plant operations are not adversely affected by inland flooding and inundation. The plans shall be developed in accordance with the "Standard Plans for Drainage" provided by the County (Contra Costa County 2008).

Implementation of Mitigation Measures 3.6-1 and 3.6-2 would reduce potentially significant drainage and flooding impacts from construction of project facilities under Option 1 and Option 2 to a **less-than-significant** level, because it would require that facilities would be designed to minimize exposure of property to flooding and flood hazards or creation of such hazards and would reduce and control off-site runoff from impervious areas.

IMPACT 3.6-3 **Short-Term Stormwater Quality Impacts from Project Construction Activities and Operations.** *Project-related construction activities under Options 1 and 2 have the potential to result in temporary soil erosion, discharges of construction-related contaminants, and off-site discharge of contaminants in stormwater runoff. Under Option 1, long-term operation of the new corporation yard also has the potential to cause discharge of contaminants in stormwater runoff.*

Option 1: New Larger Effluent Pipeline to RSD

Construction plans and specifications for Option 1 have not yet been developed. In addition to the potential for erosion (addressed in Impact 3.5-3 in Section 3.5, "Geology, Soils and Paleontological Resources") construction activities could also result in discharge of construction-related contaminants to surface water or groundwater. Construction activities would be conducted in phases over a 30-month period; therefore, bare soils and construction areas could be exposed to rainfall runoff that could result in contaminants being transported into nearby streams. Construction of the project also would require temporary staging areas for storage of construction materials, fuels, equipment, and vehicles, and would involve transporting materials to and from the site. Potential contaminants at staging areas and other construction-site locations could be exposed to stormwater and be transported off-site in runoff.

The new force main crossing over Pinole Creek would be suspended from the existing road bridge. The remaining creek crossings would occur underground via jack and bore. Pipeline crossings of creeks may require temporary site dewatering and disposal to accommodate the construction activity.

Stormwater runoff generated at the Pinole-Hercules WPCP site would be routed to the headworks and treated with the wastewater stream.

Because of the shallow groundwater table at the Pinole-Hercules WPCP, construction activities for structural foundations may requiring dewatering, which, if not properly contained and treated, could result in adverse water quality impacts to surface water bodies.

Based on the size and duration of construction activities, the potential exists for temporary discharges of construction-related contaminants to enter adjacent surface water or groundwater. Contaminated and/or high-turbidity runoff could enter the localized surface ditches or creeks, thereby adversely affecting water quality. This impact would be **potentially significant**.

Option 2: Pinole-Only Flows at Existing Plant

The effects of project construction activities on stormwater quality under Option 2 would be similar to those under Option 1. Option 2 would not include the construction of a new pipeline or relocation of the corporation yard. However, Option 2 would include the construction of a 450,000-gallon underground concrete storage tank and associated piping. Because of the shallow groundwater table, installation of the tank would likely require construction dewatering. The potential exists for this groundwater to be discharged to adjacent surface water and thereby introduce contaminants or sediments into the surface water. Therefore, this impact would be **potentially significant**.

Mitigation Measure 3.6-3a: Obtain an NPDES Permit and Develop and Implement a SWPPP with BMPs

Applies to: Options 1 and 2

The project's construction area is expected to be larger than 1 acre and therefore would require appropriate stormwater construction permits. To avoid or minimize the potential for adverse construction-related effects on water quality, the City shall develop a SWPPP and obtain authorization under the City's municipal stormwater authority or the statewide NPDES stormwater permit for general construction activity before beginning work.

To comply with the NPDES regulations, the City shall identify and implement construction-related BMPs to avoid and minimize erosion and contaminant runoff. Such BMPs may include, but are not limited to, the following:

- keeping construction grade below lot curb at 2 inches to prevent runoff,
- covering small areas with rolled material during rain,
- covering large areas with erosion control blankets and/or mulch,
- distributing rock bags in the gutter before an inlet to slow flow and filter sediment,
- protecting inlets with straw wattles and rock bags,
- putting stucco and concrete supplies and materials in one place with pH sampling equipment and covering with plastic,
- using large river rock to stabilize entrance and exit areas and prevent tracking to streets,
- minimizing construction work near or in drainage channels, and
- locating staging areas as far as practicable from surface waters.

Other preventive good housekeeping practices could include, but are not limited to, road sweeping, sediment tracking and hauling, and dust control; and diversion measures such as berms to prevent clear runoff from contacting disturbed areas, and contaminated runoff from entering surface waters. Erosion and sedimentation control measures can also include soil stabilization, mulching, silt fencing, or temporary desilting basins.

The NPDES permit and SWPPP shall also be applied to construction activities involving pipe crossings at Pinole, Ohlone, Refugio, and Rodeo Creeks. Streamflow shall be maintained downstream of the stream crossing sites at all times during construction, and not otherwise restrict flow in any manner that would restrict passage of fish around the sites.

Mitigation Measure 3.6-3b: Divert Discharge from Construction Dewatering to Pinole-Hercules WPCP Headworks

Applies to: Options 1 and 2

To avoid the potential for adverse effects on water quality of adjacent surface water bodies, any groundwater that is dewatered as a result of construction activities at the Pinole-Hercules WPCP shall be sent to the Pinole-Hercules WPCP headworks for treatment with the wastewater stream. (This mitigation measure does not require a separate NPDES permit.)

Implementation of Mitigation Measures 3.6-3a and 3.6-3b would reduce potentially significant impacts on stormwater quality from construction activities under Options 1 and 2 to a **less-than-significant** level because it would require the implementation of a SWPPP and BMPs, which would minimize the effect of runoff on stormwater quality and volume. Furthermore, groundwater encountered during construction dewatering would be diverted to the headworks of the Pinole-Hercules WPCP and therefore adverse water quality impacts from dewatering would be avoided.

IMPACT 3.6-4 **Impacts of Project Discharges on Ammonia, Copper, and Cyanide in San Pablo Bay.** *Ammonia, copper, and cyanide concentrations in the project-related discharges may cause exceedance of applicable regulatory water quality criteria in the initial zone of mixing and a 0–1% increase in these constituent concentrations in the far field of San Pablo Bay. However, the project-related discharges would not increase levels of these constituents enough to cause federal or state numeric or narrative water quality criteria to be exceeded by a frequency, magnitude, and geographic extent that would result in adverse effects on one or more beneficial uses of San Pablo Bay. The discharges also would not result in substantial, permanent degradation of existing water quality that would cause adverse impacts on one or more beneficial uses of San Pablo Bay.*

Option 1: New Larger Effluent Pipeline to RSD and Option 2: Pinole-Only Flows at Existing Plant

Ammonia, copper, and cyanide are constituents of concern because of their potential to cause toxicity to aquatic life. Ammonia also is constituent of concern because of its potential to have the following effects on the aquatic environment: (1) It acts as a plant nutrient that stimulates algae and aquatic weed growth and (2) it becomes an oxygen-demanding substance when converted to nitrate by nitrifying bacteria. Copper and cyanide are also of concern to human health; however, the thresholds necessary for protection from human health effects are much higher than those for protection of aquatic life.

Because the beneficial uses of San Pablo Bay that are most sensitive to ammonia, copper, and cyanide levels are aquatic-life uses, the water quality impacts of the project-related discharge of these constituents and their associated impacts on aquatic life uses are assessed in Section 3.4, “Fisheries and Aquatic Resources,” under Impact 3.4-5. The utilization of dissolved oxygen by ammonia is assessed in Section 3.4, “Fisheries and Aquatic Resources,” under Impact 3.4-6 for the same reason. In summary, under Option 1, the project would incrementally increase the size of the initial zone of mixing at the deepwater outfall (Outfall 001) during the wet-weather discharge periods compared to existing conditions. The treatment plant improvements for Option 1 also are intended to increase treatment for all flows, eliminated blending with partially treated wastewater, and improve overall constituent removal performance, thereby likely resulting in reduced constituent loading and/or concentrations relative to existing conditions. Under Option 2, the size of the initial zone of mixing at Outfall 001 would not change, because the wet-weather effluent discharge rate would be equivalent to the existing flow (i.e., 12.8 mgd); however, the quality of the effluent discharged to the deepwater outfall may change relative to existing conditions with the elimination of the city of Hercules’ effluent contribution. Within a small area of the initial zone of mixing near the outfall, water quality criteria for ammonia, copper, and cyanide may occasionally be exceeded at similar concentrations to existing conditions. However, under both options, the project-related water quality changes are not expected to currently cause, nor increase the potential to cause or contribute to lethal exposure or cause adverse long-term effects on populations or communities of any aquatic organisms exposed to the initial zone of mixing. Additionally, within the initial zone of mixing and near-field project area immediately downstream, the elimination of effluent constituent discharges at the shallow Outfall 002 under both project options is considered a net water quality project-related benefit.

As demonstrated in Table 3.6-10, project-related discharges are expected to raise concentrations of ammonia, copper, and cyanide in the far field of San Pablo Bay only by 0–1%, and water quality criteria for these constituents would be met at the far-field locations. The small project-related changes in far-field ammonia concentrations are not expected to measurably affect levels of dissolved oxygen in San Pablo Bay, particularly given the other factors present in the aquatic environment that affect levels of ammonia (e.g., aquatic plant uptake) and dissolved oxygen (e.g., atmospheric reaeration, algae photosynthesis). Given that there would be minor (likely immeasurable) changes in far-field ammonia, copper, and cyanide levels, the project-related discharges would not result in substantial degradation of existing water quality, on a permanent basis, that would cause adverse effects to one or more beneficial uses of San Pablo Bay.

Table 3.6-10
Projected Receiving-Water Concentrations of Ammonia, Copper, and Cyanide at Modeled Far-Field San Pablo Bay Locations

Constituents of Concern	Units	Ambient Water Quality Criterion	Existing/Option 2 (12.8 mgd)		Option 1 (17.09 mgd)		Maximum Increase in Receiving- Water Concentration	Maximum Consumption of Available Assimilative Capacity
			Receiving Water Concentration	Does Option 2 Meet Criterion?	Receiving-Water Concentration	Does Option 1 Meet Criterion?		
Davis Point RMP Site								
Ammonia, total	mg/l as N	1.49[a]	0.076	Yes	0.077	Yes	1%	0.08%
Copper, dissolved[b]	µg/l	6.0	3.4	Yes	3.4	Yes	~0	~0
Cyanide[c]	µg/l	2.9	0.4	Yes	0.4	Yes	~0	~0
Carquinez Bridge RMP Site								
Ammonia, total	mg/l as N	1.49[a]	0.074	Yes	0.075	Yes	1%	0.07%
Copper, dissolved[b]	µg/l	6.0	3.4	Yes	3.4	Yes	~0	~0
Cyanide[c]	µg/l	2.9	0.4	Yes	0.4	Yes	~0	~0
Pinole Point RMP Site								
Ammonia, total	mg/l as N	1.33[a]	0.062	Yes	0.062	Yes	~0	~0
Copper, dissolved[b]	µg/l	6.0[b]	2.3	Yes	2.3	Yes	~0	~0
Cyanide[c]	µg/l	2.9[c]	0.4	Yes	0.4	Yes	~0	~0
San Pablo Bay RMP Site								
Ammonia, total	mg/l as N	1.33[a]	0.050	Yes	0.050	Yes	~0	~0
Copper, dissolved[b]	µg/l	6.0[b]	3.1	Yes	3.1	Yes	~0	~0
Cyanide[c]	µg/l	2.9[c]	0.4	Yes	0.4	Yes	~0	~0

Notes: µg/l = micrograms per liter; mg/l = milligrams per liter; mgd = million gallons per day; RMP = Regional Monitoring Program

[a] Total ammonia criterion is dependent on temperature, pH, and salinity. Criterion shown is based on San Pablo Bay RMP site data from March 1993 to August 2001.

[b] Copper criterion is the site-specific objective approved by the U.S. Environmental Protection Agency (EPA) in January 2009; Acute Translator = 0.67; Chronic Translator = 0.38. Criterion shown based on use of the Acute Translator.

[c] Cyanide criterion is the site-specific objective approved by EPA in July 2008.

~0 = Statistics were not calculated for constituents for which no detectable change is projected.

Source: Data compiled by Robertson-Bryan Inc. in 2009

In summary, under Option 1 and Option 2, the project-related discharge is not expected to incrementally increase the existing levels of ammonia, copper, and cyanide enough to cause federal or state numeric or narrative water quality criteria to be exceeded by a frequency, magnitude, and geographic extent that would result in adverse effects on one or more beneficial uses of San Pablo Bay. Any exceedances of applicable criteria/objectives or EPA recommended criteria would be limited to a very small area within the initial zone of mixing, immediately adjacent to the diffuser. Additionally, the project discharges would not result in substantial, permanent degradation of existing water quality that would cause adverse effects on one or more beneficial uses of San Pablo Bay. Therefore, this impact would be **less than significant**.

The influence of ammonia on nuisance algae and aquatic weed growth is discussed below under Impact 3.6-7 (Nutrients).

Mitigation Measure: **No mitigation measures are required.**

IMPACT 3.6-5	Impacts of Project Discharges on Biochemical Oxygen Demand, Oil and Grease, Total Coliform, and Total Suspended Solids in San Pablo Bay. *The upgraded Pinole-Hercules WPCP would be designed and operated to comply with the NPDES permit limitations for biochemical oxygen demand, oil and grease, and total suspended solids either at the end of the discharge pipe or within the diffuser's initial zone of mixing. The NPDES permit limitations are based on applicable Basin Plan water quality objectives that have been determined to be protective of beneficial uses. Project discharges would not measurably change background concentrations of these constituents in San Pablo Bay. The project-related discharges would not increase levels of these constituents sufficiently to cause federal or state water quality criteria/objectives to be exceeded by a frequency, magnitude, and geographic extent that would result in adverse effects on one or more beneficial uses of San Pablo Bay. The discharges also would not result in substantial, permanent degradation of existing water quality that would cause adverse impacts on one or more beneficial uses of San Pablo Bay.*

Option 1: New Larger Effluent Pipeline to RSD and Option 2: Pinole-Only Flows at Existing Plant

Biochemical oxygen demand (BOD) or carbonaceous biological oxygen demand (CBOD) are an indirect measures of a discharge's utilization of dissolved oxygen (DO), and the Basin Plan includes numeric water quality objectives for DO to protect aquatic life. Because aquatic life–related beneficial uses of San Pablo Bay are most sensitive to BOD (or CBOD) through its effect on DO levels in the aquatic environment, the impacts of combined effluent BOD levels on water quality are discussed in Section 3.4, "Fisheries and Aquatic Resources," under Impact 3.4-6. In summary, under Option 1, the project would incrementally increase the size of the initial zone of mixing during the wet-weather discharge periods. Under Option 2, the quality of the effluent discharged to the deepwater outfall may change relative to existing conditions with elimination of the City of Hercules' effluent contribution. However, under both options, the resulting water quality changes in the initial zone of mixing are not expected to cause lethal exposure or adverse long-term effects on populations or community levels of any aquatic species.

BOD is also considered a conventional pollutant along with oil and grease, total coliform, and TSS, which are all subject to numeric and narrative Basin Plan water quality objectives that prohibit adverse effects on beneficial uses. Specifically, there are numeric Basin Plan objectives for coliform bacteria and bacteriological criteria for water contact recreation. There are two sets of total coliform objectives depending on whether contact recreation and shellfish harvesting are presumed for shallow-water discharges. The narrative Basin Plan water quality objective for oil and grease states, "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." The Basin Plan's narrative water quality objective for suspended materials states, "waters shall not contain suspended material in concentrations that cause nuisance or adversely affect beneficial uses."

The San Francisco Bay RWQCB has established limitations in the Basin Plan (Section 4.5.5.1, Table 4-2), as shown in Table 3.6-6 of this EIR, for effluent discharges to enclosed bays (including San Pablo Bay) that implement the Basin Plan's numeric and narrative water quality objectives for conventional pollutants such as oil and grease, total coliform, and suspended material. The NPDES permit's effluent limitations for total coliform are based on the deep-water discharge requirements.

Expected receiving-water (far-field) concentrations for CBOD, oil and grease, total coliform, and TSS under Option 1 and Option 2 are presented in Table 3.6-11. These concentrations demonstrate that the project's discharges would not measurably change background constituent concentrations in San Pablo Bay. As described above, the effluent limitations for these conventional constituents in the current permit were used as the basis for assessing the potential effects of the project discharges on receiving-water quality, because they are considered by the San Francisco Bay RWQCB to be consistent with Basin Plan policies for compliance with the numeric and narrative receiving-water-quality objectives. Under both options, the undiluted effluent is projected to comply with chronic effluent limitations (and applicable Basin Plan objectives) for total coliform and TSS, as well as acute and chronic effluent limitations for CBOD and oil and grease. Furthermore, the concentrations of CBOD, oil and grease, total coliform, and TSS in effluent are not expected to increase in the future, given that no actions are proposed that would reduce the ability of the treatment plant to remove these constituents. Moreover, under Option 1 there might be an improvement in effluent water quality with respect to CBOD, oil and grease, total coliform, and TSS as a result of the installation of a new secondary clarifier and aeration tanks.

Data for the current treatment process indicates that concentrations of BOD, oil and grease, total coliform, and TSS in effluent are typically in compliance with effluent limitations (Table 3.6-6). Under Option 1, the anticipated acute and chronic concentrations would be approximately the same as, or lower than, existing acute and chronic concentrations as a result of treatment plant improvements. Maximum concentrations of total coliform are known to be greater than 1,600 (most probable number per 100 milliliters [MPN/100 ml]), although the exact concentrations are not known. However, potential exceedances of the maximum-total-coliform limit (10,000 MPN/100 ml) are not likely, given that the five-sample moving median of 240 MPN/100 ml was exceeded only twice in the 5-year period of 2001–2005. Furthermore, the incremental increase in the size of the initial zone of mixing under Option 1 and related potential for short-term exceedances of the maximum-total-coliform objective, would not adversely affect beneficial uses because elevated levels would only occur for short periods of time, and in a small geographic area immediately adjacent to the outfall.

Under Option 1, the potential for maximum concentrations of TSS to exceed the average-weekly-effluent limitation would not be expected to adversely affect beneficial uses in the incrementally larger zone of initial mixing, relative to existing conditions because elevated TSS in the effluent during peak wet-weather flows would occur only for a short period of time and would be less than peak TSS levels in San Pablo Bay. Specifically, TSS levels in San Pablo Bay are elevated over the short term (hours to days) as a function of peak tidal velocities during spring tides and sediments coming from the Delta during periods of peak wet-weather inflows (Ruhl and Schoellhamer 1999). TSS levels are also a function of proximity to bottom sediment. In water years 2002–2005, concentrations of suspended solids at the Carquinez Bridge ranged from 5 mg/l to 442 mg/l at mid-depth, with an average of 41.4 mg/l, and ranged from 7 mg/l to 1,015 mg/l near the bottom, with an average of 74.5 mg/l (Schoellhamer and Buchanan 2009). RMP TSS data, summarized in Tables 3.6-1 through 3.6-3, are measured in samples collected 1–2 feet below the water surface while Outfall 001 discharges near the bottom. Thus, short-term elevation of TSS levels within the incrementally larger zone of initial mixing would not adversely affect beneficial uses.

Table 3.6-11
Projected Receiving-Water Concentrations of Biochemical Oxygen Demand, Oil and Grease, and Total Suspended Solids at Modeled Far-Field San Pablo Bay Locations

Constituents of Concern	Units	Lowest NPDES Effluent Limitation [a]	Existing/Option 2 (12.8 mgd)		Option 1 (17.09 mgd)		Maximum Increase in Receiving-Water Concentration
			Receiving-Water Concentration	Does Option 1 Meet Effluent Limitation?	Receiving-Water Concentration	Does Option 2 Meet Effluent Limitation?	
Davis Point RMP Site							
CBOD	mg/l	25	<5.0	Yes	<5.0	Yes	~0
Oil and grease	mg/l	10	<5.0	Yes	<5.0	Yes	~0
Total coliform	MPN/100 ml	240	NA [b]	Yes	NA [b]	Yes	~0
TSS	mg/l	30	46.4	Yes	46.4	Yes	~0
Carquinez Bridge RMP Site							
CBOD	mg/l	25	<5.0	Yes	<5.0	Yes	~0
Oil and grease	mg/l	10	<5.0	Yes	<5.0	Yes	~0
Total coliform	MPN/100 ml	240	NA [b]	Yes	NA [b]	Yes	~0
TSS	mg/l	30	46.4	Yes	46.4	Yes	~0
Pinole Point RMP Site							
CBOD	mg/l	25	<5.0	Yes	<5.0	Yes	~0
Oil and grease	mg/l	10	<5.0	Yes	<5.0	Yes	~0
Total coliform	MPN/100 ml	240	NA [b]	Yes	NA [b]	Yes	~0
TSS	Mg/l	30	24.4	Yes	24.4	Yes	~0
San Pablo Bay RMP Site							
CBOD	mg/l	25	<5.0	Yes	<5.0	Yes	~0
Oil and grease	mg/l	10	<5.0	Yes	<5.0	Yes	~0
Total coliform	MPN/100 ml	240	NA [b]	Yes	NA [b]	Yes	~0
TSS	mg/l	30	45.2	Yes	45.2	Yes	~0

Notes: CBOD = carbonaceous biochemical oxygen demand; mg/l = milligrams per liter; mgd = million gallons per day; MPN/100 ml = most probable number per 100 milliliters; NA = not applicable; NPDES = National Pollutant Discharge Elimination System; RMP = Regional Monitoring Program; TSS = total suspended solids

[a] Lowest applicable effluent limitations in the NPDES permits (see Table 3.6-6). Effluent limitations based on the San Francisco Bay Regional Water Quality Control Board's interpretation of discharge concentrations considered protective of numeric and narrative objectives in the *Water Quality Control Plan for the San Francisco Bay Basin* (Basin Plan), and associated policy for wastewater effluent limitations identified in Basin Plan Table 4-2.

[b] Assessment of discharge effects to receiving water not applicable (NA) because background coliform data for San Pablo Bay are unavailable to accurately characterize ambient background concentrations.

~0 = Statistics were not calculated for constituents for which no detectable change is projected.

Source: Data compiled by Robertson-Bryan Inc. in 2009

Under Option 2, treatment of Pinole-only flows would not be expected to result in any change to the concentrations of these constituents at the outfall 001. Therefore, because the wet-weather discharge rate to Outfall 001 would not change under Option 2, there would be no measureable change in the size of the initial zone of mixing. Any constituent concentration increases within or downstream of the mixing zone would be minor. Moreover, within the initial zone of mixing and near-field project area immediately downstream, the elimination of effluent constituent discharges at the shallow Outfall 002 under both project options is considered a net water quality project-related benefit.

In summary, under Option 1 and Option 2, the discharge would not measurably increase levels of BOD, oil and grease, total coliform, or TSS enough to cause federal or state numeric or narrative water quality criteria/objectives to be exceeded by a frequency, magnitude, and geographic extent that would result in adverse effects on one or more beneficial uses of San Pablo Bay. Additionally, the project discharges would not result in substantial, permanent degradation of existing water quality that would cause adverse effects on one or more beneficial uses of San Pablo Bay. Therefore, this impact would be **less than significant**.

Mitigation Measure: **No mitigation measures are required.**

IMPACT 3.6-6	Impacts of Project Discharges on Dioxin, Mercury, and Selenium in San Pablo Bay. *Dioxin, mercury, and selenium concentrations in project-related discharges would meet applicable regulatory criteria at end-of-pipe and would not measurably change background constituent concentrations in San Pablo Bay relative to existing conditions. Furthermore, the project-related discharges would result in no net increase in dioxin, mercury, and selenium loading to San Pablo Bay, and thus would not increase levels or loadings of these water quality parameters enough to cause federal or state numeric or narrative water quality criteria to be exceeded with a frequency, magnitude, and geographic extent that would result in adverse effects on one or more beneficial uses of San Pablo Bay. The discharges also would not result in substantial, permanent degradation of existing water quality that would cause adverse effects on one or more beneficial uses of San Pablo Bay.*

Option 1: New Larger Effluent Pipeline to RSD and Option 2: Pinole-Only Flows at Existing Plant

San Pablo Bay is listed as impaired for dioxin, mercury, and selenium in accordance with Section 303(d) of the CWA (SWRCB 2007). A schedule has been proposed to develop a dioxin TMDL, a selenium TMDL is in progress, and a mercury TMDL has been adopted. The applicable CTR criteria for dioxin were adopted for the protection of human health. The applicable criteria for mercury include Basin Plan objectives, CTR criteria for the protection of human health, and TMDL fish tissue criteria. The Basin Plan's mercury objective is based on a final residue value derived in EPA's *Ambient Water Quality Criteria for Mercury* (EPA 1984) and from the U.S. Food and Drug Administration's action level for consumption of mercury in fish. Since 1995, however, EPA has not used the final residue value procedure in deriving new or revised criteria for aquatic life (EPA 2006). Thus, all the mercury criteria are derived for the protection of human health. Concentrations of selenium in surface waters are of potential concern for drinking water supplies, fish consumption, and protection of aquatic life (EPA 2000), which the NTR criteria address for San Francisco Bay. All three constituents—dioxin, mercury, and selenium—are of concern, in part because of their potential to bioaccumulate.

Bioaccumulation of dioxin in sport fish, as measured by the RMP, is evident from consistently elevated levels that, in some species, exceed a screening value for human consumption of fish established by the state Office of Environmental Health Hazard Assessment. Bioaccumulation of mercury in a number of rivers and other water bodies has caused public health advisory notices to be issued for selected fish species in the Delta and in San Francisco Bay to alert the public to the potential health hazards of consuming contaminated organisms. As a result, two water quality objectives were approved for San Francisco Bay by the San Francisco Bay RWQCB in 2007. One objective was established to protect people who consume bay fish and applies to fish large enough to be consumed by humans. The objective is 0.2 milligram (mg) of mercury per kilogram (kg) of fish tissue (average wet-weight concentration measured in the muscle tissue of fish large enough to be consumed by humans). Another objective was established to protect aquatic organisms and wildlife. This objective applies to small fish

(3–5 centimeters in length) commonly consumed by the California least tern, an endangered species. This objective is 0.03 mg mercury per kg fish (average wet-weight concentration). Bioaccumulation of selenium is of concern for aquatic life based on differential food web pathways that can lead to accumulation of toxic-effect concentrations of selenium (Stewart et al. 2004).

Effluent from the Pinole-Hercules WPCP is in compliance with NPDES-permitted mercury limitations (Table 3.6-6) derived from the San Francisco Bay water quality objectives and the EPA-approved TMDL. Dioxin, mercury, and selenium levels would not be affected by the improvements in the treatment process and, as indicated in Table 3.6-9, would meet applicable regulatory criteria in project-related discharges in the undiluted effluent. As demonstrated in Table 3.6-12, project-related discharges are expected to not measurably raise background concentrations of mercury and selenium in San Pablo Bay, and water quality criteria for these constituents would be met at the far-field locations. Background San Pablo Bay receiving water concentrations of dioxin reported by the San Francisco Bay RWQCB in the NPDES permit currently exceed the applicable CTR criterion for human health. Therefore, because the projected average dioxin concentrations in project-generated effluent are not expected to change, relative to existing concentrations, the discharge would not result in any increase in dioxin levels in the receiving water.

Under Option 1, all loading of dioxin, mercury, and selenium from wet weather discharges that currently are split between the deepwater Outfall 001 and the shallow water Outfall 002 would be discharged at Outfall 001 for no net change in loading to San Pablo Bay. Under Option 2, the Pinole-only portion of the current loading would likewise be discharged from Outfall 001 while the Hercules only portion of the current loading would be conveyed to West County Wastewater District Water Pollution Control Facility for discharge to a different portion of San Francisco Bay. Therefore, the project would not change net loading of dioxin, mercury, and selenium to San Pablo Bay under Option 1, and would reduce local loading of these constituents in the initial zone of mixing and the immediately downstream project area under Option 2 through elimination of discharges to Outfall 002.

Given that there would be little or no change in far-field dioxin, mercury, and selenium levels, and there would be no net increase with a potential local net decrease (under Option 2) of dioxin, mercury, and selenium loadings, the project-related discharges would not result in substantial, permanent degradation of existing water quality that would cause adverse impacts on one or more beneficial uses of San Pablo Bay. Furthermore, concentrations of dioxin, mercury, and selenium in project-related discharges would meet applicable regulatory criteria in the undiluted effluent, and thus any project-related changes in the size of the initial zone of mixing under Option 1 or changes in effluent quality under Option 2 would not increase concentrations or loadings of these water quality parameters enough to cause federal or state numeric or narrative water quality criteria to be exceeded with a frequency, magnitude, and geographic extent that would result in adverse impacts on one or more beneficial uses of San Pablo Bay. Therefore, this impact would be **less than significant**.

Mitigation Measure: No mitigation measures are required.

Table 3.6-12
Projected Receiving-Water Concentrations of Dioxin, Mercury, and Selenium at Modeled Far-Field San Pablo Bay Locations

Constituents of Concern	Units	Ambient Water Quality Criterion	Existing/Option 2 (12.8 mgd)		Option 1 (17.09 mgd)		Maximum Increase in Receiving Water Concentration	Maximum Consumption of Available Assimilative Capacity
			Receiving Water Concentration	Does Option 2 Meet Criterion?	Receiving Water Concentration	Does Option 1 Meet Criterion?		
Davis Point RMP Site								
Dioxin	pg/l	0.014	0.05 [a]	No [a]	0.05 [a]	No [a]	~0	~0
Mercury	µg/l	0.025 [a]	0.016	Yes	0.016	Yes	~0	~0
Selenium	µg/l	5	0.18	Yes	0.18	Yes	~0	~0
Carquinez Bridge RMP Site								
Dioxin	pg/l	0.014	0.05 [a]	No [a]	0.05 [a]	No [a]	~0	~0
Mercury	µg/l	0.025 [a]	0.016	Yes	0.016	Yes	~0	~0
Selenium	µg/l	5	0.18	Yes	0.18	Yes	~0	~0
Pinole Point RMP Site								
Dioxin	pg/l	0.014	0.05 [a]	No [a]	0.05 [a]	No [a]	~0	~0
Mercury	µg/l	0.025 [b]	0.009	Yes	0.009	Yes	~0	~0
Selenium	µg/l	5	0.16	Yes	0.16	Yes	~0	~0
San Pablo Bay RMP Site								
Dioxin	pg/l	0.014	0.05 [a]	No [a]	0.05 [a]	No [a]	~0	~0
Mercury	µg/l	0.025 [a]	0.014	Yes	0.014	Yes	~0	~0
Selenium	µg/l	5	0.16	Yes	0.16	Yes	~0	~0

Notes: µg/l = micrograms per liter; mgd = million gallons per day; pg/l = picograms per liter; RMP = Regional Monitoring Program

a The background San Pablo Bay concentration of 2,3,7,8-TCDD (dioxin congener) reported in the Pinole-Hercules Water Pollution Control Plant's National Pollutant Discharge Elimination System permit currently does not meet the applicable California Toxics Rule criterion of 0.014 pg/l for protection of human health from consumption of organisms.

b Objective in the Water Quality Control Plan for the San Francisco Bay Basin; in addition, a fish tissue objective has been established by the San Francisco Regional Water Quality Control Board in the mercury total maximum daily load for San Pablo Bay of (1) 0.3 milligram of mercury per kilogram of fish, based on average wet-weight concentration measured in whole fish 3–5 centimeters in length; and (2) 0.2 milligram of mercury per kilogram of fish, based on average wet-weight concentration measured in the edible portion of trophic level 3 and trophic level 4 fish.

Source: Data compiled by Robertson-Bryan Inc. in 2009

IMPACT 3.6-7 **Impact of Project Discharges on Nutrients in San Pablo Bay.** *Concentrations of nutrients in project-related effluent discharges (e.g., nitrogen and phosphorus compounds) that can cause biostimulation of aquatic algae and plant growth would not measurably change background concentrations of nutrients in San Pablo Bay. Furthermore, the project-related discharges would result in no net increase in nutrient loading, and thereby would not increase biostimulation conditions in San Pablo Bay. As such, narrative Basin Plan objectives would not be exceeded by a frequency, magnitude, and geographic extent that would result in adverse impacts on one or more beneficial uses. Additionally, the project discharges would not result in substantial, permanent degradation of existing water quality that would cause adverse impacts on one or more beneficial uses of San Pablo Bay.*

Option 1: New Larger Effluent Pipeline to RSD and Option 2: Pinole-Only Flows at Existing Plant

Nitrogen and phosphorus are the primary nutrients essential for healthy plant and animal populations in an aquatic ecosystem. The term “eutrophication” is often used to define increases in nutrient levels that result in increased growth of aquatic biota. The nutrient compounds of greatest interest are nitrate, nitrite, ammonia, total Kjeldahl nitrogen, and phosphates. It is important to note that “eutrophic” aquatic systems are not problematic per se. Many of the nation’s most valuable and productive (e.g., fish production) aquatic systems would be classified by limnologists as “eutrophic.” Nutrient enrichment or eutrophication becomes a problem when nutrients increase to levels that cause undesirable conditions in surface waters, including nuisance algal blooms and growth of aquatic plants, associated periodic DO depletion, elevated pH, or high turbidity. These undesirable conditions can adversely affect recreational and aesthetic uses, water supply uses, and aquatic life uses. The evaluation of the role of nutrients as a causative or predictive factor for such conditions is complicated because several other factors (e.g., light transmittance, water temperature, flow conditions, substrate) may have substantial influence on the outcome.

San Pablo Bay is not identified on the CWA Section 303(d) list as being impaired for nutrients or any of the nutrient compounds (Table 3.6-4). There are currently no state water quality objectives for ammonia, total Kjeldahl nitrogen, total nitrogen, phosphates, or total phosphorus applicable to the control of nutrient biostimulation. EPA published a technical guidance manual to assist states in developing criteria for estuarine and coastal marine waters, but has not developed specific criteria values for nutrients. EPA has strongly encouraged states to develop nutrient standards that reflect localized conditions and protect specific designated uses. In response, the State of California is developing a work plan for development of nutrient criteria that outlines the process for adopting nutrient water quality standards.

Wastewater effluent discharges contain the nutrients of potential concern for eutrophication effects. Only ammonia concentrations are monitored in Pinole-Hercules WPCP and RSD effluent. Under Option 1, there would be no net increase in nutrient loading to the Bay under the project condition. Under this option, a small incremental increase in the size of the initial zone of mixing at Outfall 001 of ammonia and other nutrient compounds that may be present in the effluent may occur, due to the increased volume of discharge at Outfall 001. Project-related discharges are not expected to measurably raise background concentrations of nutrients in San Pablo Bay. Any increase in nutrient loading within the initial zone of mixing is not expected to cause a localized nuisance conditions (e.g., excessive plant growth) near Outfall 001. This is primarily because the increased discharge would occur during wet-weather events, which are transient and because of rapid and large dilution that occurs here. The transient nature of the wet-weather events coupled with the tidal mixing and movement of the water near the outfall would not provide a continuous source of nutrient enrichment to support growth of nuisance plants or algae blooms in the vicinity of the outfall.

Under Option 2, the size of the initial zone of mixing at Outfall 001 would not change, because the wet-weather effluent discharge rate would be equivalent to the existing flow (i.e., 12.8 mgd); however, the quality of the effluent discharged to the deepwater outfall may change relative to existing conditions with the elimination of the city of Hercules’ effluent contribution. Under Option 2, concentrations of nutrient in the initial zone of mixing would potentially be reduced during dry-weather months because of the reduced amount of effluent discharge.

Moreover, within the initial zone of mixing and near-field project area immediately downstream, the elimination of nutrient discharges at the shallow Outfall 002 under both project options is considered a net water quality project-related benefit.

In summary, under Option 1 and Option 2, there would be no net increase in nutrient loading to the Bay. Anticipated increases in levels of nutrients in the initial zone of mixing would not result in conditions that would exceed a narrative water quality objective relating to nutrient biostimulation and thus would not adversely affect any beneficial uses of San Pablo Bay. Given that there would be little to no change in the initial zone of mixing or far-field nutrient levels, and a potential local net decrease (under Option 2), the project-related nutrient discharges are not expected to result in substantial, permanent degradation of existing water quality. Any minor degradation that may occur within the initial zone of mixing under Option 1, relative to existing conditions, would not cause adverse effects to any beneficial uses of San Pablo Bay. Therefore, this impact would be **less than significant**.

Mitigation Measure: No mitigation measures are required.

IMPACT 3.6-8 Impacts of Project Discharges on Endocrine-Disrupting Compounds in San Pablo Bay. *Project-related discharges could contain endocrine-disrupting compounds (EDCs). However, there are no applicable regulatory criteria for these compounds, and it may be many years before the scientific understanding of their effects is sufficient for the San Francisco Bay RWQCB to establish permit limitations for treated wastewater discharges. Because San Pablo Bay is not used for or designated as a drinking water supply, the potential for these compounds, if present, to affect human health would be unlikely. Aquatic organisms are not expected to be exposed to substantially different or higher levels of EDCs (if present in the effluent) under either Option 1 or Option 2, relative to existing conditions. The potential for exposure to EDCs by aquatic life or humans would not be expected to change under the project.*

Option 1: New Larger Effluent Pipeline to RSD and Option 2: Pinole-Only Flows at Existing Plant

In recent years there has been heightened scientific awareness and public debate over potential effects that may result from exposure to EDCs. A state-of-the-science assessment by the World Health Organization (WHO) defines an EDC as an exogenous substance or mixture that alters function of the endocrine system and consequently causes adverse health effects in an intact organism or its progeny (WHO 2002). Endocrine disruption may be described as a functional change that may lead to adverse effects, not necessarily a toxicological endpoint. Some EDCs are human-made synthetic chemicals (e.g., pharmaceuticals), while others are natural (e.g., sex steroid hormones) released into the environment unintentionally (e.g., as trace elements in human urine that are not removed by conventional wastewater treatment). EDCs may block, mimic, stimulate, or inhibit the production of natural hormones, disrupting the endocrine system's natural functions. The endocrine system is a complex of glands that secrete hormones that in turn regulate reproduction, growth, and development. Certain drugs, such as birth control pills, intentionally alter the endocrine system. Although there are some known EDCs, many chemicals are termed "suspect," because they have not been sufficiently evaluated to make a conclusive determination of their endocrine-disrupting characteristics.

The U.S. Geological Survey (Kolpin et al. 2002) found occurrence of EDCs or potential EDCs across the country to be high in surface waters affected by wastewater discharges. The study found that 80% of the streams sampled contained at least one of 95 endocrine-disrupting compounds that were tested. Although occurrence frequency was relatively high, measured concentrations for compounds that have standards were low relative to the respective standards. However, these standards are typically derived for endpoints other than endocrine effects, and these endpoints typically occur at much higher exposure levels than endocrine effects.

The potential ecological effects of EDCs in the aquatic environment were first reported in the 1990s. Many laboratory studies have indicated effects at the individual organism level from exposure to wastewater-derived EDCs; population-level effects and/or endocrine-disrupting effects in the wild have only been documented in a few instances. The best examples of this have been population collapses of marine mollusks exposed to tributyltin, an anti-fouling agent generally added to paint for boat hulls (which has since been phased out for this use), and sexual and reproductive disruption in fish exposed to estrogenic EDCs. Studies have shown the presence of natural and synthetic estrogen hormones in the wastewater-induced production in male fish of vitellogenin, which is a protein involved in reproduction and normally found only in females (Desbrow et al. 1998). Other sexual and reproductive disruption in fish has been observed in upstream/downstream population assessments (Vajda et al. 2008), caged fish studies (Burki et al. 2006), laboratory flow-through exposures (Jobling et al. 1998), and field experimental lake exposures (Kidd et al. 2007). Similar results were observed with alkylphenolic compounds, which are breakdown products of industrial surfactants used in products such as paints, herbicides, and cosmetics (Jobling et al. 1998). Other research has since confirmed that natural and synthetic estrogens are present in some discharges in sufficient quantity that they could cause endocrine disruption in some aquatic organisms (e.g., Rodgers-Gray et al. 2000).

Although most EDCs do exhibit some risk for acute or chronic toxicity (e.g., lethal endpoints or short-term reproductive failure), the exposure levels at which these effects occur are generally much greater than those levels found in wastewater effluent (see Table 3.6-13). Endocrine-related effects occur at much lower concentrations; however, they are generally only observed after exposures of greater than 28 days, or in life-cycle/multigenerational studies.

Table 3.6-13
Representative Endocrine-Disrupting Compounds, Levels in Surface Waters and Wastewater Treatment Plant Effluent, and Acute Toxicity Levels

Constituent	Concentration		
	Surface Water (ng/l)	WWTP Effluent (ng/l)	Acute EC50 (ng/l)
Ethinyl estradiol	<0.1–5.1	<0.1–8.9	3,800,000
Bisphenol-A	<0.5–250	4.8–258	1,000,000
Nonylphenol/nonylphenol ethoxylate	6.7–97,600	18–1570	4,600,000

Notes: EC50 = 50%-effect-level concentration; ng/l = nanograms per liter; WWTP = wastewater treatment plant
Sources: Pascoe et al. 2002 (ethinyl estradiol), Alexander et al. 1988 (bisphenol-A), Servos 2001 (nonylphenol/nonylphenol ethoxylate)

Human exposure and dose response to EDCs in concentrations at the low levels found in the environment are still largely unknown. The absence of adequate exposure data, especially exposure data during critical development periods, is the weakest link in determining whether any observed adverse effects in humans and/or fish and wildlife are linked to EDCs. WHO's state-of-the-science assessment concludes that "…our current understanding of the effects posed by EDCs to wildlife [including fish] and humans is incomplete" (WHO 2002). The *National Toxicology Program's Report of the Endocrine Disruptors Low-Dose Peer Review* (HHS 2001) was released for public comment in May 2001 (66 FR 27152, May 16, 2001). As stated in the National Toxicology Program's report, "the focus of this review was on 'biological change' rather than on 'adverse effect' because, in many cases, the long-term health consequences of altered endocrine function during development have not been fully characterized" (HHS 2001). Additional recommendations were made regarding research approaches and needed future studies.

Some known EDCs (e.g., PCBs, dichlorodiphenyltrichloroethane [DDT], chlordane) are regulated via ambient water quality criteria or drinking water standards based on their toxicological and carcinogenic effects. However, there are no applicable water quality criteria for natural and synthetic estrogens or related pharmaceutical chemicals. Based on the current state of knowledge regarding dose-response relationships of EDCs for various organisms at the low levels in which they can occur in surface waters, it is likely to be several years—possibly many years—before any such standards are promulgated. The approach in the United States, and specifically in California, has been to require more definitive information to be gathered and conclusive research conducted before regulatory measures can be taken:

- In the most recent version of Title 22, Section 60320.040(g)(2) of the California Code of Regulations (22 CCR Section 60320.040[g][2]), draft August 2002), the California Department of Public Health has included monitoring requirements for EDCs and pharmaceuticals in recycled water for purposes of groundwater recharge only. However, the requirements do not identify the specific contaminants to be monitored.

- The 2009 workshop "Managing Contaminants of Emerging Concern in California" (California Ocean Science Trust et al. 2009) determined that "we are currently in the investigative phase, and developing regulatory limits would be premature at this time."

- The SWRCB has taken the position that "The issue of pharmaceuticals and other emerging contaminants is of concern to this board…At this point in time, however, the science is too uncertain to require each POTW [publicly owned treatment works] to monitor for a host of materials that have the potential to be found in its discharge" (SWRCB 2009).

The potential for project-related discharges to contain unregulated EDCs is unknown. However, neither project option would change the loading to San Pablo Bay of any EDCs that may be present in the Pinole-Hercules WPCP effluent and, under Option 2, local loading of these constituents in the initial zone of mixing and immediately downstream project area would potentially be reduced (because of the reduced amount of effluent).

The anticipated incremental increase in the size of the initial zone of mixing at Outfall 001, and related effects from EDC concentrations within the initial zone of mixing is not expected to contribute to adverse effects on beneficial uses. San Pablo Bay is not used for or designated as a drinking water supply; therefore, the potential for these compounds, if present, to affect human health through the consumption of organisms or water is effectively zero. As described above, the available scientific evidence regarding the effects of EDCs on aquatic organisms indicates potential for effects over periods of 28 days and longer, while potential for acute effects would be negligible. The levels of EDCs to which aquatic organisms would be exposed under Option 1 or Option 2 project conditions are not expected to be substantially different than under current conditions. This is primarily because the increased discharge (under Option 1) would occur during wet-weather events, which are transient and would not change the net loading to San Pablo Bay. The transient nature of the wet-weather events, when coupled with the tidal mixing and movement of the water near the outfall, would not provide a continuous source of EDC loading and concentrations near the outfall that would differ substantially from current conditions. Moreover, aquatic organisms passing through the initial zone of mixing would have substantially lesser exposure to EDCs than the exposures required to result in adverse effects, as discussed in the scientific literature cited above.

There are no current regulatory criteria against which to evaluate concentrations of EDCs in San Pablo Bay. However, the potential for effects on human health through water consumption would be negligible, the project would not result in a net increase in the mass or concentration of any EDC, and acute effects of EDCs to aquatic life occur at levels much higher than those found in wastewater effluent. As a result, the project discharges are not expected to result in substantial, long-term degradation of existing water quality that would cause adverse effects on one or more beneficial uses of San Pablo Bay. Therefore, this impact would be **less than significant**.

Mitigation Measure: No mitigation measures are required.

3.7 LAND USE PLANNING

3.7.1 ENVIRONMENTAL SETTING

Contra Costa County includes approximately 480,000 acres, approximately 25% of which consists of urban residential, commercial, and industrial land uses. The eastern portion of the county is generally used for agriculture and open space, while the central and western portions of the county are primarily suburban cities, made up of residential, commercial, and industrial land uses. The project facilities are located in the western portion of the county.

PINOLE-HERCULES WATER POLLUTION CONTROL PLANT

The Pinole-Hercules Water Pollution Control Plant (WPCP) is located within the city of Pinole and is subject to land use designations and zoning under the *City of Pinole General Plan 1995* (City of Pinole 1995).

The WPCP is located along the shoreline of San Pablo Bay, at 11 Tennent Avenue, Pinole, California, within Contra Costa County. The WPCP is bordered by the Union Pacific Railroad tracks to the south; Pinole Creek to the northeast; Bayfront Park to the southwest; and San Pablo Bay to the west. Land east and south of the project site, across the railroad tracks, consists of residential housing and a storage facility. The WPCP facility is located within an approximately 4.5-acre area, and is designated as light industrial/service commercial land uses and zoned as general industrial under the *City of Pinole General Plan*. This land use designation and zoning provide for a wide range of industrial and commercial activities that involve warehousing, manufacturing, processing, and other similar operations. Current operations of the WPCP are consistent with these land use designations and zoning.

PROPOSED CORPORATION YARD

The proposed corporation yard site is located within the city of Pinole on land designated as medium density residential/light industrial and zoned as mixed use under the *City of Pinole General Plan*. Adjacent land uses include medium density residential to the north and south, industrial/office park to the east, and light industrial/service commercial to the west.

PROPOSED PIPELINE ROUTE

The proposed pipeline under Option 1 would be installed within the boundaries of the city of Pinole, the city of Hercules, and unincorporated Contra Costa County. Land use designations under the *Contra Costa County General Plan 2005–2020*, *City of Pinole General Plan*, and *Hercules General Plan* are shown in Exhibit 3.7-1 and discussed in detail below.

City of Pinole

With the exception of a small portion that would be located within the existing Pinole-Hercules WPCP boundary, the pipeline would be installed along Pinole Creek, within the Atichson Topeka & Santa Fe and Union Pacific Railroad right-of-way, and within San Pablo Avenue. Land along Pinole Creek is designated and zoned as open space (Hersch, pers. comm., 2009). Additionally, Contra Costa County Flood Control and Water Conservation District maintains an easement along the creek.

The pipeline would leave the city of Pinole boundary approximately 100 feet before reaching the intersection of San Pablo Avenue and Hercules Avenue. Generally, residential land uses are adjacent to the segment of proposed pipeline located within the city of Pinole.

City of Hercules

The pipeline would travel through the city of Hercules for approximately 8,800 feet, beginning approximately 100 feet after reaching San Pablo Avenue (Exhibit 3.7-1). Within the city of Hercules, the pipeline would be installed within existing roadways.

The pipeline route would enter unincorporated Contra Costa County where it intersects with Willow Avenue. Land uses adjacent to the city of Hercules segment of the proposed pipeline include industrial, commercial, residential, and open space.

Unincorporated Contra Costa County

The proposed pipeline would enter the community of Rodeo at Willow Avenue, which is located within unincorporated Contra Costa County, approximately 50 feet before turning onto Parker Avenue (Exhibit 3.7-1). The remainder of the pipeline route to the Rodeo Sanitary District (RSD), a wastewater treatment plant, would be located within unincorporated Contra Costa County within existing roadways, except for a small portion within the RSD property boundary where it would be tied into existing facilities. Under the *Contra Costa County General Plan 2005–2020*, roadways, utility corridors, and transportation right-of-ways are considered to be designated as public and semi-public land uses; thus, the pipeline would be located within this land use designation for the unincorporated county segment. The proposed pipeline would be located within the community of Rodeo for approximately 1.25 miles. The planned unit zoning designation under Contra Costa County's general plan allows for large-scale residential developments that are encouraged to have creative and flexible designs.

Residential, commercial, open space, mixed use, and industrial land uses are adjacent to the proposed pipeline route within unincorporated portions of Contra Costa County.

3.7.2 REGULATORY FRAMEWORK

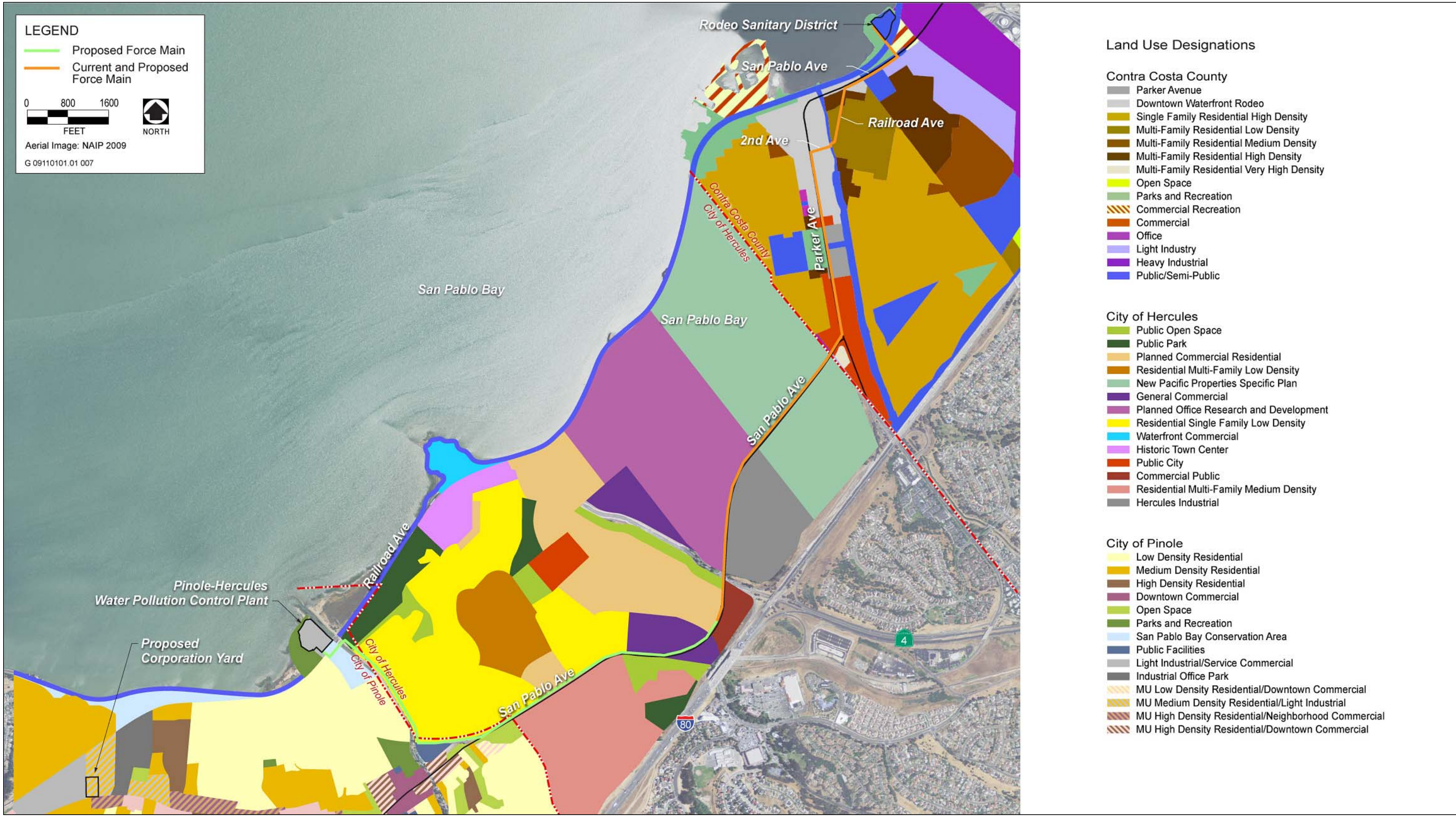
FEDERAL PLANS, POLICIES, REGULATIONS, AND LAWS

No federal plans, policies, regulations, or laws related to land use are applicable to the project.

STATE PLANS, POLICIES, REGULATIONS, AND LAWS

State Planning and Zoning Laws

Government Code Section 65300 et seq. establishes the obligation of cities and counties to adopt and implement general plans. The general plan is a comprehensive, long-term, and general document that describes plans for the physical development of a city or county and of any land outside its boundaries that, in the city's or county's judgment, bears relation to its planning. The general plan addresses a broad range of topics, including, at a minimum, land use, circulation, housing, conservation, open space, noise, and safety. In addressing these topics, the general plan identifies the goals, objectives, policies, principles, standards, and plan proposals that support the city's or county's vision for the area. The general plan is a long-range document that typically addresses the physical character of an area over a 20-year period. Finally, although the general plan serves as a blueprint for future development and identifies the overall vision for the planning area, it remains general enough to allow for flexibility in the approach taken to achieve the plan's goals.The California zoning law (Government Code Section 65800 et seq.) establishes that zoning ordinances, which are laws that define allowable land uses within a specific district, are required to be consistent with the general plan and any applicable specific plans. When amendments to the general plan are made, corresponding changes in the zoning ordinance may be required within a reasonable time to ensure that the land uses designated in the general plan would also be allowable by the zoning ordinance (Government Code Section 65860[c]).



Source: City of Hercules 1998, City of Pinole 1995, Contra Costa County 2005, compiled by AECOM in 2010

Land Uses in the Project Vicinity **Exhibit 3.7-1**

REGIONAL AND LOCAL PLANS, POLICIES, REGULATIONS, AND LAWS

Contra Costa County General Plan 2005–2020

The following goal and policy of the *Contra Costa County General Plan 2005–2020* (Contra Costa County 2005) Land Use Element regarding land use are applicable to the project.

- **Goal 3-A**: To coordinate land use with circulation, development of other infrastructure facilities, and protection of agriculture and open space, and to allow growth and the maintenance of the County's quality of life. In such an environment all residential, commercial, industrial, recreational and agricultural activities may take place in safety, harmony, and to mutual advantage.
  - **Policy 3-7**: The location, timing and extent of growth shall be guided through capital improvements programming and financing (i.e., a capital improvement program, assessment districts, impact fees, and developer contributions) to prevent infrastructure, facility and service deficiencies.

City of Pinole General Plan

The following policy of the *City of Pinole General Plan* (City of Pinole 1995) regarding land use is applicable to the project.

- **Policy LU5.9**: Retain the Open Space designation to protect the resource and recreation values of Pinole Creek.

City of Hercules General Plan

As described above under "Environmental Setting," the segment of proposed pipelined that would be located within the city of Hercules would be installed within existing roadways. No goals, objectives, or policies of the *Hercules General Plan* (City of Hercules 1998) are applicable to the project.

POTENTIAL PROJECT INCONSISTENCY WITH GENERAL PLAN POLICIES

Section 15125 (d) of the CEQA Guidelines suggests that in the environmental setting section, "The EIR shall discuss any inconsistencies between the proposed project and applicable general plans and regional plans." The Regulatory Framework subsections of each topic area evaluated in this DEIR contain a listing of the relevant general plan policies that would apply to proposed Options 1 and 2. Neither Option 1 nor Option 2 would result in an inconsistency with any general plan policy listed herein, within the exception of exceedence of noise standards. That inconsistency is discussed throughout Section 3.8, "Noise," is evaluated as part of Impact 3.8-1, and is identified as a significant and unavoidable impact in Section 4.3.

3.7.3 ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

THRESHOLDS OF SIGNIFICANCE

The thresholds for determining the significance of impacts for this analysis are based on the environmental checklist in Appendix G of the State CEQA Guidelines. The project was determined to result in a significant impact related to land use if it would do in any of the following:

- conflict with applicable land use plans, policies, or regulations of an agency with jurisdiction over the project adopted for the purpose of avoiding or mitigating an environmental effect;
- physically divide an established community; or

- conflict with any applicable habitat conservation plan or natural community conservation plan.

Issues related to land use compatibility with applicable habitat conservation plans or natural community conservation plans are addressed in Section 3.9, “Terrestrial Biology.”

ANALYSIS METHODOLOGY

Analysis of land use impacts is based on a review of the existing on-site and off-site land uses, as well as a review of the applicable land use plans, land use maps, and regulations.

Land use plans applicable to the project include:

- Contra Costa County General Plan 2005–2020
- City of Pinole General Plan 1995 (City of Pinole General Plan)
- Hercules General Plan (City of Hercules General Plan)

IMPACT ANALYSIS

IMPACT 3.7-1	Compatibility with Land Use Plans Adopted to Avoid or Mitigate Environmental Effects. *Implementation of the project would be consistent with applicable land use plans.*

Option 1: New Larger Effluent Pipeline to RSD

Improvements within the existing Pinole-Hercules WPCP boundary (i.e., improvements to the on-site primary and secondary treatment systems) would be consistent with the current light industrial/service commercial land use designation of the *City of Pinole General Plan*. These land use designations and zoning provide for a wide range of industrial and commercial activities that involve warehousing, manufacturing, processing, and other similar operations. Current operations of the Pinole-Hercules WPCP are consistent with these land use designations and zoning, and improvements and expansions of the WPCP facilities would also be consistent with the City of Pinole’s land use designations and zoning.

The proposed corporation yard would be located in the city of Pinole in an area designated for mixed uses/institutional land uses. Institutional uses include activities such as distribution, warehousing, storage, and processing. Therefore, the corporation yard would be consistent with the *City of Pinole General Plan* land use designation.

As discussed above under “Environmental Setting,” a small portion of the pipeline near the WPCP would be installed in an area designated and zoned as open space within the city of Pinole. Because the pipeline would be installed underground, there would be no change in, or conflict with, land use designations or zoning associated with project implementation within the city of Pinole.

Where the pipeline would be located within the city of Hercules, it would generally be located within existing roadways and public right-of-ways except for a small portion that passes through private property between Pinole Creek and San Pablo Avenue. As discussed above, the pipeline would be installed underground, and would therefore not change or conflict within applicable land use designations or zoning.

Public and semi-public land uses are designated in the segment of pipeline that would be installed within unincorporated Contra Costa County. The public and semi-public land use designation allows for a variety of uses including utility corridors (e.g., pipelines). Upon completion of project implementation, there would be no change in land uses compared to the existing conditions.

The facilities associated with Option 1 would be consistent with applicable land use designations because improvements to the Pinole-Hercules WPCP facility and pipeline installation would not conflict with any applicable land use plans adopted to avoid or mitigate an environmental effect. Therefore, there would be **no impact** under Option 1.

Option 2: Pinole-Only Flows at Existing Plant

Option 2 consists of a much smaller suite of improvements that would only be constructed within the existing WPCP facility boundary. As previously described above under Option 1, these activities would be consistent with the *City of Pinole General Plan* general industrial zoning designation. Therefore, there would be **no impact** under Option 2.

Mitigation Measure: No mitigation measures are required.

IMPACT 3.7-2	Potential for Division of an Established Community. *Implementation of the project would occur within the city of Pinole, the city of Hercules, and the community of Rodeo, but would not divide an established community.*

Option 1: New Larger Effluent Pipeline to RSD

The Pinole-Hercules WPCP is fenced and consists only of industrial uses; therefore, proposed improvements at the WPCP would not divide an established community.

The proposed corporation yard would be located in an area that consists of both commercial/industrial uses and residential housing. Because the area already consists of mixed uses, the corporation yard would not divide an established community.

As discussed above under "Environmental Setting," the proposed pipeline would generally be installed within roadways and small portions of open space and public lands (Exhibit 3.7-1). Land uses adjacent to the proposed pipeline route include residential, commercial, industrial, and open space uses. Installation of the pipeline would entail excavation, pipeline placement, and backfilling of the trench. Because the pipeline would be located underground, it would not divide an established community. For the reasons described above, there would be **no impact** related to division of an established community under Option 1.

Option 2: Pinole-Only Flows at Existing Plant

Option 2 consists of improvements that would be constructed only within the existing WPCP facility boundary; therefore, these improvements would not divide an existing community and there would be **no impact** under Option 2.

Mitigation Measure: No mitigation measures are required.

3.8 NOISE

3.8.1 ENVIRONMENTAL SETTING

ACOUSTIC FUNDAMENTALS

Acoustics is the scientific study that evaluates perception, propagation, absorption, and reflection of sound waves. Sound is a mechanical form of radiant energy, transmitted by a pressure wave through a solid, liquid, or gaseous medium. Sound that is loud, disagreeable, unexpected, or unwanted is generally defined as noise; consequently, the perception of sound is subjective in nature, and can vary substantially from person to person. Common sources of environmental noise and noise levels are presented in Exhibit 3.8-1.

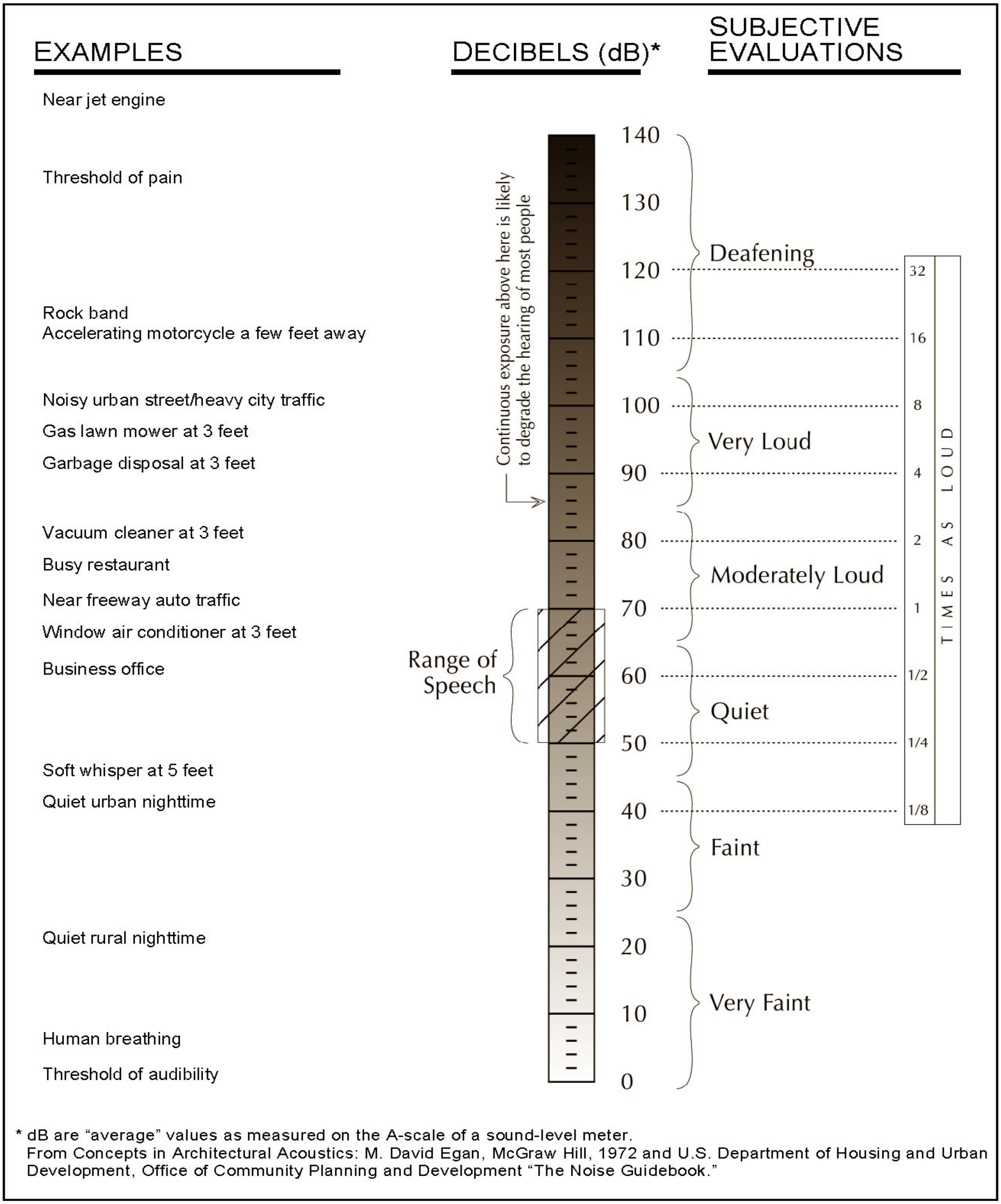
A sound wave is initiated in a medium by a vibrating object (e.g., vocal chords, the string of a guitar, the diaphragm of a radio speaker). The wave consists of minute variations in pressure, oscillating above and below the ambient atmospheric pressure. The number of pressure variation cycles occurring per second is referred to as the frequency of the sound wave and is expressed in hertz.

Directly measuring sound pressure fluctuations would require the use of a very large and cumbersome range of numbers. To avoid this and have a more useable numbering system, the decibel (dB) scale was introduced. A sound level expressed in decibels is the logarithmic ratio of two like pressure quantities, with one pressure quantity being a reference sound pressure. For sound pressure in air the standard reference quantity is generally considered to be 20 micropascals, which directly corresponds to the threshold of human hearing. The use of the decibel is a convenient way to handle the millionfold range of sound pressures to which the human ear is sensitive. A decibel is logarithmic; it does not follow normal algebraic methods and cannot be directly added. For example, a 65 dB source of sound, such as a truck, when joined by another 65 dB source results in a sound amplitude of 68 dB, not 130 dB (i.e., doubling the source strength increases the sound pressure by 3 dB). A sound level increase of 10 dB corresponds to 10 times the acoustical energy, and an increase of 20 dB equates to a hundredfold increase in acoustical energy.

The loudness of sound perceived by the human ear depends primarily on the overall sound pressure level and frequency content of the sound source. The human ear is not equally sensitive to loudness at all frequencies in the audible spectrum. To better relate overall sound levels and loudness to human perception, frequency-dependent weighting networks were developed. The standard weighting networks are identified as A through E. There is a strong correlation between the way humans perceive sound and A-weighted sound levels (dBA). For this reason the dBA can be used to predict community response to noise from the environment, including noise from transportation and stationary sources. Sound levels expressed as dB in this section are A-weighted sound levels, unless noted otherwise.

Noise can be generated by a number of sources, including mobile sources (transportation noise sources) such as automobiles, trucks, and airplanes and stationary sources (nontransportation noise sources) such as construction sites, machinery, and commercial and industrial operations. As acoustic energy spreads through the atmosphere from the source to the receiver, noise levels attenuate (decrease) depending on ground absorption characteristics, atmospheric conditions, and the presence of physical barriers (walls, building façades, berms). Noise generated from mobile sources generally attenuate at a rate of 4.5 dB per doubling of distance. Stationary noise sources spread with more spherical dispersion patterns that attenuate at a rate of 6 to 7.5 dB per doubling of distance.

Atmospheric conditions such as wind speed, turbulence, temperature gradients, and humidity may additionally alter the propagation of noise and affect levels at a receiver. Furthermore, the presence of a large object (e.g., barrier, topographic features, and intervening building façades) between the source and the receptor can provide significant attenuation of noise levels at the receiver. The amount of noise level reduction or “shielding” provided by a barrier primarily depends on the size of the barrier, the location of the barrier in relation to the source and receivers, and the frequency spectra of the noise. Natural barriers such as berms, hills, or dense woods, and human-made features such as buildings and walls may be used as noise barriers.



Source: Data compiled by AECOM in 2009

Common Noise Sources and Levels **Exhibit 3.8-1**

Noise Descriptors

The intensity of environmental noise fluctuates over time, and several different descriptors of time-averaged noise levels are used. The selection of a proper noise descriptor for a specific source depends on the spatial and temporal distribution, duration, and fluctuation of both the noise source and the environment. The noise descriptors most often used to describe environmental noise are defined below.

- **L_{max} (Maximum Noise Level):** The highest A/B/C weighted integrated noise level occurring during a specific period of time.
- **L_{min} (Minimum Noise Level):** The lowest A/B/C weighted integrated noise level during a specific period of time.
- **Peak:** The highest weighted or unweighted instantaneous peak-to-peak value occurring during a measurement period.
- **L_n (Statistical Descriptor):** The noise level exceeded n% of a specific period of time, generally accepted as an hourly statistic. An L_{10} would be the noise level exceeded 10% of the measurement period.
- **L_{eq} (Equivalent Noise Level):** The energy mean (average) noise level. The steady-state sound level that, in a specified period of time, contains the same acoustical energy as a varying sound level over the same time period.
- **L_{dn} (Day-Night Noise Level):** The 24-hour L_{eq} with a 10-dB "penalty" applied during nighttime noise-sensitive hours, 10 p.m. through 7 a.m. The L_{dn} attempts to account for the fact that noise during this specific period of time is a potential source of disturbance with respect to normal sleeping hours.
- **CNEL (Community Noise Equivalent Level):** Similar to the L_{dn} described above, but with an additional 5-dB "penalty" for the noise-sensitive hours between 7 p.m. to 10 p.m., which are typically reserved for relaxation, conversation, reading, and watching television. If the same 24-hour noise data are used, the CNEL is typically 0.5 dB higher than the L_{dn}.

Effects of Noise on Humans

Excessive and chronic exposure to elevated noise levels can result in auditory and nonauditory effects on humans. Auditory effects of noise on people are those related to temporary or permanent hearing loss caused by loud noises. Nonauditory effects of exposure to elevated noise levels are those related to behavioral and physiological effects. The nonauditory behavioral effects of noise on humans are associated primarily with the subjective effects of annoyance, nuisance, and dissatisfaction, which lead to interference with activities such as communications, sleep, and learning. The nonauditory physiological health effects of noise on humans have been the subject of considerable research attempting to discover correlations between exposure to elevated noise levels and health problems, such as hypertension and cardiovascular disease. The mass of research infers that noise-related health issues are predominantly the result of behavioral stressors and not a direct noise-induced response. The extent to which noise contributes to nonauditory health effects remains a subject of considerable research, with no definitive conclusions.

The degree to which noise results in annoyance and interference is highly subjective and may be influenced by several nonacoustic factors. The number and effect of these nonacoustic environmental and physical factors vary depending on individual characteristics of the noise environment such as sensitivity, level of activity, location, time of day, and length of exposure. One key aspect in the prediction of human response to new noise environments is the individual level of adaptation to an existing noise environment. The greater the change in the noise levels that are attributed to a new noise source, relative to the environment an individual has become accustom to, the less tolerable the new noise source will be perceived.

With respect to how humans perceive and react to changes in noise levels, a 1 dB increase is imperceptible, a 3 dB increase is barely perceptible, a 6 dB increase is clearly noticeable, and a 10-dB increase is subjectively perceived as approximately twice as loud (Egan 1988). These subjective reactions to changes in noise levels was developed on the basis of test subjects' reactions to changes in the levels of steady-state pure tones or broad-band noise and to changes in levels of a given noise source. It is probably most applicable to noise levels in the range of 50 to 70 dB, as this is the usual range of voice and interior noise levels. For these reasons, a noise level increase of 3 dB or more is typically considered substantial in terms of the degradation of the existing noise environment.

Vibration

Vibration is the periodic oscillation of a medium or object with respect to a given reference point. Sources of vibration include natural phenomena (e.g., earthquakes, volcanic eruptions, sea waves, landslides) and those introduced by human activity (e.g., explosions, machinery, traffic, trains, construction equipment). Vibration sources may be continuous, (e.g., operating factory machinery or transient in nature, explosions). Vibration levels can be depicted in terms of amplitude and frequency, relative to displacement, velocity, or acceleration.

Vibration amplitudes are commonly expressed in peak particle velocity (PPV) or root-mean-square (RMS) vibration velocity. PPV is defined as the maximum instantaneous positive or negative peak of a vibration signal. PPV is typically used in the monitoring of transient and impact vibration and has been found to correlate well to the stresses experienced by buildings (FTA 2006:7-1 through 7-8, Caltrans 2004:5-7). PPV and RMS vibration velocity are normally described in inches per second (in/sec).

Although PPV is appropriate for evaluating the potential for building damage, it is not always suitable for evaluating human response. The response of the human body to vibration relates well to average vibration amplitude; therefore, vibration impacts on humans are evaluated in terms of RMS vibration velocity. Similar to airborne sound, vibration velocity can be expressed in decibel notation as vibration decibels (VdB). The logarithmic nature of the decibel serves to compress the broad range of numbers required to describe vibration.

Typical outdoor sources of perceptible groundborne vibration include construction equipment, steel-wheeled trains, and traffic on rough roads. Although the effects of vibration may be imperceptible at low levels, effects may result in detectable vibrations and slight damage to nearby structures at moderate and high levels, respectively. At the highest levels of vibration, damage to structures is primarily architectural (e.g., loosening and cracking of plaster or stucco coatings) and rarely results in damage to structural components. The range of vibration that is relevant to this analysis occurs from approximately 50 VdB, which is the typical background vibration-velocity level, to 100 VdB, which is the general threshold where minor damage can occur in fragile buildings (FTA 2006:8-1 through 8-8).

EXISTING NOISE ENVIRONMENT

Sensitive Land Uses

Noise-sensitive land uses are generally considered to include those uses where noise exposure could result in health-related risks to individuals, as well as places where quiet is an essential element of their intended purpose. Residential dwellings are of primary concern because of the potential for increased and prolonged exposure of individuals to both interior and exterior noise levels. Additional land uses such as parks, historic sites, cemeteries, and recreation areas are also generally considered sensitive to increases in exterior noise levels. Schools, places of worship, hotels, libraries, and other places where low interior noise levels are essential are also considered noise-sensitive.

Existing noise-sensitive land uses in the project vicinity consist primarily of single-family residences. More specifically, residences are currently located approximately 500 feet to the east, adjacent to Pinole Creek, and to the south of the Pinole-Hercules WPCP within the City of Pinole. Residences are also currently located along the proposed pipeline route under Option 1 adjacent to such roadways as Parker Avenue, Railroad Avenue, and San Pablo Avenue in Contra Costa County; San Pablo Avenue and Cardoza Drive in the City of Hercules; and Calais Drive in the City of Pinole. With respect to the proposed corporation yard location under Option 1, the nearest noise-sensitive receptor includes a residential community located approximately 250 feet to the northwest along Dohrmann Lane and west of Pinole Shores Drive.

Vibration-sensitive land uses include those described above as noise sensitive; schools are considered less vibration sensitive than residences and similar land uses where people sleep. Vibration-sensitive land uses also include educational, commercial, and industrial buildings where vibration would interfere with operations within the building, including levels that may be well below those associated with human annoyance. Equipment such as electron microscopes and high-resolution lithographic equipment can be very sensitive to vibration, and even normal optical microscopes will sometimes be difficult to use when vibration is well below the human annoyance level. Manufacturing of computer chips is an example of a vibration-sensitive process. This category does not include most computer installations or telephone switching equipment because most such equipment is designed to operate in typical building environments where the equipment may experience occasional shock from bumping and continuous background vibration caused by other equipment (FTA 2006). The vibration-sensitive receptors in the project vicinity are the same residences that are considered noise sensitive.

Ambient-Noise Survey

An ambient noise survey was conducted on December 10, 2009. The purpose of the survey was to establish existing noise conditions in the project vicinity. Short-term noise measurements were taken at four locations along the proposed pipeline route under Option 1, because those areas represent the greatest potential for noise impacts. Noise level measurements were taken in accordance with American National Standards Institute (ANSI) standards using a Larson Davis Laboratories (LDL) Model 820 precision integrating sound level meters (SLMs) The SLMs were calibrated before and after use with an LDL Model CAL200 acoustical calibrator to ensure that the measurements would be accurate. The equipment used meets all pertinent specifications of the ANSI for Type 1 SLMs (ANSI S1.4-1983 [R2006]). Ambient-noise survey locations are shown in Exhibit 3.8-2. The L_{eq}, L_{max}, and L_{50} values taken at each ambient noise measurement location are presented in Table 3.8-1.

Table 3.8-1
Summary of Ambient Noise Measurements (short term)

Site	Location	Time	dB L_{eq}	L_{50} dB	L_{max}
ST-1	South of San Pablo Avenue on Railroad Avenue	12:40–12:55 p.m.	58.2	54.6	76.1
ST-2	San Pablo Avenue northeast of Hercules Avenue	2:30–2:45 p.m.	66.4	65.0	79.0
ST-3	San Pablo Avenue southwest of Victoria Crescent	1:15–1:30 p.m.	62.4	58.6	75.1
ST-4	Pinole Creek and Woodfield Lane	2:55–3:10 p.m.	49.8	48.1	60.4

Notes: dB=A-weighted decibels; L_{eq} = energy-equivalent noise level; L_{max} = maximum noise level; L_{50} = noise level exceeded 50% of the time; ST = short-term.
Noise measurement sites correspond to those depicted on Exhibit 3.8-2.
Source: Data collected by AECOM on December 10, 2009.

During the survey, noise levels ranged from approximately 50 to 66 dB L_{eq}, with maximum noise levels ranging from 60 to 79 dB L_{max}. The primary noise source affecting noise measurement locations was vehicular traffic on San Pablo Avenue, Interstate 80 (I-80), Railroad Avenue, and other nearby roadways. Ambient noise levels were dependent on the relative distance from nearby roadways and shielding provided by nearby existing structures. Meteorological conditions during the measurement period were adequate for reliable noise measurements, with cloudy skies, temperatures ranging from 50°F to 56°F, and light winds at 5 to 10 mph.

Source: Prepared by AECOM in 2009

Ambient Noise Measurement Locations **Exhibit 3.8-2**

Noise Sources

The existing noise environment in the project vicinity is influenced primarily by surface transportation noise emanating from vehicular traffic on area roadways (e.g., San Pablo Avenue, Parker Avenue, Railroad Avenue, I-80, State Route [SR] 4, and Pinole Shores Drive). At receptors adjacent to the existing roadways along the proposed pipeline route under Option 1, the primary noise source is vehicle traffic on adjacent roadways. Some of the roadways where the proposed pipeline would be installed are currently rarely used. In these areas, noise from landscaping equipment, dogs barking, people talking, and aircraft overflight may be as noticeable as vehicle noise.

Current on-site noise is also associated with the existing WPCP, cogeneration plant, and corporation yard. On-site noise-generating stationary equipment includes electrical pump motors, air compressors, fans, aerators, chlorination systems, transformers, and emergency generators. Operations at the co-generation plant involve an engine that has been constructed to run on methane and an associated generator. Noise sources associated with the corporation yard includes truck idling, truck circulation on-site, forklift operation, as well as fixed or stationary-type noise sources such as generators, fans, air compressors, heavy equipment, and diesel motors.

The Union Pacific railroad track runs diagonally through Hercules and Rodeo in a southwest-to-northeast direction along the San Pablo Bay shoreline. In addition, the Atchison-Topeka & Santa Fe Railway runs through Hercules and the City of Pinole in an east-west direction. The proposed pipeline under Option 1 would parallel the Union Pacific Railroad for approximately 1,250 feet in Rodeo and the Atchison-Topeka & Santa Fe railroad for approximately 4,500 feet in the City of Hercules. The proposed corporation yard would be located adjacent to the Atchison-Topeka & Santa Fe railroad in Pinole. According to the *Hercules General Plan*, both the Union Pacific and the Atchison-Topeka & Santa Fe railroads are considered “major noise sources” in the city (City of Hercules 1998a:VII-7). Noise from railroad operations (e.g., train passbys and warning horns) is also a dominant noise source for receptors near the tracks. The Union Pacific and Atchison-Topeka & Santa Fe railroads are also considered to be a source of groundborne vibration in the immediate vicinity of the tracks.

3.8.2 REGULATORY FRAMEWORK

Various private and public agencies have established noise guidelines and standards to protect citizens from potential hearing damage and other adverse physiological and social effects associated with noise. Applicable standards and guidelines are described below.

FEDERAL PLANS, POLICIES, REGULATIONS, AND LAWS

The U.S. Environmental Protection Agency’s (EPA’s) Office of Noise Abatement and Control was originally established to coordinate Federal noise control activities. After its inception EPA’s Office of Noise Abatement and Control issued the Federal Noise Control Act of 1972, establishing programs and guidelines to identify and address the effects of noise on public health, welfare, and the environment. In 1981, EPA administrators determined that subjective issues such as noise would be better addressed at more local levels of government. Consequently, in 1982 responsibilities for regulating noise control policies were transferred to state and local governments. However, noise control guidelines and regulations contained in EPA rulings in prior years remain in place by designated Federal agencies where relevant. No Federal noise regulations are applicable to Option 1 or Option 2.

To address the human response to groundborne vibration, FTA has guidelines for maximum-acceptable vibration criteria for different types of land uses. These guidelines recommend 65 VdB referenced to 1 microinch per second (μin/sec) and based on the RMS velocity amplitude for land uses where low ambient vibration is essential for interior operations (e.g., hospitals, high-tech manufacturing, laboratory facilities); 80 VdB for residential uses and buildings where people normally sleep; and 83 VdB for institutional land uses with primarily daytime operations (e.g., schools, churches, clinics, offices) (FTA 2006).

STATE PLANS, POLICIES, REGULATIONS, AND LAWS

The State of California has adopted noise standards in areas of regulation not preempted by the Federal government. State standards regulate noise levels of motor vehicles, sound transmission through buildings, occupational noise control, and noise insulation.

Title 24 of the California Code of Regulations, also known as the California Building Standards Code, establishes building standards applicable to all occupancies throughout the state (California Building Standards Commission 2002). The code provides acoustical regulations for both exterior-to-interior sound insulation as well as sound and impact isolation between adjacent spaces of various occupied units. Title 24 regulations state that interior noise levels generated by exterior noise sources shall not exceed 45 dB L_{dn}/CNEL, with windows closed, in any habitable room for general residential uses. The California Streets and Highways Code also contain regulations for assessing traffic noise impacts of new or altered state freeways on schools.

Though not adopted by law, the *State of California General Plan Guidelines 2003*, published by the California Governor's Office of Planning and Research, provides guidance for the compatibility of projects within areas of specific noise exposure. Table 3.8-2 presents acceptable and unacceptable community noise exposure limits for various land use categories. The guidelines also present adjustment factors that may be used to arrive at noise acceptability standards that reflect the noise control goals of the community, the particular community's sensitivity to noise, and the community's assessment of the relative importance of noise pollution.

Table 3.8-2
Land Use Noise Compatibility Guidelines

Land Use Category	Community Noise Exposure (L_{dn}/CNEL, dB)			
	Normally Acceptable[1]	Conditionally Acceptable[2]	Normally Unacceptable[3]	Clearly Unacceptable[4]
Residential-Low Density Single Family, Duplex, Mobile Home	<60	55–70	70–75	75+
Residential-Multiple Family	<65	60–70	70–75	75+
Transient Lodging, Motel, Hotel	<65	60–70	70–80	80+
School, Library, Church, Hospital, Nursing Home	<70	60–70	70–80	80+
Auditorium, Concert Hall, Amphitheater		<70	65+	
Sports Arenas, Outdoor Spectator Sports		<75	70+	
Playground, Neighborhood Park	<70		67.5–75	72.5+
Golf Courses, Stable, Water Recreation, Cemetery	<75		70–80	80+
Office Building, Business Commercial and Professional	<70	67.5–77.5	75+	
Industrial, Manufacturing, Utilities, Agriculture	<75	70–80	75+	

Notes: CNEL = Community Noise Equivalent Level; dB = A-weighted decibels; L_{dn} = day-night average noise level.

1 Specified land use is satisfactory, based on the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.

2 New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features are included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice.

3 New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design. Outdoor areas must be shielded.

4 New construction or development should generally not be undertaken.

Source: OPR 2003:244-254, Contra Costa County 2005:11-38, Figure 11-6

REGIONAL AND LOCAL PLANS, POLICIES, REGULATIONS, AND LAWS

Contra Costa County General Plan 2005–2020

Under Option 1, a portion of the proposed effluent pipeline would be constructed in Rodeo, an unincorporated community in Contra Costa County. Therefore, the following goals and policies of the *Contra Costa County General Plan 2005–2020* (Contra Costa County 2005) Noise Element regarding noise are applicable to Option 1. No goals and policies of the *Contra Costa County General Plan 2005–2020* regarding noise are applicable to Option 2.

- **Goal 11-A:** To improve the overall environment in the County by reducing annoying and physically harmful levels of noise for existing and future residents and for all land uses.

- **Goal 11-B:** To maintain appropriate noise conditions in all areas of the County.

- **Goal 11-C:** To ensure that new developments will be constructed so as to limit the effects of exterior noise on the residents.

  - **Policy 11-1:** New projects shall be required to meet acceptable exterior noise level standards as established in the Noise and Land Use Compatibility Guidelines contained in Figure 11-6 [Table 3.8-2 of this section]. These guidelines, along with the future noise levels shown in the future noise contours maps, should be used by the county as a guide for evaluating the compatibility of "noise sensitive" projects in potentially noisy areas.

  - **Policy 11-2:** The standard for outdoor noise levels in residential areas is 60 dB L_{dn}. However, 60 dB L_{dn} or less may not be achievable in all residential areas due to economic or aesthetic constraints. One example is small balconies associated with multi-family housing. In this case, second and third story balconies may be difficult to control to the goal. A common outdoor use area that meets the goal can be provided as an alternative.

  - **Policy 11-7:** Public projects shall be designed and constructed to minimize long-term noise impacts on existing residents.

  - **Policy 11-8:** Construction activities shall be concentrated during the hours of the day that are not noise-sensitive for adjacent land uses and should be commissioned to occur during normal work hours of the day to provide relative quiet during the more sensitive evening and early morning periods.

Contra Costa County Code

The Contra Costa County Code does not include a noise ordinance or any performance standards or regulations for the purpose of preventing unnecessary, excessive, and offensive noise levels within the county. Noise complaints in unincorporated areas are addressed by ordinances concerning disturbance of the peace and general nuisance.

City of Pinole General Plan

The following goals and policies outlined in the *City of Pinole General Plan* (City of Pinole 1995) Health and Safety Element regarding noise are applicable to both Option 1 and Option 2.

Health and Safety Element

- **Goal H54: New Development Noise Standards.** Ensure all new development complies with the noise standards established in the Pinole Health and Safety Element and prevent all new noise sources from increasing the existing noise level above acceptable standards.

- **Goal HS5: Reduce Existing Objectionable Noise Sources.** Eliminate or reduce noise from existing objectionable noise sources.

  - **Policy HS4: New Development Noise Standards.** Ensure all new development complies with the noise standards established in the Pinole health and safety element and prevent all new noise sources from increasing the existing noise level above acceptable standards (normally acceptable noise standards for new land uses are established in the Land Use Compatibility for Community Exterior Noise Environments table below [Table 3.8-3 of this section]).

Table 3.8-3
Land Use Compatibility for Community Noise Environments

Land Use Category	Exterior Noise Exposure L_{dn}/CNEL (dB)					
	55	60	65	70	75	80
Residential, Hotels, and Motels	Normally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Unacceptable	Unacceptable
Outdoor Sports and Recreation, Neighborhood Parks and Playgrounds	Normally Acceptable	Normally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Unacceptable
Schools, Libraries, Museums, Hospitals, Personal Care, Meeting Halls, Churches	Normally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Unacceptable	Unacceptable
Office Buildings, Business Commercial, and Professional	Normally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Unacceptable
Auditoriums, Concert Halls, Amphitheaters	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Unacceptable	Unacceptable	Unacceptable
Industrial, Manufacturing, Utilities, and Agriculture	Normally Acceptable	Normally Acceptable	Normally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable

Normally Acceptable – Specified Land use is satisfactory, based upon the assumption that any buildings involved are of normal convention construction, without any special insulation requirements.

Conditionally Acceptable – Specified land use may be permitted only after detailed analysis of the noise reduction requirements and needed noise insulation features are included in the design to mitigate noise to normally acceptable levels.

Unacceptable – new construction or development should generally not be undertaken because mitigation is usually not feasible to comply with noise element policies.

Notes: CNEL = Community Noise Equivalent Level; dB = A-weighted decibels; L_{dn} = day-night average noise level.
Source: City of Pinole 1995:8-11

  - **Policy HS4.2: Outdoor Noise Levels.** The goal for maximum outdoor noise levels in residential areas is 60 dB L_{dn}. This level is a requirement to guide the design and location of future development and is a goal for the reduction of noise in existing development. However, 60 dB L_{dn} is a goal which cannot necessarily be reached in all residential areas within the realm of economic or aesthetic feasibility. This goal will be applied where outdoor use is a major consideration (e.g., backyards in single-family housing developments and recreation areas in multi-family housing projects). The outdoor standard will not normally be applied to the small decks associated with apartments and condominiums but these will be evaluated on a case-by-case basis.

- **Policy HS4.6: New Commercial, Industrial and Office Noise Standards.** Appropriate interior noise levels in commercial, industrial, and office buildings are a function of the use of space and shall be evaluated on a case-by-case basis. Interior noise levels in offices generally should be maintained at 45 L_{eq} (hourly average) or less.

- **Policy HS4.7: Areas Below Desired Noise Standards.** These guidelines are not intended to be applied reciprocally. In other words, if an area currently is below the desired noise standards, an increase in noise up to the maximum should not necessarily be allowed. The impact of a proposed project on an existing land use should be evaluated in terms of the increase in existing noise levels and potential for adverse community impact, regardless of the compatibility guidelines.

- **Policy HS4.8**: **Non-Transportation Related Noise Sources.** For non-transportation related noise sources, noise levels outdoors should not exceed the limits in the table below [Table 3.8-4 of this DEIR]. Interior noise levels shall be 15 dB lower than those shown in the table.

- **Policy HS4.9: Noise Environment in Existing Residential Areas.** Protect the noise environment in existing residential areas. In general, the City will require the evaluation of mitigation measures for projects under the following circumstances:

  a. The project would cause the L_{dn} to increase 3 dB or more.
  b. Any increase would result in 60 dB L_{dn} or greater.
  c. The L_{dn} already exceeds 60 dB.
  d. The project has the potential to generate significant adverse community response.

- **Policy HS4 10: Mitigating the Effects of Noise on Adjacent Properties.** Require proposals to reduce noise impacts on adjacent properties through the following and other means, as appropriate:

  a. Screen and control noise sources such as parking, outdoor activities and mechanical equipment.

  b. Increase setbacks for noise sources from adjacent dwellings.

  c. Wherever possible do not remove fences, walls or landscaping that serve as noise buffers, although design, safety and other impacts must be addressed.

  d. Use soundproofing materials and double glazed windows.

  e. Control hours of operation, including deliveries and trash pickup to minimize noise impacts.

► **Goal HS5:** Reduce Existing Objectionable Noise Sources. Eliminate or Reduce Noise From Existing or Objectionable Noise Sources.

- **Policy HS5.1: Commercial or Industrial Source Noise.** Noise created by commercial or industrial sources associated with new projects or developments shall be controlled so as not to exceed the noise level standards set forth in the table below (Maximum Allowable Noise Exposure for Stationary Noise Sources [Table 3.8-4 of this section]), as measured at any affected residential land use.

Table 3.8-4 Maximum Allowable Noise Exposure for Stationary Noise Sources [1]		
	Daytime [5] 7 a.m. to 10 p.m.	Nighttime [2, 5] 10 p.m. to 7 a.m.
Hourly L_{eq} (dB) [3]	55	45
Maximum Level (dB) [3]	70	65
Maximum Level (dB) – Impulsive Noise [4]	65	60

Notes: L_{eq} = the equivalent hourly average noise level; dB = A-weighted decibels.
(1) As determined at the property line of the receiving land use. When determining effectiveness of noise mitigation measures, the standards may be applied on the receptor side of noise barriers or other property line noise mitigation measures.
(2) Applies only where the receiving land use operates or is occupied during nighttime hours.
(3) Sound level measurements shall be made with "slow" meter response.
(4) Sound level measurements shall be made with "fast" meter response.
(5) Allowable levels shall be raised to the ambient noise levels where the ambient levels exceed the allowable levels. Allowable levels shall be reduced 5 dB if the ambient hourly L_{eq} is at least 10 dB lower than the allowable level.
Source: City of Pinole 1995:8-15

- **Policy HS5.2: New Noise Reducing Technologies.** Support and employ new noise reducing technologies in the development and maintenance of local and regional infrastructure.

City of Pinole Code, General Regulations of Construction

The noise standards contained in the City of Pinole Code (City of Pinole 2009) are reproduced below, and are applicable to Option 1 and Option 2.

Chapter 15.02, General Provisions

Section 15.02.070 General Regulations of Construction

A. Saturday construction work is allowed in commercial zones only, from nine a.m. (9:00 a.m.) to six p.m. (6:00 p.m.), as long as it is interior work and does not generate significant noise.

B. Work be allowed from seven a.m. (7:00 a.m.) to five p.m. (5:00 p.m.) on non-federal holidays (holidays recognized by the City of Pinole, but not acknowledged federally are: Lincoln's Birthday (February 12), Ceasar Chavez Day (March 30) Admission's Day and the Day after Thanksgiving), but no inspections would be performed.

C. The Council designates the City Manager (or his/her representative) to further modify on a case-by-case basis the hours of construction in commercial zones. Additionally, the City Manager or his/her designee has the ability to revise the construction hours based on inclement weather conditions or certain construction procedures (such as setting up from a concrete pour) that may require working beyond 5 pm on weekdays or six p.m. (6:00 p.m.) on Saturday.

D. Administrative citations and penalties penalize responsible parties who fail or refuse to comply with any city ordinance or fail to promptly abate a public nuisance.

E. The minimum fine for such a citation or penalty is one thousand dollars ($1,000.00), and escalates in one thousand dollars ($1,000.00) increments.

1 Exception 1. Homeowners performing additions, repairs, or remodeling are allowed to work on their residences on weekends and holidays between nine a.m. (9:00 a.m.) and five p.m. (5:00 p.m.)

2. Exception 2. By written authorization of the building official, a residential property owner with a valid permit to construct a single-family residence for personal occupancy shall be allowed to work on weekends and holidays between nine a.m. (9:00 a.m.) and five p.m. (5:00 p.m.). This authorization shall be granted to applicants who have not built a residence in Pinole in the previous five-year (5) period and who affirm in writing their intention to reside at the subject property.

F. Work must be controlled to prevent causing a public nuisance due to dust, noise, vibrations, etc. (Ord. 2007-03 § 1, 2007; Ord. 553 § 2(part), 1992).

Hercules General Plan

Under Option 1, the proposed effluent pipeline would be constructed in the city of Hercules. The following goals and policies of the *Hercules General Plan* (City of Hercules 1998) Noise Element regarding noise are applicable to Option 1. No goals and policies of the *Hercules General Plan* policies regarding noise are applicable to Option 2.

GOALS: The goals of the City of Hercules' Noise Element are to:

- ensure that all new development is compatible with the existing and future noise environment;
- prevent all new noise sources from increasing the existing noise level above acceptable standards; and
- eliminate or reduce noise from existing or objectionable noise sources.

- **Policy 1:** New residential development projects shall meet acceptable exterior noise level standards. The noise contour map on file at City Hall shall be used to screen projects to determine if acoustical studies will be required. The "normally acceptable" noise standards for new land uses established in Land Use Compatibility for Community Exterior Noise Environments shown in Table 6 [Table 3.8-5 of this section] shall be modified by the following:

    - The maximum acceptable noise level in residential areas is 60 dB L_{dn}. This level shall guide the design and location of future development, and is a goal for the reduction of noise in existing development. A 60 dB Ldn goal will be applied where outdoor use is a major consideration (e.g., backyards in single-family housing developments and recreation areas in multi-family housing projects).

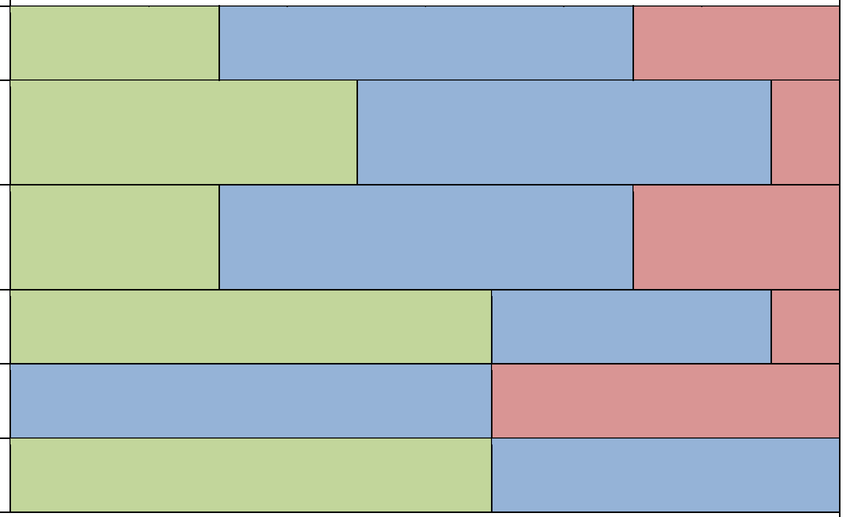
    - Appropriate interior noise levels in commercial, industrial, and office buildings are a function of the use of space and shall be evaluated on a case-by-case basis. Interior noise levels in offices generally should be maintained at 45 dB Leq (hourly average) or less.

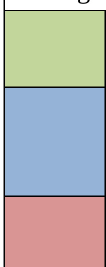
    - These guidelines are not intended to be applied reciprocally. In other words, if an area currently is below the desired noise standards, an increase in noise up to the maximum should not necessarily be allowed. The impact of a proposed project on an existing land use should be evaluated in terms of the potential for adverse community response based on a significant increase in existing noise levels, regardless of the compatibility guidelines.

    - For non-transportation related noise sources, outdoor noise levels within a residential property should not exceed the limits in Table 7 [Table 3.8-6 of this section]. Interior noise levels shall be 15 dB lower than those shown in Table 7 [Table 3.8-6 of this section].

Table 3.8-5
Land Use Noise Compatibility for Community Noise Environments

Land Use Category	Exterior Noise Exposure L_{dn}/CNEL, dB					
	55	60	65	70	75	80
Residential, Hotels, and Motels						
Outdoor Sports and Recreation, Neighborhood Parks and Playgrounds						
Schools, Libraries, Museums, Hospitals, Personal Care, Meeting Halls, Churches						
Office Buildings, Business Commercial, and Professional						
Auditoriums, Concert Halls, Amphitheaters						
Industrial, Manufacturing, Utilities, and Agriculture						





Normally Acceptable – Specified Land use is satisfactory, based upon the assumption that any buildings involved are of normal convention construction, without any special insulation requirements.

Conditionally Acceptable – Specified land use may be permitted only after detailed analysis of the noise reduction requirements and needed noise insulation features are included in the design to mitigate noise to normally acceptable levels.

Unacceptable – new construction or development should generally not be undertaken because mitigation is usually not feasible to comply with noise element policies.

Notes: CNEL = Community Noise Equivalent Level; dB = A-weighted decibels; L_{dn} = day-night average noise level.
Source: City of Hercules 1998a: 21, Table 6

Table 3.8-6
Maximum Allowable Noise Exposure Stationary Noise Sources [1]

	Daytime [5] 7 a.m. to 10 p. m.	Nighttime [2, 5] 10 p.m. to 7 a.m.
Hourly L_{eq} (dB) [3]	55	45
Maximum Level (dB) [3]	70	65
Maximum Level (dB) – Impulsive Noise [4]	65	60

Notes: dB = A-weighted decibels; L_{dn} = day-night average noise level.
Stationary noise sources include all nontransportation sources.
1 As determined at the property line of the receiving land use. When determining the effectiveness of noise mitigation measures, the standards may be applied on the receptor side of noise barriers or other property line noise mitigation measures.
2 Applies only where the receiving land use operates or is occupied during nighttime hours.
3 Sound level measurements shall be made with "slow" meter response.
4 Sound level measurements shall be made with "fast" meter response.
5 Allowable levels shall be raised to the ambient noise levels where the ambient levels exceed the allowable levels. Allowable levels shall be reduced by 5 dB if the ambient hourly L_{eq} is at least 10 dB lower than the allowable level.
Source: City of Hercules 1998a: 23, Table 7

- **Policy 2:** New non-residential land development projects shall meet acceptable exterior noise level standards set forth in Table 6 [Table 3.8-5 of this section]. The noise contour map on file at City Hall shall be used to screen projects to determine if acoustical studies will be required.

- **Policy 3:** Protect existing noise-sensitive land uses from long-term noise impacts generated by new projects. The City shall use the following criteria to judge the significance of long-term noise impacts on existing noise-sensitive land uses:

  - Noise level increases resulting from traffic associated with new projects will be considered significant if: (1) the noise level increase is 5 dB Ldn or greater and the future noise level is less than 60 dB Ldn; or (2) the noise level increase is 3 dB Ldn or greater and the future noise level is 60 dB Ldn or greater.

  - Noise levels produced by stationary sources associated with new projects will be considered significant if they exceed the noise level standards set forth in Table 7 [Table 3.8-6 of this section] as measured at any affected noise sensitive land use.

- **Policy 4:** Noise created by commercial or industrial sources associated with new projects or developments shall be controlled so as not to exceed the noise level standards set forth in Table 7 [Table 3.8-5 of this section] as measured at any affected residential land use.

- **Policy 6:** Control the level of noise at noise-sensitive land uses generated by construction activities through implementation of the following measures:

  - For construction near noise-sensitive areas, as determined by the Community and Business Development Department, require that noisy construction activities (including truck traffic) be scheduled for periods, according to construction permit to limit impact on adjacent residents or other receptors.

  - Develop a construction schedule that minimizes potential cumulative construction noise impacts and accommodates particularly noise-sensitive periods for nearby land uses (e.g., for schools, churches)

  - Where feasible, require that holes for driven piles be pre-drilled to reduce the level and duration of noise impacts.

  - Where feasible, construct temporary solid noise barriers between sources and sensitive receptors to reduce offsite propagation of construction noise. This measure could reduce construction noise by up to 5 dB.

  - Require internal combustion engines used for construction purposes to be equipped with a properly operating muffler of a type recommended by the manufacturer. Also, require impact tools to be shielded per manufacturer’s specifications.

- **Policy 7:** Reduce the level of truck-generated noise in residential areas through implementation of the following restrictions.

  - The City shall restrict truck traffic in residential areas except for non-regular deliveries within the area or on designated truck routes. The City shall review and update the noise ordinance to limit truck traffic noise impacts to sensitive receptors.

  - The City shall post signs prohibiting trucks from using the proposed Claeys Road extension, except for local deliveries. All other trucks shall be required to use Sycamore Avenue to reach the Claeys Road/SR 4 interchange.

City of Hercules Zoning Ordinance

The noise standards contained in the City of Hercules Zoning Ordinance (City of Hercules 1998b: 117–119) are reproduced below, and are applicable to the proposed pipeline under Option 1. These standards are not applicable to Option 2.

Performance Standards, Noise (Section 31.300, part 11)

11. Noise

B. New non-residential land development projects shall meet acceptable exterior noise level standards set forth in Table 6 [Table 3.8-5 of this section] of the Noise Element of the General Plan. The noise contour map on file at City Hall shall be used to screen projects to determine if acoustical studies will be required.

C. Noise created by commercial or industrial sources associated with new projects or developments shall be controlled so as not to exceed the noise level standards set forth in Table 7 [Table 3.8-6 of this section] of the Noise Element of the General Plan as measured at any affected residential land use.

D. Control the level of noise at noise-sensitive land uses generated by construction activities through implementation of the following measures:

   1) For construction near noise-sensitive areas, as determined by the Community Development Department, require that noisy construction activities (including truck traffic) be scheduled for periods, according to construction permit to limit impact on adjacent residents or other sensitive receptors.

   2) Require a construction schedule that minimizes potential cumulative construction noise impacts and accommodates particularly noise-sensitive periods for nearby land uses (e.g., for schools, churches)

   3) Where feasible, require that holes for driven piles be pre-drilled to reduce the level and duration of noise impacts.

   4) Where feasible, construct temporary solid noise barriers between sources and sensitive receptors to reduce offsite propagation of construction noise. This measure could reduce construction noise by up to 5 dB.

   5) Require internal combustion engines used for construction purposes to be equipped with a properly operating muffler of a type recommended by the manufacturer. Also, require impact tools to be shielded per manufacturer's specifications.

E. Noise Attenuation Techniques: Where noise levels exceed community noise standards for a proposed land use, one or more of the following techniques may be required to reduce the noise to acceptable level.

   1) Proper site planning to reduce noise impacts should be investigated for a project. By taking advantage of the natural shape and contours of the site, it is often possible to arrange the buildings and other uses in a manner which will reduce and possibly eliminate noise impact. Site planning techniques include:

      a) Increasing the distance between the noise sources and the receiver.

      b) Placing non-noise sensitive structures such as parking lots, maintenance facilities and utility areas between the source and the receiver.

      c) Using non-noise sensitive structures such as garages to shield noise-sensitive areas.

      d) Orienting buildings to shield outdoor spaces from a noise source.

3) Noise Barriers: To be effective, a noise barrier must be massive enough to prevent significant noise transmission through it and high enough to shield the receiver from the noise source. The minimum acceptable surface weight for a noise barrier is 4 pounds per square foot (lb/sq. ft.) (e.g., three-quarter-inch plywood) and the barrier must be carefully constructed so that there are no cracks or openings. To be effective, a barrier must interrupt the line-of-sight between the noise source and the receiver.

Vibration Criteria

CEQA states that the potential for any excessive groundborne noise and vibration levels must be analyzed; however, it does not define the term "excessive" vibration. Numerous public and private organizations and governing bodies have provided guidelines to assist in the analysis of groundborne noise and vibration; however, the Federal, state, and local governments have yet to establish specific groundborne noise and vibration requirements. The following publications of the FTA and Caltrans are two of the seminal works for the analysis of groundborne noise and vibration relating to transportation and construction-induced vibration. Caltrans recommends that a level of 0.2 in/sec PPV not be exceeded for the protection of normal residential buildings, and that 0.08 in/sec PPV not be exceeded for the protection of old or historically significant structures (Caltrans 2004:17). With respect to human response within residential uses (i.e., annoyance), FTA recommends maximum acceptable vibration levels of 80 VdB, respectively (FTA 2006).

Ambient Community Noise Environment Degradation

In addition to the criteria discussed above, the degradation of the existing ambient noise environment must be considered. In community noise assessments, it is "generally not significant" if no noise-sensitive sites are located within the plan area, or if increases in community noise levels associated with implementation of the project would not exceed +3 dB at noise-sensitive locations in the project vicinity (Caltrans 1998:40–43). Using a single value to evaluate an impact relating to a noise level increase does not account for the preexisting ambient noise environment a person has become accustom too. Studies assessing the percentage of people who are highly annoyed by changes in ambient noise levels indicate that when ambient noise levels are low, a greater change is needed to cause a response. As ambient noise levels increase, less change in noise levels is required to elicit significant annoyance. The significance criteria outlined in Table 3.8-7 correlate well with human response to changes in ambient noise levels and assess degradation of the ambient community noise environment.

Table 3.8-7
Significant Change in Ambient Noise Levels

Existing Ambient Noise Level, L_{dn}/CNEL	Significant Increase
<60 dB	+ 5 dB or greater
>60 dB	+ 3 dB or greater

Notes: CNEL = Community Noise Equivalent Level; dB = A-weighted decibels; L_{dn} = day-night average noise level.
Source: Adapted from FICON 1992 and Caltrans 1998

3.8.3 ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

THRESHOLDS OF SIGNIFICANCE

The thresholds for determining the significance of impacts for this analysis are based on the environmental checklist in Appendix G of the State CEQA Guidelines and applicable City of Hercules, City of Pinole, and Contra Costa County, noise regulations. The project was determined to result in a significant impact related to noise if it would do any of the following:

- **Short-Term Construction Source Noise Levels**. Short-term noise impacts would be significant if construction of the project would expose persons to or generate noise levels in excess of applicable standards (i.e., *Contra Costa County General Plan 2005–2020,* and *City of Hercules General Plan* and *City of Pinole General Plan* and municipal codes) or result in a substantial temporary or periodic increase in ambient noise above levels existing without the project (e.g., 3 dB L_{dn} or greater) at nearby existing noise-sensitive receptors during the more noise-sensitive early morning, evening, and nighttime periods of the day.

- **Long-Term Increases in Traffic Source Noise Levels**. Long-term noise impacts would be significant if project-generated increases in traffic would expose persons to or generate noise levels in excess of applicable standards (i.e., *Contra Costa County General Plan 2005–2020,* and *City of Hercules General Plan* and *City of Pinole General Plan* and municipal codes) or result in a permanent increase in ambient noise levels above levels existing without the project (e.g., 3 dB L_{dn} or greater) at nearby existing noise-sensitive receptors.

- **Long-Term Stationary – and Area-Source Noise Levels**. Long-term noise impacts would be significant if project-generated stationary or area sources would expose persons to or generate noise levels in excess of applicable standards (i.e., *Contra Costa County General Plan 2005–2020,* and *City of Hercules General Plan* and *City of Pinole General Plan* and municipal codes) or result in a permanent increase in ambient noise levels above levels existing without the project (e.g., 3 dB L_{dn} or greater) at nearby existing noise-sensitive receptors.

- **Compatibility of Proposed Land Uses with Project Site Noise Levels**. Long-term noise impacts would be significant if noise levels at a project site would expose persons to or generate noise levels in excess of applicable standards (i.e., *Contra Costa County General Plan 2005–2020,* and *City of Hercules General Plan* and *City of Pinole General Plan* and municipal codes) at proposed noise-sensitive receptors.

- **Exposure of Sensitive Receptors to or Generation of Excessive Ground-Borne Vibration or Noise Levels**. Vibration impacts would be significant if construction or operation of the project would expose persons to or generate excessive groundborne vibration or groundborne noise levels (e.g., exceed Caltrans's recommended standard of 0.2 in/sec PPV with respect to the prevention of structural damage for normal buildings or FTA's maximum acceptable vibration standard of 80 VdB with respect to human response for residential uses [i.e., annoyance] at nearby existing vibration-sensitive land uses).

ANALYSIS METHODOLOGY

Data included in Chapter 2, "Project Description," and obtained during on-site noise monitoring were used to determine locations of existing noise-sensitive receptors and noise-generating land uses in the vicinity of project facilities.

To assess potential short-term (construction-related) noise impacts, sensitive receptors and their relative exposure were identified. Project-generated construction source noise levels at these sensitive receptors were determined using the Federal Transit Administration Noise and Vibration Impact Assessment methodology for construction noise prediction (FTA 2006:5-1–5-29 and 10-1–10-12) along with reference emission noise levels and usage factors based on information contained in the *FHWA Roadway Construction Noise Model User's Guide* (FHWA 2006:3).

Potential long-term (operation-related) stationary source noise impacts were assessed based on existing documentation (e.g., equipment noise levels) and site reconnaissance data. This analysis also included an evaluation of the proposed noise-generating uses that could affect noise-sensitive receptors in the project vicinity.

The methods identified above for were also used to assess the compatibility of Option 1 and Option 2 with future noise levels in the project vicinity.

Groundborne vibration impacts were quantitatively assessed based on existing documentation (e.g., vibration levels produced by specific construction equipment operations) and the distance of sensitive receptors from the given source.

ISSUES NOT DISCUSSED FURTHER IN THIS EIR

Project facilities associated with Option 1 and Option 2 are not located within 2 miles of a public or private airstrip. The closest airport is the Vallejo airport, approximately 5 miles to the north. In addition, the project facilities would not be located within the 60 dB CNEL noise contour zones of any nearby airports. Therefore, airport noise impact are not discussed further in this EIR.

Long-term exposure of sensitive receptors to increased traffic noise levels from project operation would not occur, because no new personnel would be required to operate the proposed facilities. Thus there would be no impact, and therefore this issue is not discussed further in this EIR.

IMPACT ANALYSIS

IMPACT 3.8-1 **Short-Term Increases in Construction Source Noise Levels.** *If construction activities were to occur during the more noise-sensitive hours or if construction equipment were not properly equipped with noise-control devices or shielded, construction-generated noise could result in the exposure of persons to or generation of noise levels in excess of applicable standards and/or, annoyance and/or sleep disruption to occupants of any existing noise-sensitive land uses in the project vicinity, and/or create a substantial temporary increase in ambient noise levels.*

Construction noise levels in the project vicinity would fluctuate depending on the particular type, number, and duration of usage for the varying equipment. The effects of construction noise largely depend on the type of construction activities occurring on any given day, noise levels generated by those activities, distances to noise-sensitive receptors, and the existing ambient noise environment in the receptor's vicinity. Construction generally occurs in several discrete stages, each phase requiring a specific complement of equipment with varying equipment type, quantity, and intensity. These variations in the operational characteristics of the equipment change the effect they have on the noise environment of the project site and in the surrounding community for the duration of the construction process.

To assess noise levels associated with the various equipment types and operations, construction equipment can be considered to operate in two modes, mobile and stationary. Mobile equipment sources move around a construction site performing tasks in a recurring manner (e.g., loaders, graders, bulldozers). Stationary equipment operates in a given location for an extended period of time to perform continuous or periodic operations. Operational characteristics of heavy construction equipment are additionally typified by short periods of full-power operation followed by extended periods of operation at lower power, idling, or powered-off conditions. Noise emission levels from typical types of construction are shown in Table 3.8-8 below. Additionally when construction-related noise levels are being evaluated, activities that occur during the more noise-sensitive early morning, evening, and nighttime hours are of increased concern. Because exterior ambient noise levels typically decrease during these periods as traffic volumes and commercial activities decrease, construction activities performed during these more noise-sensitive periods can result in increased annoyance and potential sleep disruption for occupants of nearby residential uses.

Table 3.8-8 Noise Emission Levels from Construction Equipment	
Equipment Type	Typical Noise Level (dB) @ 50 feet
Air compressor	78
Asphalt paver	77
Backhoe	78
Blasting	94
Compactor	83
Concrete breaker	82
Concrete pump	81
Concrete saw	90
Crane, mobile	81
Dozer	82
Front-end loader	79
Generator	81
Grade	85
Hoe ram extension	90
Jack hammer	89
Pneumatic tools	85
Rock drill	81
Scraper	84
Trucks	74–81
Water pump	81

Notes:
dB = A-weighted decibels.
Assumes all equipment is fitted with a properly maintained and operational noise control device, per manufacturer specifications. Noise levels listed are manufacture-specified noise levels for each piece of heavy construction equipment.
Source: Bolt Beranek and Newman Inc. 1981, FTA 2006

Option 1: New Larger Effluent Pipeline to RSD

Based on the types of facilities improvements, noise-generating construction activities would be primarily associated with the proposed on-site Pinole-Hercules WPCP facility improvements, installation of a new force main pipeline to the Rodeo Sanitary District (RSD) wastewater treatment plant, jack-and-bore operations at creek crossings and potentially one railroad track crossing, and relocation of the corporation yard, as discussed separately below.

Proposed On-Site Pinole-Hercules WPCP Facility Improvements

The noisiest pieces of on-site heavy-duty construction equipment would be anticipated to include an excavator, backhoe, grader, and truck associated with site preparation, grading, excavation, backfilling, and building construction activities. Based on the modeling conducted for this project, the simultaneous operation of on-site construction equipment could result in combined intermittent noise levels up to approximately 85 dB L_{eq} at 50 feet from the project site (refer to Appendix G). Exterior noise levels at noise-sensitive receptors located within approximately 1,647 feet and 5,209 feet from the project site could exceed the applicable City of Pinole daytime and nighttime standards of 55 dB L_{eq} and 45 dB L_{eq}, respectively. More specifically, construction-generated noise levels could exceed 65 dB L_{eq} at the closest sensitive receptor approximately 500 feet from the WPCP facility, without feasible noise control. As a result, this impact is considered **potentially significant**.

Installation of New Pipeline

Pipeline installation would be linear in nature, moving at an approximate rate of 100–200 feet per day, and would consist of a series of activities at each location. The noisiest pieces of heavy-duty construction equipment would be anticipated to include an excavator, backhoe, paver, and jackhammer associated with trenching and excavation; pavement breaking (as needed); pipeline installation; backfill; and paving (as needed) activities. Based on the modeling conducted for this project, the simultaneous operation of this construction equipment could result in combined intermittent noise levels up to approximately 86 dB L_{eq} at 50 feet from the proposed route (refer to Appendix G). Exterior noise levels at noise-sensitive receptors located within approximately 1,751 feet and 5,537 feet from the proposed pipeline alignment could exceed the applicable Contra Costa County and City of Hercules daytime and nighttime standards of 55 dB L_{eq} and 45 dB L_{eq}, respectively. More specifically, construction-generated noise levels could exceed 86 dB L_{eq} and 85 dB L_{eq} at the closest sensitive receptors approximately 50 feet and 60 feet (e.g., residences on Railroad Avenue in Rodeo [Contra Costa County] and on Woodfield Drive near Pinole Creek [City of Hercules]) from the proposed route, respectively, without feasible noise control. As a result, this impact is considered **potentially significant**.

Jack and Bore Creek Crossings

Construction of the force main would cross four creeks: Pinole Creek, Ohlone Creek, Refugio Creek, and Rodeo Creek. The Pinole Creek crossing would be accomplished by suspending the new pipeline underneath the existing bridge, and the other three creek crossings via the jack and bore method of horizontal directional drilling (HDD) beneath the creek beds. In addition, jack and boring may be necessary underneath the Southern Pacific Railroad tracks near San Pablo Avenue.

The noisiest pieces of heavy-duty construction equipment would be anticipated to include a drilling machine, screening/shaking machine, drill mud trailer, and truck. Based on the modeling conducted for this project, the simultaneous operation of this construction equipment could result in combined intermittent noise levels up to approximately 86 dB L_{eq} at 50 feet from the creek crossings (refer to Appendix G). Exterior noise levels at noise-sensitive receptors located within approximately 1,715 feet and 5,424 feet of the creek crossings could exceed 55 dB L_{eq} and 45 dB L_{eq}, respectively (i.e.., applicable Contra Costa County and City Hercules daytime and nighttime standards). More specifically, construction-generated noise levels could exceed 86 dB L_{eq} and 66 dB L_{eq} at the closest sensitive receptors approximately 50 feet and 485 feet (i.e., residences on Railroad Avenue in Rodeo [Contra Costa County] and on Forest Circle [City of Hercules], south of San Pablo Avenue) from the creek crossings, respectively, without feasible noise control. Therefore, this impact is considered **potentially significant**.

Corporation Yard

The noisiest pieces of on-site heavy-duty construction equipment would be anticipated to include a bulldozer, tractor, backhoe, and paver associated with site preparation, foundation construction, building construction, and paving activities. Based on the modeling conducted for this project, the simultaneous operation of on-site construction equipment could result in combined intermittent noise levels up to approximately 86 dB L_{eq} at 50 feet from the project site (refer to Appendix G). Taking into account the existing 8-foot-high solid noise barrier surrounding the site of the proposed corporation yard, the intervening topography (hill) between the corporation yard site and the nearest sensitive receptor, and the distance to the nearest sensitive receptor from construction activities, the resulting noise level is predicted to be 54 dB L_{eq} at the nearest noise sensitive receptor. Therefore, construction activities at the corporation yard would not exceed the applicable City of Pinole daytime standard of 55 dB L_{eq}. Therefore, construction-related noise activities associated with the corporation yard would be considered **less than significant.**

Option 2: Pinole-Only Flows at Existing Plant

Noise impacts under Option 2 would be similar to those described above for the proposed on-site Pinole-Hercules WPCP facility improvements under Option 1. The simultaneous operation of on-site construction equipment could result in combined intermittent noise levels up to approximately 85 dB L_{eq} at 50 feet from the project site (refer to Appendix G). Exterior noise levels at noise-sensitive receptors located within approximately 1,647 feet and 5,209 feet of the project site could exceed the applicable City of Pinole daytime and nighttime standards of 55 dB L_{eq} and 45 dB L_{eq}, respectively. More specifically, construction-generated noise levels could exceed 65 dB L_{eq} at the closest sensitive receptor approximately 500 feet from the WPCP facility, without feasible noise control. Therefore, this impact is considered **potentially significant**.

Mitigation Measure 3.8-1: Reduce Short-Term Increases in Noise Levels from Construction Sources.

Applies to: Option 1 (WPCP and Pipeline Alignment Only) and Option 2

To reduce impacts associated with noise generated during project-related construction activities at the WPCP and along the proposed pipeline route, the City of Pinole and its primary construction contractors shall ensure that the following requirements are implemented at each work site in any year of project construction to avoid and minimize construction noise effects on sensitive receptors. Measures that shall be used to limit noise shall include the items listed below:

1. To the maximum extent feasible, construction activities (except for the use of the drilling machine required for HDD associated with jack-and-bore and the pipeline connections to existing equipment at the WPCP) shall be limited to the hours of 7 a.m. to 5 p.m. Monday through Friday, and from 9 a.m. to 6 p.m. on Saturday in commercial zones only.

2. Construction equipment shall be properly maintained and equipped with noise control, such as mufflers, in accordance with manufacturers' specifications. Impact tools shall be shielded per manufacturer's specifications.

3. Temporary barriers shall be erected for the stationary construction noise sources at the sites of HDD activity and along the eastern side of the Pinole-Hercules WPCP, in accordance with all of the following specifications:

    - The barrier shall be placed as close to stationary noise sources as possible and shall break the line of sight between the source and receptor.

    - The barrier shall be constructed of ¾-inch Medium Density Overlay plywood sheeting, or other acceptable material having a surface weight of 2 lb/sq. ft. or greater, and a demonstrated Sound Transmission Class (STC) rating of 25 or greater as defined by the American Society for Testing and Materials (ASTM) Test Method E90.

    - For a temporary acoustical curtain, the material shall be weather and abuse resistant, and exhibit superior hanging and tear strength during construction and with a surface weight of at least 1 lb/sq. ft. The material shall have a minimum breaking strength of 120 pounds per inch (lb/in) per Federal Test Method Standard 191 A-M5102 and minimum tear strength of 30 lb/in per ASTM D117. Based on the same test procedures, the absorptive material facing shall have a minimum breaking strength of 100 lb/in and minimum tear strength of 7 lb/in. The material shall have a STC rating of 25 or greater, based on certified sound transmission loss data taken according to ASTM Test Method E90. It shall also have a Noise Reduction Coefficient rating of 0.70 or greater, based on certified sound absorption coefficient data according to ASTM Test Method C423.

    - When barrier units are joined together, the mating surfaces of the barrier sides shall be flush with each other. Gaps between barrier units, and between the bottom edge of the barrier panels and the ground, shall be closed with material that will completely close the gaps, and be dense enough to attenuate noise.

- The City of Pinole shall provide notice to all property owners and tenants within 500 feet of the edge of the construction right-of-way at the WPCP and along the pipeline route at least 2 weeks in advance of construction.

- The City of Pinole shall designate a disturbance coordinator to whom concerned residents may address their construction-related noise complaints. The name and phone number of the coordinator shall be conspicuously posted at construction areas and on all advanced notifications required in (4) above. The coordinator shall respond to all complaints.

With implementation of Mitigation Measure 3.8-1, construction activities would generally be limited, except for the drilling machine required for HDD and pipeline connections to existing WPCP equipment, to the less-sensitive daytime hours. In addition, temporary noise barriers would be erected to provide noise reduction, construction equipment would be provided with appropriate shielding, advance notice to nearby residents would be provided, and a disturbance coordinator would be designated to respond to complaints. However, construction-generated noise levels would still exceed the applicable standards at nearby sensitive receptors for all project components (with the exception of the corporation yard). Thus, this impact would remain **significant and unavoidable**.

IMPACT 3.8-2	**Short-Term Exposure of Sensitive Receptors to Increased Traffic Noise Levels from Project Construction.** *Implementation of Option 1 and Option 2 would result in temporary increases in off-site roadway traffic noise associated with project construction. Construction-generated traffic would not expose sensitive receptors to noise levels along off-site roadways that exceed the applicable noise standards and/or result in a substantial increase in ambient noise levels.*

Option 1: New Larger Effluent Pipeline to RSD

Construction of the facilities proposed under Option 1 would result in additional vehicle trips on the local roadway network from worker commute and the transport of equipment and materials. Construction of the WPCP improvements would require up to 8 construction personnel at any given time. Assuming two total trips per day per person, construction of the project would result in a maximum of approximately 16 one-way daily trips. Additional daily truck trips, though minor, would also occur from material transportation activities.

Typically, when the average daily traffic (ADT) volume is doubled on a roadway segment in comparison to existing conditions, the resultant increase is approximately 3 dB CNEL/L_{dn}. An increase in traffic noise levels of 3 dB CNEL/L_{dn} or greater at noise-sensitive receptors along affected roadway segments would be considered substantial, as such is perceivable to the human ear. The addition of approximately 16 daily trips on the local roadway system, as compared to existing traffic volumes, would represent a negligible increase in noise levels, and Option 1 construction would not be anticipated to result in a doubling of ADT volumes. Consequently, construction of Option 1 would not result in a perceivable change in the traffic noise contours of area roadways. Therefore, short-term construction traffic source noise would not result in the exposure of persons to or generation of noise levels in excess of applicable standards, or create a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without Option 1. As a result, this impact is considered **less than significant**.

Option 2: Pinole-Only Flows at Existing Plant

Construction of the WPCP improvements under Option 2 would require up to 8 construction personnel. Assuming two total trips per day per person, construction of the project would result in a maximum of approximately 16 one-way daily trips. Additional daily truck trips, though minor, would also occur from material transportation activities. The addition of approximately 16 daily trips on the local roadway system, as compared to existing traffic volumes, would represent a negligible increase in noise levels, and Option 2 construction would not be anticipated to result in a doubling of ADT volumes. Therefore, this impact is considered **less than significant**.

Mitigation Measure: No mitigation measures are required.

IMPACT 3.8-3	Compatibility of Proposed Land Uses with the Ambient Noise Environment. *Project implementation would not result in the development of any noise-sensitive land uses or the exposure of any sensitive receptors proposed as part of the project to noise levels that exceed applicable City or County standards.*

Option 1: New Larger Effluent Pipeline to RSD

The land use designation for the WPCP facility is light industrial/service commercial, and the site is zoned for general industrial uses under the *City of Pinole General Plan*. This land use designation and zoning provide for a wide range of industrial and commercial activities including warehousing, manufacturing, processing, and other similar operations. Current and proposed operations at the WPCP are consistent with these land use designations and zoning. The proposed corporation yard site is located within the City of Pinole on land designated as medium density residential/light industrial, and is zoned for mixed use under the *City of Pinole General Plan*. Adjacent land uses include medium density residential to the north and south, industrial/office park to the east, and light industrial/service commercial to the west.

Implementation of Option 1 would not result in the development of any noise-sensitive land uses (e.g., residential) or result in a different land use type than what currently exists or is allowed at the project sites. Thus, Option 1 would not result in the exposure of any new sensitive receptors to noise levels that exceed applicable City or County standards. As a result, this impact would be **less than significant**.

Option 2: Pinole-Only Flows at Existing Plant

Current and proposed operations at the WPCP are consistent with the land use designations and zoning for the WPCP site. Implementation of Option 2 would not result in the development of any noise-sensitive land uses (e.g., residential) or result in a different land use type than what currently exists at the project site. Thus, implementation of Option 2 would not result in the exposure of any sensitive receptors proposed as part of Option 2 to noise levels that exceed applicable City or County standards. As a result, this impact would be **less than significant**.

Mitigation Measure: No mitigation measures are required.

IMPACT 3.8-4 **Long-Term Increases in Stationary- and Area-Source Noise Levels.** *Long-term on-site stationary- and area-source noise would not result in the exposure of persons to or generation of noise levels in excess of applicable standards or create a substantial permanent increase in ambient noise levels in the project vicinity. Area sources of noise (e.g., landscape maintenance equipment) would not be anticipated to differ substantially from existing noise equipment levels.*

Option 1: New Larger Effluent Pipeline to RSD

Pinole-Hercules WPCP Facility

Long-term operation of the WPCP would increase the use of on-site noise-generating stationary equipment such as electrical pump motors, air compressors, fans, aerators, chlorination systems, transformers, odor control equipment, and emergency generators. The use of area noise sources such as landscape maintenance equipment would not increase. Without proper noise control or enclosure, on-site stationary noise-generating equipment could result in noise levels of more than 100 dBA at 3 feet from the source depending on the exact type and size (EPA 1971). Specifically, pumps could result in noise levels of more than 90 dBA at 3 feet, transformers could result in noise levels of more than 80 dBA at 3 feet, and electrical motors could result in noise levels of more than 100 dBA at 3 feet (EPA 1971). The closest noise-sensitive receptors are residences located approximately 500 feet to the east (adjacent to Pinole Creek) and to the south. Implementation of Option 1 would continue the existing land uses at the WPCP site (i.e., industrial), and would not result in the development of any noise-sensitive land uses (e.g., residential).

Under long-term operation of the WPCP, on-site noise-generating stationary equipment would continue to be housed in buildings, enclosed, and/or equipped with interior sound insulation that substantially lowers noise levels. The housing of such equipment in buildings with interior sound insulation would result in exterior noise levels below 55 dBA at 50 feet. Based on this reduced equipment noise level and a typical noise-attenuation rate of 6 dB per doubling of distance, noise levels at the closest noise-sensitive receptors, located approximately 500 feet from the WPCP site, would be substantially less than 55 dBA.

Because new and existing stationary noise sources would be enclosed in permanent structures or equipped with appropriate noise attenuation measures, and the closest noise-sensitive receptor is approximately 500 feet away from stationary equipment at the WPCP, off-site noise levels would not differ substantially from existing noise levels. Area sources of noise (e.g., landscape maintenance equipment) would not be anticipated to differ substantially from existing noise equipment levels. Therefore, long-term on-site operational stationary-source noise at the WPCP would not result in the exposure of persons to or generation of noise levels in excess of applicable standards, or create a substantial permanent increase in ambient noise levels in the project vicinity. This impact is considered **less than significant**.

Corporation Yard

Noise sources associated with the corporation yard would include truck idling, on-site truck circulation, and forklift operation. Long-term operation of the corporation yard would also involve the use of on-site noise-generating fixed or stationary-type noise sources such as generators, fans, air compressors, heavy equipment, gas or diesel motors, a maintenance shop, a metal fabricating shop, welding, cutting equipment, grinding, blowers, and loading docks. Heating, ventilation, and air conditioning (HVAC) equipment would also be assumed to operate on-site in support of operational corporation yard structures. The nearest noise-sensitive receptor to the proposed corporation yard site is a residential community located approximately 250 feet to the northwest, west of Pinole Shores Drive along Dohrmann Lane and north of the Union Pacific railway line.

According to the EPA, noise levels for such equipment can range from approximately 76 to 91 dBA at 3 feet from the source depending on the exact type and size (EPA 1971). Previously conducted noise monitoring indicates that typical hourly average noise levels at a distance of 50 feet can range from 55 to 75 dBA L_{eq} and from 80 to 84 dBA L_{max}. Under long-term operation of the corporation yard, the equipment described above would be housed in buildings, enclosed, and/or equipped with interior sound insulation that would substantially lower noise levels. Based on a typical noise-attenuation rate of 6 dB per doubling of distance, noise levels at the closest noise-sensitive receptors, located approximately 250 feet from the corporation yard site, would not be expected to result in the exposure of persons to or generation of noise levels in excess of applicable standards, or create a substantial permanent increase in ambient noise levels in the project vicinity.

HVAC equipment could be a primary noise source associated with the proposed facilities. HVAC equipment is often mounted on rooftops, located on the ground, or located within mechanical rooms. The noise sources could take the form of fans, pumps, air compressors, chillers, or cooling towers. Noise levels from HVAC equipment vary substantially depending on unit efficiency, size, and location, but generally range from 45 to 70 dB L_{eq} at a distance of 50 feet (EPA 1971). Accounting for typical attenuation rates of 6 dB per doubling of distance and shielding provided by on-site structures, and assuming that a mechanical HVAC room would be part of the building design in order to reduce HVAC noise levels to acceptable levels, noise levels attributed to HVAC mechanical systems would not be anticipated to exceed the City's noise level performance standard of 55 dB L_{eq} for noise-sensitive uses affected by non-transportation noise during the daytime period (Section 8.5, Policy HS 4.8 of the City's General Plan Health and Safety Element). In addition, HVAC noise would not result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project. Therefore, this impact is considered **less than significant**.

Option 2: Pinole-Only Flows at Existing Plant

Pinole-Hercules WPCP Facility

Under Option 2, on-site noise-generating stationary equipment would continue to be housed in buildings, enclosed, and/or equipped with interior sound insulation that substantially lowers noise levels. The housing of such equipment in buildings with interior sound insulation would result in exterior noise levels below 55 dBA at 50 feet. Because new and existing stationary noise sources would be enclosed in permanent structures or equipped with appropriate noise attenuation measures, and the closest noise-sensitive receptor is approximately 500 feet away from stationary equipment at the WPCP, off-site noise levels would not differ substantially from existing noise levels. Area sources of noise (e.g., landscape maintenance equipment) would not be anticipated to differ substantially from existing noise equipment levels. Therefore, long-term on-site operational stationary-source noise at the WPCP would not result in the exposure of persons to or generation of noise levels in excess of applicable standards, or create a substantial permanent increase in ambient noise levels in the project vicinity. This impact is considered **less than significant**.

Mitigation Measure: No mitigation measures are required.

IMPACT 3.8-5	Groundborne Noise and Vibration Levels. *Construction-generated vibration levels would not exceed Caltrans' recommended standards with respect to the prevention of structural building damage (0.2 and 0.08 in/sec PPV for normal and historical buildings) or FTA's maximum-acceptable-vibration standard with respect to human response (80 VdB for residential uses) at nearby existing vibration-sensitive land uses. Long-term operation of the project would not include any major sources of vibration. Thus, project implementation would not result in the exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels.*

Construction activities have the potential to result in varying degrees of temporary groundborne vibration, depending on the specific construction equipment used and operations involved. Vibration generated by construction equipment spreads through the ground and diminishes in magnitude with increases in distance. Table 3.8-9 displays vibration levels for typical construction equipment.

Table 3.8-9 Typical Construction-Equipment Vibration Levels			
Equipment		PPV at 25 feet (in/sec)[1]	Approximate Lv at 25 feet[2]
Pile driver (impact)	Upper range	1.518	112
	Typical	0.644	104
Pile driver (sonic)	Upper range	0.734	105
	Typical	0.170	93
Large bulldozer		0.089	87
Caisson drilling		0.089	87
Trucks		0.076	86
Jackhammer		0.035	79
Small bulldozer		0.003	58

1 Where PPV is the peak particle velocity.

2 Where Lv is the velocity level in decibels (VdB) referenced to 1 microinch/second and based on the root mean square velocity amplitude.

Source: FTA 2006

Option 1: New Larger Effluent Pipeline to RSD

With respect to the proposed on-site Pinole-Hercules WPCP facility improvements, installation of new force main pipeline, and corporation yard, the use of trucks would generate the maximum groundborne vibration in comparison to the other equipment mentioned above under Impact 3.8-1. With respect to the creek crossings, the use of a drilling machine required for HDD associated with jack-and-boring would generate the maximum groundborne vibration.

According to FTA, vibration levels associated with the use of trucks is 0.076 in/sec PPV and 86 VdB at 25 feet, as shown in Table 3.8-9. The use of the drilling machine would generate the maximum groundborne vibration of 0.089 in/sec and 87 VdB. Using FTA's recommended procedure for applying a propagation adjustment to these reference levels, which accounts for the decrease in vibration levels with an increase in distance from the source to receptor, predicted worst-case vibration levels of approximately 0.03 in/sec PPV and 77 VdB at the nearest sensitive receptor to the proposed on-site Pinole-Hercules WPCP facility improvements, pipeline route, and corporation yard could occur from use of trucks. The use of the drilling machine would generate predicted worst-case vibration levels of approximately 0.03 in/sec PPV and 78 VdB at the nearest sensitive receptors to the creek crossings. These vibration levels would not exceed Caltrans' recommended standards with respect to the prevention of structural building damage (0.2 and 0.08 in/sec PPV for normal and historical buildings) or FTA's maximum-acceptable-vibration standard with respect to human response (80 VdB for residential uses) at nearby existing vibration-sensitive land uses (Caltrans 2004, FTA 2006). In addition, the long-term operation of the project would not include any major sources of vibration. Thus, project implementation would not result in the exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels. This impact would be **less than significant**.

Option 2: Pinole-Only Flows at Existing Plant

For Option 2, using FTA's recommended procedure for applying a propagation adjustment to the reference levels discussed above under Option 1, predicted worst-case vibration levels of approximately 0.03 in/sec PPV and 77 VdB would occur at the nearest sensitive receptor to the proposed on-site Pinole-Hercules WPCP facility improvements from use of trucks. These vibration levels would not exceed Caltrans' recommended standards with respect to the prevention of structural building damage (0.2 and 0.08 in/sec PPV for normal and historical buildings) or FTA's maximum-acceptable-vibration standard with respect to human response (80 VdB for residential uses) at nearby existing vibration-sensitive land uses (Caltrans 2004, FTA 2006). In addition, the long-term operation of the project would not include any major sources of vibration. Thus, project implementation would not result in the exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels. This impact would be **less than significant**.

Mitigation Measure: No mitigation measures are required.

3.9 TERRESTRIAL BIOLOGY

3.9.1 ENVIRONMENTAL SETTING

VEGETATION

Large portions of the areas where project-related facilities would be located are surrounded by residential, commercial, and industrial development and lack natural habitat. Landscaped vegetation is found throughout the project area. Native vegetation is limited to occasional coast live oak trees and coyote brush in upland areas and common riparian and wetland species along the creeks and drainages.

The pipeline alignment proposed under Option 1 would follow existing paved roads between the Pinole-Hercules Water Pollution Control Plant (WPCP) and the Rodeo Sanitary District's (RSD's) wastewater treatment plant (Exhibit 2-3 in Chapter 2, "Project Description"). Vegetation along the alignment is characterized by a mixture of planted nonnative, exotic, and native trees and shrubs. Typical tree species include date palm, Monterey pine, redwood, and several species of eucalyptus. Stands of blue gum (eucalyptus), which were historically planted as windbreaks, are located along portions of San Pablo Avenue and a stretch of the Union Pacific Railroad tracks located between San Pablo Avenue and Pinole Creek. Annual grass, ruderal, and nonnative invasive species are also present along the alignment, especially along the edges of the paved roadways, pathways, and undeveloped lots. Typical grass species include ripgut brome, wild oats, and Italian ryegrass. Common nonnative forbs include broadleaf filaree, mustard, wild radish, and common mallow. Invasive nonnative species include Himalayan blackberry, which mainly grows along streams, and English ivy, which dominates the understory in wooded areas.

The approximately 1.22-acre lot proposed for the corporation yard is highly disturbed and surrounded by commercial and industrial operations and paved roadways (Exhibit 2-5 in Chapter 2, "Project Description"). Vegetation on the site of the proposed corporation yard consists of ruderal ground cover and scattered pine tree saplings growing on mounds of soil or waste materials. Landscaped vegetation is present along Pinole Shores Drive, which borders the west side of the lot; paved lots that are mostly devoid of vegetation surround the remainder of the lot.

Under both Option 1 and Option 2, upgrades would occur within the Pinole-Hercules WPCP, which is located near the shoreline of San Pablo Bay. This facility is completely developed and no biological resources (other than a few weed species) are present on the property. However, coastal salt marsh vegetation and habitat associated with San Pablo Bay and Pinole Creek are present within approximately 30 feet of the property.

Native riparian and freshwater marsh habitat are present in the upstream and downstream reaches of Ohlone and Refugio Creeks, and in a small tributary that drains into the upstream end of Pinole Creek. The dominant species present in these habits are red willow, arroyo willow, broadleaf cattail, mugwort, and common rush.

A narrow band of native coastal salt marsh vegetation follows Pinole Creek from Railroad Avenue upstream for approximately 1,600 feet before transitioning into ruderal and annual grass species. Native coastal salt marsh species in this habitat include pickleweed, salt grass, gumplant, and smooth cordgrass.

Riparian and wetland habitats, including salt marsh, are considered sensitive habitats and are discussed further below under "Sensitive Biological Resources." Exhibits 3.9-1 through 3.9-4 show habitat and vegetation communities along the entire pipeline alignment within a 100-foot potential disturbance area (50 feet on both sides of the actual pipeline location).

WILDLIFE

The habitat along the proposed pipeline alignment has limited value to wildlife because of the overall developed nature of the project area and surrounding urbanization. The habitats with the highest value to wildlife are present along Pinole Creek and within the riparian zones. Riparian habitat that provides high wildlife habitat value is found downstream and upstream of San Pablo Avenue on Ohlone Creek and Refugio Creek, and northeast of Pinole Creek within the small tributary that drains into the upstream end of Pinole Creek via a piped culvert (Exhibits 3.9-2 and 3.9-3).

The salt marsh habitat along Pinole Creek is a remnant of the higher transitional zone that was once present above the larger tidal marshes located along the shores of San Pablo Bay. Although these habitats are mainly surrounded by development, these areas support relatively high wildlife diversity, which often includes special-status wildlife species.

The riparian woodland and freshwater marsh habitat present along the alignment is also a remnant of more intact communities that were historically present along these creeks and drainages. Healthy riparian and freshwater marsh habitat provides food, cover, breeding habitat, and movement corridors for an abundance of wildlife species. These habitats as a whole have been greatly reduced in Contra Costa County and California since the time of European settlement, and remnants of such habitat are important vestiges of the more extensive riparian forests that once existed. The remaining riparian and freshwater marsh habitat along the pipeline alignment is primarily bordered by development and fragmented, but still has the potential to support relatively high levels of species diversity, including numerous common species such as red-shouldered hawk, black phoebe, and western scrub-jay as well as blackbirds, finches, warblers, and sparrows.

Other nonnative habitats, such as landscaped, ruderal, and exotic woodlands, provide reduced habitat values but can support native bird species as well as typical ones such as mourning dove, house finch, American crow, and northern mockingbird. These nonnative habitats also support small mammals such as mice, gophers, ground squirrels, and striped skunk; and reptiles such as western fence lizard and alligator lizard.

SENSITIVE BIOLOGICAL RESOURCES

Sensitive biological resources addressed below include special-status species and sensitive habitat that are afforded special protection under CEQA, the California Fish and Game Code (including the California Endangered Species Act [CESA]), the federal Endangered Species Act (ESA), the Clean Water Act (CWA), the Porter-Cologne Water Quality Control Act (Porter-Cologne Act), and local policies and ordinances.

Special-Status Species

Special-status species are plants and wildlife that are legally protected or otherwise considered sensitive by federal, state, or local resource conservation agencies and organizations, including:

- species listed or proposed for listing under the ESA and/or CESA as rare, threatened, or endangered;
- species considered candidates for state or federal listing as endangered, threatened, or rare;
- wildlife species identified by the California Department of Fish and Game (DFG) as special animals or California Species of Concern (CSC);
- wildlife species identified as fully protected under the California Fish and Game Code;
- species afforded protection under local or regional planning documents; and

Source: Adapted by AECOM in 2009

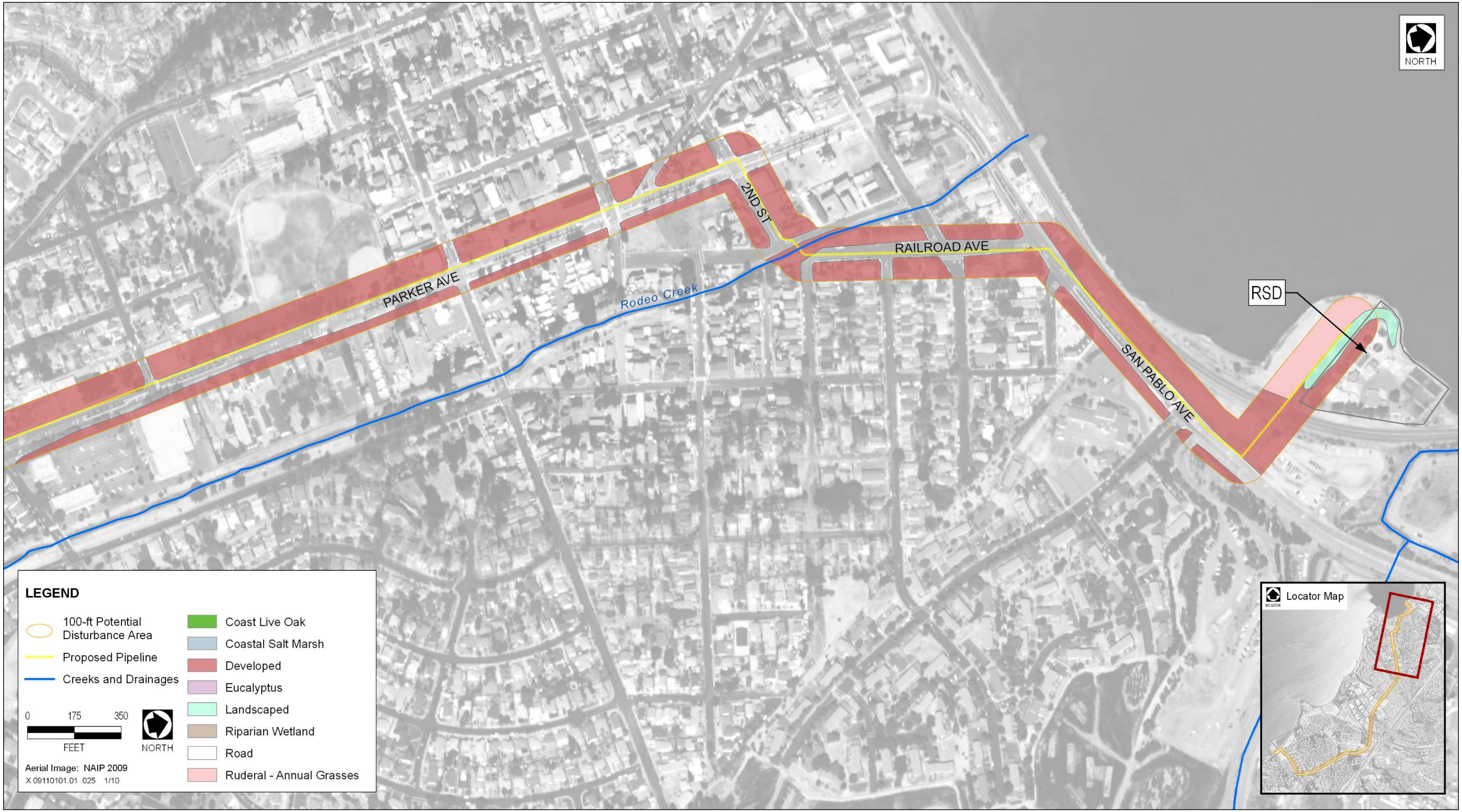
Habitat and Vegetation Communities along the Pipeline Alignment—Southernmost Segment **Exhibit 3.9-1**

Source: Adapted by AECOM in 2009

Habitat and Vegetation Communities along the Pipeline Alignment—Southern Inshore Segment **Exhibit 3.9-2**

Source: Adapted by AECOM in 2009

Habitat and Vegetation Communities along the Pipeline Alignment—Central Segment **Exhibit 3.9-3**



Source: Adapted by AECOM in 2009

Habitat and Vegetation Communities along the Pipeline Alignment—Northernmost Segment **Exhibit 3.9-4**

- plant species considered by the California Native Plant Society (CNPS) to be "rare, threatened, or endangered in California." These include plants on the following three CNPS lists:
  - List 1A—Plants presumed to be extinct in California
  - List 1B—Plants that are rare, threatened, or endangered in California and elsewhere
  - List 2—Plants that are rare, threatened, or endangered in California but more common elsewhere

Tables 3.9-1 and 3.9-2 provide lists of special-status plant and wildlife species, respectively, known to occur or with potential to occur within the project area or in the surrounding region. Documented occurrences of special-status species in the project vicinity included 47 plant and wildlife species along a 14-mile stretch that included the coastline and the lower foothills of the Coast Ranges. Exhibit 3.9-5 presents the special-status species located within a 1-mile radius of the proposed project facilities.

Table 3.9-1
Special-Status Plant Species Known to Occur or with Potential to Occur on the Project Site and in the Vicinity

Common Name	Scientific Name	Status[1]	Potential for Occurrence
Soft bird's beak	*Cordylanthus mollis* ssp. *mollis*	USFWS: E DFG: R CNPS: 1B	**Not expected to occur:** This herbaceous annual plant inhabits coastal salt marshes. The closest known occurrence is approximately 2.5 miles southwest of the WPCP along the shoreline of Pinole Point. No suitable habitat is present along Pinole Creek; suitable habitat is present outside the mouth of Pinole Creek along the shoreline of San Pablo Bay, where there are large areas of salt marsh habitat.
Point Reyes bird's beak	*Cordylanthus maritimus* ssp. *palustris*	CNPS: 1B	**Not expected to occur:** This herbaceous annual plant inhabits coastal salt marshes. The closest known occurrence is over 10 miles south of the WPCP along the Emeryville-Berkeley shoreline. No suitable habitat is present along Pinole Creek; suitable habitat is present outside the mouth of Pinole Creek along the shoreline of San Pablo Bay, where there are large areas of salt marsh habitat.
Santa Cruz Tarplant	*Holocarpha macradenia*	USFWS: T DFG: E CNPS: 1B	**Not expected to occur:** This herbaceous annual inhabits coastal prairie and valley and foothill grassland. The closest known occurrence is over 2.5 miles south of the WPCP near Interstate 80 and the Hilltop Bayview Mall; however, it now believed to be extirpated due to grading and development. No suitable habitat is present in or adjacent to the project area.
Round-leaved filaree	*California macrophylla*	CNPS: 1B	**Not expected to occur:** This herbaceous annual inhabits valley and foothill grassland and foothill woodland, and is typically associated with clays soils. The closest known occurrence is over 10 miles south of the WPCP near Berkeley; however, it is now believed to be extirpated. No suitable habitat is present in or adjacent to the project area.
Robust monardella	*Monardella villosa* ssp. *globosa*	CNPS: 1B	**Not expected to occur:** This herbaceous perennial inhabits openings in chaparral and foothill woodland. The closest reported occurrence is approximately 9 miles southeast of the WPCP in Tilden Regional Park; however, identification of this species is not certain. No suitable habitat is present in or adjacent to the project area.

Table 3.9-1
Special-Status Plant Species Known to Occur or with Potential to Occur on the Project Site and in the Vicinity

[1] **Legal Status Definitions**

U.S. Fish and Wildlife Service (USFWS)

E Endangered (legally protected)

T Threatened (legally protected)

California Department of Fish and Game (DFG)

E Endangered (legally protected)

R Rare (no formal protection)

California Native Plant Society (CNPS) Categories

1B Plant species considered rare or endangered in California and elsewhere (but not legally protected under the federal Endangered Species Act [ESA] or the California Endangered Species Act [CESA])

Sources: CNDDB 2009; CNPS 2009; data compiled by AECOM in 2009

Table 3.9-2
Special-Status Wildlife Species Known to Occur or with Potential to Occur on the Project Site and in the Vicinity

Common Name	Scientific Name	Status	Potential for Occurrence
Birds			
Alameda song sparrow	*Melospiza melodia pusillula*	DFG: CSC	**Not expected to occur:** Nesting habitat for this species includes coastal salt marsh vegetation, which occurs along Pinole Creek. The closest known occurrence is more than 8 miles southwest of the Pinole-Hercules WPCP near Point Richmond. Marginally suitable habitat is present along Pinole Creek in the form of a narrow, patchy band of pickleweed, cordgrass, and gumplant that parallels the creek and a paved pedestrian pathway.
American peregrine falcon	*Falco peregrinus anatum*	DFG: FP	**Not expected to occur:** Nests on cliffs, ledges, or tall structures and typically near open water bodies or open areas where it forages. The closest occurrence is noted generally across a large undisclosed area beginning approximately 1.5 northeast of the RSD. Nonsuitable nesting habitat is present on or adjacent to the project area; suitable foraging habitat is present along the shoreline of San Pablo Bay.
California black rail	*Laterallus jamaicensis coturniculus*	DFG: T, FP	**Not expected to occur:** Inhabits coastal salt marsh habitat. The closest known occurrence is approximately 2 miles southwest of the Pinole-Hercules WPCP near Point Pinole. No suitable habitat is present along Pinole Creek because of the open channel and patchy nature of the vegetation; suitable habitat is present along the shoreline of San Pablo Bay.
California clapper rail	*Rallus longirostris obsoletus*	USFWS: E DFG: E; FP	**Not expected to occur:** Inhabits coastal salt marsh habitat. The closest known occurrence is 6 miles southwest of the Pinole-Hercules WPCP near Point San Pablo. No suitable habitat is present along Pinole Creek because of the open channel and patchy nature of the vegetation; suitable habitat is present along the shoreline of San Pablo Bay.
Salt-marsh common yellowthroat	*Geothlypis trichas sinuosa*	DFG: CSC	**Not expected to occur:** Inhabits fresh and salt marsh habitat with thick, continuous cover. The closest known occurrence is located approximately 6 miles north of the RSD along the Napa River. No suitable habitat is present on or adjacent to the project area.
San Pablo song sparrow	*Melospiza melodia samuelis*	DFG: CSC	**Not expected to occur:** Inhabits coastal salt marsh habitat. The closest known occurrence is approximately 1.5 miles southwest of the Pinole-Hercules WPCP between the city of Pinole and San Pablo Bay. Marginally suitable habitat is present along Pinole Creek in the form of a narrow, patchy band of pickleweed, cordgrass, and gumplant that parallels the creek and a paved pedestrian pathway.

Table 3.9-2
Special-Status Wildlife Species Known to Occur or with Potential to Occur on the Project Site and in the Vicinity

Common Name	Scientific Name	Status	Potential for Occurrence
White-tailed kite	*Elanus leucurus*	DFG: FP	**Not expected to occur:** Inhabits open grassland, meadows, oak and deciduous woodland. The closest known occurrence is approximately 6 miles southwest of the Pinole-Hercules WPCP in the marsh area near the mouth of Wildcat Creek, in Richmond. No suitable foraging or nesting habitat is present on or adjacent to the project area.
Yellow-headed blackbird	*Xanthocephalus xanthocephalus*	DFG: CSC	**Not expected to occur:** Inhabits freshwater wetlands with dense vegetation and deep water. The single and only known occurrence is in Contra Costa County within 2 miles of Pinole, from 1899. No suitable habitat is present on or adjacent to the project area.
Reptiles			
Alameda whipsnake	*Masticophis lateralis euryxanthus*	USFWS: T DFG: T	**Not expected to occur:** Restricted to valley and foothill hardwood habitat in the Coast Ranges between Monterey and the San Francisco Bay Area. The closest occurrence is noted generally across a large undisclosed area beginning approximately 1.5 miles northeast of the RSD. Nosuitable nesting habitat is present on or adjacent to the project area.
Amphibians			
California red-legged frog	*Rana draytonii*	USFWS: T DFG: CSC	**Not expected to occur:** Inhabits streams, lakes, and ponds with dense, shrubby, or emergent vegetation. One known occurrence is documented approximately 0.25 mile upstream and across Interstate 80 on a tributary to Refugio Creek. No suitable habitat is present in the project area because of surrounding development, habitat fragmentation, and a lack of deep calm pools.
Mammals			
Pallid bat	*Antrozous pallidus*	DFG: CSC	**Not expected to occur:** Inhabits desert, grassland, shrub, and woodland habitat and is most common in open dry areas with rock formations for roosting. The closest known occurrence is marked with uncertainty within 2 miles of the Pinole-Hercules WPCP. No suitable roosting or breeding habitat is present on or adjacent to the project area.
Salt-marsh harvest mouse	*Reithrodontomys raviventris*	USFWS: E DFG: E; FP	**Not expected to occur:** Inhabits coastal salt marsh habitat, builds nests in dense pickleweed, and moves upland during highest tides. The closest known occurrence is approximately 6 miles southwest of the Pinole-Hercules WPCP near Point San Pablo. No suitable habitat is present along Pinole Creek because of the patchy nature of the salt marsh vegetation; more suitable habitat is present along the shoreline of San Pablo Bay, but upland habitat is lacking.
Salt-marsh wandering shrew	*Sorex vagrans halicoetes*	DFG: CSC	**Not expected to occur:** Inhabits dense salt marsh habitat with pickleweed and abundant driftwood for cover and nesting. The closest known occurrence is approximately 3.5 miles southwest of the Pinole-Hercules WPCP on the south side of Pinole Point. No suitable habitat is present along Pinole Creek because of the patchy nature of the salt marsh vegetation; more suitable habitat is present along the shoreline of San Pablo Bay, but upland habitat is lacking.
San Pablo vole	*Microtus californicus sanpabloensis*	DFG: CSC	**Not expected to occur:** Inhabits salt marsh habitat and connected grassland. The closest known occurrence is approximately 5.5 miles southwest of the project area near the mouth of San Pablo Creek. Marginally suitable habitat is present along Pinole Creek in the form of a narrow, patchy band of salt marsh and annual grassland-ruderal vegetation that parallels the creek and a paved pedestrian pathway.

Table 3.9-2
Special-Status Wildlife Species Known to Occur or with Potential to Occur on the Project Site and in the Vicinity

Common Name	Scientific Name	Status	Potential for Occurrence
Suisun shrew	*Sorex ornatus sinuosus*	DFG: CSC	**Not expected to occur:** Inhabits dense salt marsh habitat with driftwood or debris for cover and nesting. The closest known occurrence was reported approximately 5 miles north near the Mare Island shipping channel. No suitable habitat is present along Pinole Creek because of the patchy nature of the salt marsh vegetation; more suitable habitat is present along the shoreline of San Pablo Bay, but upland habitat is lacking.

[1] **Legal Status Definitions**

U.S. Fish and Wildlife Service (USFWS)
E Endangered (legally protected)
T Threatened (legally protected)

California Department of Fish and Game (DFG)
E Endangered (legally protected)
T Threatened (legally protected)
FP Fully Protected (no formal protection)
CSC California Species of Concern (no formal protection)

Sources: CNDDB 2009; USFWS 2008; data compiled by AECOM in 2009

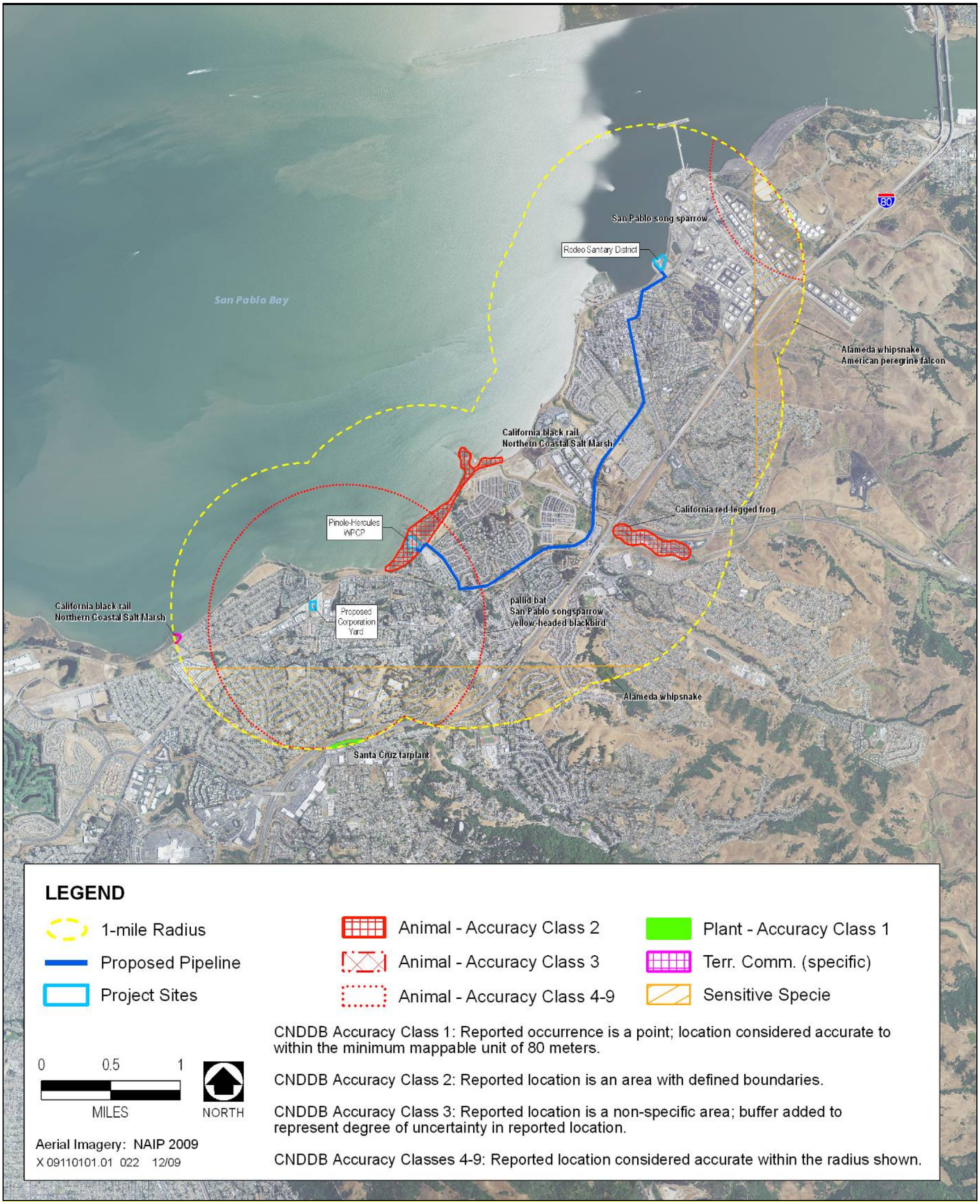
Special-Status Plants

Only one special-status plant species, Santa Cruz tarplant, was identified in the California Natural Diversity Database (CNDDB) as occurring within a 1-mile of the proposed project facilities. Occurrences of an additional 19 special-status plant species were found during searches of the CNDDB (2009), CNPS (2009), and U.S. Fish and Wildlife Service (USFWS) (2009) databases for the Richmond and Mare Island U.S. Geological Survey 7.5-minute quadrangles. Of the 20 total species, 15 are not addressed further in this section because they are restricted to habitats that are not present in the areas where proposed project facilities would be located. Table 3.9-1 contains information on the five species for which potentially suitable habitat is present: soft bird’s beak, Point Reyes bird’s beak, Santa Cruz tarplant, round-leaved filaree, and robust monardella.

Special-Status Wildlife

A total of 27 special-status wildlife species were found during searches of the CNDDB (2009) and USFWS (2009) databases for the Richmond and Mare Island U.S. Geological Survey 7.5-minute quadrangles, while seven of those were occurred within a 1-mile radius around the proposed project facilities. Of the 27 total species, 12 are not addressed further in this section because they are restricted to habitats that are not present in the areas where the proposed project facilities would be located. Table 3.9-2 contains information on the 15 species for which potentially suitable habitat is present: Alameda song sparrow, American falcon, California black rail, California clapper rail, salt-marsh yellowthroat, San Pablo song sparrow, white-tailed kite, yellow-headed blackbird, Alameda whipsnake, California red-legged frog, pallid bat, salt-marsh harvest mouse, salt-marsh wandering shrew, San Pablo vole, and Suisun shrew.

Raptors, including those species in the orders of falconiformes (falcons, kites, eagles, and hawks) and strigiformes (owls), are protected under California Fish and Game Code and under the Migratory Bird Treaty Act (MBTA). Raptors not formally listed under the CESA or ESA and are not generally considered special-status species; however, they are protected by law, and therefore they are addressed in the following sections.



Source: CNDDB 2009

Special-Status Species Occurrences within 1-Mile Search Results **Exhibit 3.9-5**

Sensitive Habitats

Sensitive habitats are those that are of special concern to DFG, or that are afforded specific consideration through CEQA, Section 1602 of the California Fish and Game Code, the Porter-Cologne Act, and/or Section 404 of the CWA. Sensitive habitats may be of special concern to these agencies and to conservation organizations for a variety of reasons, including their locally or regionally declining status, or because they provide important habitat to common and special-status species. Three sensitive habitat types are present in the vicinity of the project area: coastal salt marsh, freshwater marsh, and mixed riparian woodland.

Coastal salt marsh in the project vicinity is limited to the lower reach of Pinole Creek, where the proposed alignment would be attached to and cross the creek on an existing bridge and then parallel the creek underneath a paved pedestrian pathway. Species occupying this habitat include cordgrass, pickleweed, saltgrass, and gumplant.

Native riparian and freshwater marsh habitats are only present in the upstream and downstream reaches of Ohlone and Refugio Creeks, and in a small tributary that drains into the upstream end of Pinole Creek. The riparian habitat present in Ohlone Creek is dominated by red willow trees but also contains arroyo willow and typical native understory species such as mugwort, common rush, and nonnative Himalayan blackberry. The riparian habitat on the small tributary is dominated by arroyo willow with an understory of primarily nonnative Himalayan blackberry.

Freshwater marsh habitat is present in Refugia Creek, Ohlone Creek, and the tributary to Pinole Creek and is composed primarily of broadleaf cattail that occupies areas within the channel and along the banks.

3.9.2 REGULATORY FRAMEWORK

Biological resources in California are protected and/or regulated by a variety of federal, state, and local laws and policies. Key regulatory and conservation planning issues applicable to the project are discussed below.

FEDERAL PLANS, POLICIES, REGULATIONS, AND LAWS

Federal Endangered Species Act

Pursuant to the ESA, USFWS and the National Marine Fisheries Service have regulatory authority over federally listed species. Under the ESA, a permit to “take” a listed species is required for any action that may harm an individual of that species. “Take” is defined under Section 9 of the ESA as “to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct” (Title 16, Section 1532 of the U.S. Code; Title 50, Section 17.3 of the Code of Federal Regulations). Under federal regulation, “take” is further defined to include habitat modification or degradation where it would be expected to result in death or injury to listed wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. If a project would result in take of a federally listed species, the project applicant must either acquire an incidental-take permit under Section 10(a) of ESA or complete a federal interagency consultation under Section 7 of ESA before the take occurs. Such a permit typically requires various types of mitigation to compensate for or minimize the take.

Section 404 of the Clean Water Act

Section 404 of the CWA establishes a requirement for a project proponent to obtain a permit from the U.S. Army Corps of Engineers (USACE) before engaging in any activity that involves any discharge of dredged or fill material into “waters of the United States,” including wetlands. Waters of the United States include navigable waters of the United States, interstate waters, all other waters where the use or degradation or destruction of the waters could affect interstate or foreign commerce, tributaries to any of these waters, and wetlands that meet any of these criteria or that are adjacent to any of these waters or their tributaries. Wetlands are defined as those areas that are inundated or saturated by surface water 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. Jurisdictional wetlands must meet three wetland delineation criteria: hydrophytic vegetation, hydric soil types, and wetland hydrology. Many surface waters and wetlands in California meet the criteria for waters of the United States, including intermittent streams and seasonal lakes and wetlands.

Section 401 of the Clean Water Act

Under Section 401 of the CWA, an applicant for a Section 404 permit must obtain a certificate from the appropriate state agency stating that the intended dredging or filling activity is consistent with the state's water quality standards and criteria. In California, the authority to grant water quality certification is delegated by the State Water Resources Control Board.

Migratory Bird Treaty Act

The MBTA, first enacted in 1918, implements domestically a series of treaties between the United States and Great Britain (on behalf of Canada), Mexico, Japan, and the former Soviet Union that provide for international migratory bird protection. The MBTA authorizes the Secretary of the Interior to regulate the taking of migratory birds; the act provides that it shall be unlawful, except as permitted by regulations, "to pursue, take, or kill any migratory bird, or any part, nest or egg of any such bird…" (U.S. Code Title 16, Section 703). This prohibition includes both direct and indirect acts, although harassment and habitat modification are not included unless they result in direct loss of birds, nests, or eggs. The current list of species protected by the MBTA includes several hundred species and essentially includes all native birds.

STATE PLANS, POLICIES, REGULATIONS, AND LAWS

California Endangered Species Act

Pursuant to the CESA of the California Fish and Game Code, a permit from DFG is required for projects the implementation of which could result in the take of a species state listed as threatened or endangered (i.e., species listed under CESA), except that plants may be taken without a permit pursuant to the terms of the California Native Plant Protection Act (California Fish and Game Code Section 1900 et seq.). Pursuant to Section 2080, take of a listed species is prohibited without an incidental-take permit. A take of a species under CESA is defined as an activity that would directly or indirectly kill an individual of the species. Unlike the definition in the federal ESA, the CESA definition of take does not include "harm" or "harass." As a result, the threshold for take under CESA is generally considered higher than under ESA.

California Fish and Game Code Section 1602—Streambed Alteration

All diversions, obstructions, or changes to the natural flow or bed, channel, or bank of any river, stream, or lake in California that supports wildlife or fishery resources are subject to regulation by DFG under Section 1602 of the California Fish and Game Code. Under Section 1602, it is unlawful for any person, governmental agency, or public utility to do the following without first notifying DFG: substantially divert or obstruct the natural flow of, or substantially change or use any material from, the bed, channel, or bank of any river, stream, or lake, or deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it may pass into any river, stream, or lake. A stream is defined as a body of water that flows at least periodically or intermittently through a bed or channel that has banks and supports fish or other aquatic life. This definition includes watercourses with a surface or subsurface flow that supports or has supported riparian vegetation. DFG's jurisdiction within altered or artificial waterways is based on the value of those waterways to fish and wildlife. A DFG streambed alteration agreement must be obtained for any project that would result in an impact on a river, stream, or lake.

Porter-Cologne Water Quality Control Act

Under the Porter-Cologne Act, "waters of the state" fall under the jurisdiction of the appropriate regional water quality control board (RWQCB). The RWQCB must prepare and periodically update water quality control plans (basin plans). Each basin plan sets forth water quality standards for surface water and groundwater, as well as actions to control nonpoint and point sources of pollution to achieve and maintain these standards. Projects that discharge waste to wetlands or waters of the state must meet waste discharge requirements of the RWQCB, which may be issued in addition to a water quality certification or waiver under Section 401 of the CWA.

More recently, the appropriate RWQCB has also generally taken jurisdiction over "waters of the state" that are not subject to USACE jurisdiction under the CWA, in cases where USACE has determined that certain features do not fall under its jurisdiction. Mitigation requiring no net loss of wetlands functions and values of waters of the state is typically required.

REGIONAL AND LOCAL PLANS, POLICIES, REGULATIONS, AND LAWS

San Francisco Bay Conservation and Development Commission

San Pablo Bay is within the jurisdiction of the San Francisco Bay Conservation and Development Commission (BCDC). BCDC is composed of appointees from local government and state and federal agencies and is responsible for regulating a number of activities within and adjacent to the bay. Any dredging and disposal activity in the bay, marshes, and some creeks requires a permit from BCDC; most work (including grading) on land within 100 feet of the bay shoreline also requires a permit.

Contra Costa County General Plan 2005–2020

The purpose of the *Contra Costa County General Plan 2005–2020* is to express the broad goals and policies and the specific implementation measures to guide decisions on future growth, development, and the conservation of resources through the year 2020. The following goals and policy associated with conservation of vegetation and wildlife are applicable to the project.

- **Goal 8-D:** To protect ecologically significant lands, wetlands, plant and wildlife habitats.

- **Goal 8-E:** To protect rare, threatened and endangered species of fish, wildlife and plants, significant plant communities, and other resources which stand out as unique because of their scarcity, scientific value, aesthetic quality or cultural significance; attempt to achieve a significant net increase in wetland values and functions within the County over the life of the Plan.

- **Goal 8-F:** To encourage the preservation and restoration of the natural characteristics of the San Francisco Bay/Delta estuary and adjacent lands, and recognize the role of Bay vegetation and water area in maintaining favorable climate, air and water quality, and fisheries and migratory waterfowl.

  - **Policy 8.28:** Efforts shall be made to identify and protect the County's mature native oak, bay, and buckeye trees.

The following water resources goals that also serve to protect biological resources are also applicable to the project.

- **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.

- **Goal 8-U:** To maintain the ecology and hydrology of creeks and streams and provide an amenity to the public, while at the same time preventing flooding, erosion and danger to life and property.

- **Goal 8-V:** To preserve and restore remaining natural waterways in the County which have been identified as important and irreplaceable natural resources.

Contra Costa County Tree Preservation Ordinance

Preservation of Heritage Trees

Chapter 816-6 of the Contra Costa County Municipal Code, "Heritage Tree Preservation" (Ords. 94-59, 94-22) contains several sections pertaining to the preservation of heritage trees, as discussed below.

Section 816-4.402 defines a heritage tree as:

1. A tree seventy-two inches or more in circumference measured four and one-half feet above the natural grade; or

2. Any tree or a group of trees particularly worthy of protection, and specifically designated as a heritage tree by the board of supervisors pursuant to the provisions of this chapter, because of:

3. Having historical or ecological interest or significance, or

4. Being dependent upon each other for health or survival, or

5. Being considered an outstanding specimen of its species as to such factors as location, size, age, rarity, shape, or health.

Under Section 816-4.802, when proposed construction would encroach into the dripline or a radius of 12 feet (whichever is greater) from the trunk of any designated heritage tree, special construction, as determined necessary by the Building Inspection Division of the Contra Costa County Department of Conservation & Development, is required to allow the roots to breathe and obtain water and nutrients and minimize damage to the part of the tree visible above ground level. Excavation, cuts, fills, or compaction of the existing ground surface within the dripline or a radius of 12 feet from the trunk of a designated heritage tree must minimize damage to the root system. Permission is required before backfilling may occur. Tree wells may be used where approved by the Building Inspection Division.

Section 816-4.804 prohibits storage or dumping of any oil, gas, or chemicals that may be harmful to trees and prohibits placement of heavy construction machinery or construction materials in the open within the dripline of any designated heritage tree or within a radius of 12 feet from the tree's trunk, whichever is greater.

Section 816-4.1002 requires a permit for any action that would affect a heritage tree:

1. Any application for a permit to destroy, cut down or remove a designated heritage tree shall be submitted to the community development department by the owner or his authorized agent (satisfactory evidence of such authorization to be submitted with the application) on the form provided by the community development department together with any specified fee.

2. The application shall contain the location, number, species, size, and heritage designation of the tree to be destroyed, cut down or removed and a statement of reasons for the proposed action, together with such other information as may be required by the community development department.

Protection of Trees

Chapter 816-6 of the Contra Costa County Municipal Code, "Tree Protection and Preservation" (Ords. 94-59, 94-22) contains several sections pertaining to the protection of trees, as described below.

Section 816-6.6002 states that no person shall trench, grade, or fill within the dripline of any protected tree or cut down, destroy, trim by topping, or remove any protected tree on private property within the county without a tree permit, except as provided for in Section 816-4.1002.

Section 816-6.6004 defines a protected tree as any one of the following:

1. On all properties within the unincorporated area of the county:

    a. Where the tree to be cut down, destroyed or trimmed by topping is adjacent to or part of a riparian, foothill woodland, or oak savanna area, or part of a stand of four or more trees, measures twenty inches or larger in circumference (approximately 6.5 inches in diameter) as measured four and one-half feet from ground level, and is included in the following list of indigenous trees: *Acer macrophyllum* (Bigleaf Maple), *Acer negundo* (Box Elder), *Aesculus califonica* (California Buckeye), *Alnus Rhombifolia* (White Alder), *Arbutus menziesii* (Madrone), *Heteromeles arbutifolia* (Toyon), *Juglans Hindsii* (California Black Walnut), *Juniperus californica* (California Juniper), *Lithocarpus densiflora* (Tanoak or Tanbark Oak), *Pinus attenuata* (Knobcone Pine), *Pinus sabiniana* (Digger Pine), *Platanus Racemosa* (California Sycamore), *Populus fremontii* (Fremont Cottonwood), *Populus trichocarpa* (Black Cottonwood), *Quercus agrifolia* (California or Coast Live Oak), *Quercus chrysolepis* (Canyon Live Oak), *Quercus douglasii* (Blue Oak), *Quercus kelloggii* (California Black Oak), *Quercus lobata* (Valley Oak), *Quercus wislizenii* (Interior Live Oak), *Salix lasiandra* (Yellow Willow), *Salix laevigata* (Red Willow), *Salix lasiolepis* (Arroyo Willow), *Sambucus callicarpa* (Coast Red Elderberry), *Sequoia sempervirens* (Coast Redwood), *Umbellularia californica* (California Bay or Laurel);

    b. Any tree shown to be preserved on an approved tentative map, development or site plan or required to be retained as a condition of approval;

    c. Any tree required to be planted as a replacement for an unlawfully removed tree.

2. On any of the properties specified in subsection (3) [see below] of this section:

    a. Any tree measuring twenty inches or larger in circumference (approximately six and one-half inches diameter), measured four and one-half feet from ground level including the oak trees listed above;

    b. Any multistemmed tree with the sum of the circumferences measuring forty inches or larger, measured four and one-half feet from ground level;

    c. And any significant grouping of trees, including groves of four or more trees.

3. Specified properties referred to in subsection (2) of this section includes:

    a. Any developed property within any commercial, professional office, or industrial district;

    b. Any undeveloped property within any district;

    c. Any area designated on the general plan for recreational purposes or open space;

d. Any area designated in the county general plan open space element as visually significant riparian or ridge line vegetation and where the tree is adjacent to or part of a riparian, foothill woodland, or oak savanna area.

Section 816-6.8002 requires any person proposing to trench, grade, or fill within the dripline of any protected tree or cut down, destroy, trim by topping, or remove any protected tree to apply to Building Inspection Division of the Contra Costa County Department of Conservation & Development for a tree permit at least 10 days before the proposed tree removal or tree alterations.

Section 816-6.1002 states that a tree permit is not required for the following situations, among others:

- **Prior Approval.** Any tree whose removal was specifically approved as a part of an approved development plan, subdivision, other discretionary project or a building permit.

- **Public Agencies/Utilities.** Trimming and clearing within public agency or utility easements and rights-of-way for maintenance of easement or right-of-way will not require a tree permit. Lands owned by public utilities and used for administrative purposes or uses unrelated to the public service provided by the utility are not exempted under this provision.

Section 816-6.1004 governs tree removal and protection as part of a proposed development:

1. On any property proposed for development approval, tree alterations or removal shall be considered as a part of the project application.

2. All trees proposed to be removed, altered or otherwise affected by development construction shall be clearly indicated on all grading, site and development plans. Except where the director otherwise provides, a tree survey shall be submitted as a part of the project application indicating the number, size, species and location of the dripline of all trees on the property. This survey shall be overlaid on the proposed grading and development plans. The plan shall include a tabulation of all trees proposed for removal.

Section 816-6.1202 governs tree preservation during development:

> Except where otherwise provided by the involved development's conditions of approval or approved permit application, on all properties where trees are required to be saved during the course of development, the developer shall follow the following tree preservation standards:

1. Prior to the start of any clearing, stockpiling, trenching, grading, compaction, paving or change in ground elevation on a site with trees to be preserved, the applicant shall install fencing at the dripline or other area as determined by an arborist report of all trees adjacent to or in the area to be altered. Prior to grading or issuance of any permits, the fences may be inspected and the location thereof approved by appropriate county staff.

2. No grading, compaction, stockpiling, trenching, paving or change in ground elevation shall be permitted within the dripline unless indicated on the grading plans approved by the county and addressed in any required report prepared by an arborist. If grading or construction is approved within the dripline, an arborist may be required to be present during grading operations. The arborist shall have the authority to require protective measures to protect the roots. Upon completion of grading and construction, an involved arborist shall prepare a report outlining further methods required for tree protection if any are required. All arborist expense shall be borne by the developer and applicant unless otherwise provided by the development's conditions of approval.

3. No parking or storing vehicles, equipment, machinery or construction materials, construction trailers and no dumping of oils or chemicals shall be permitted within the dripline of any tree to be saved.

Section 816-6.1206 governs repair or replacement of trees damaged during construction:

1. A development's property owner or developer shall notify the Department of Conservation & Development of any damage that occurs to any tree during the construction process. The owner or developer shall repair any damage as determined by an arborist designated by the director.

2. Any tree not approved for destruction or removal that dies or is significantly damaged as a result of construction or grading shall be replaced with a tree or trees of equivalent size and of a species as approved by the Department of Conservation & Development to be reasonably appropriate for the particular situation.

East Contra Costa County Habitat Conservation Plan/Natural Community Conservation Plan

The *East Contra Costa County Habitat Conservation Plan/Natural Community Conservation Plan* (HCP/NCCP) is intended to provide an effective framework to protect natural resources in eastern Contra Costa County, while improving and streamlining the environmental permitting process for impacts on endangered species. The HCP/NCCP inventory area is located in the eastern portion of Contra Costa County and does not include the western side of the county where the project is located.

City of Pinole General Plan

The Open Space and Environmental Protection Element of the *City of Pinole General Plan* establishes policies regarding the preservation of open space and conservation of natural resources. The following policies of the *City of Pinole General Plan* are applicable to the project:

- **Goal OS1.1: Habitat Protection.** Preserve oak/woodland, riparian vegetation, creeks, fisheries, saltwater and freshwater marsh, native bunchgrass grasslands, wildlife corridors, and sensitive nesting sites.

- **Goal OS1.2: Rare and Endangered Species.** Limit development in areas which support rare and endangered species.

- **Goal OS1.5: Riparian Areas and Creek Setbacks.** Lands adjacent to riparian areas should be protected as public or private permanent open space and through dedication or easements.

City of Pinole Tree Preservation Ordinance

Section 17.64.020 of the City of Pinole Municipal Code defines a "protected tree" as follows:

1. Any tree with single perennial stem of twelve (12) inches or larger in circumference measured four and a half (4.5) feet above the natural grade; including the species coast live oak, madrone, buckeye, black walnut, redwood, big-leafed maple, redbud, California bay, and toyon.

2. Any other tree with a single perennial stem greater than fifty-six (56) inches in larger in circumference measured four and a half (4.5) feet above the natural grade.

    a. Tree species specifically excluded from protection under this chapter include any other species of nut or fruit trees, palm trees, or eucalyptus trees.

b. Also any tree species not listed above, that is smaller than fifty-six (56) inches in larger in circumference measured four and a half (4.5) feet above the natural grade.

Section 17.64.050 requires a tree removal permit application:

1. Any person desiring to cut down, destroy or remove one (1) or more protected trees on any undeveloped, vacant property or land under development that requires a building permit in the city, shall file an application for a tree removal permit application with the Community Development Director.

    a. If the protected tree removal does not involve development, the application shall be filed not less than ten (10) days prior to the time desired for the physical removal of the protected tree.

    b. If the protected tree removal does involve development, the applicant shall file the application concurrently with the first application for approval of the development.

Hercules General Plan

The Open Space and Conservation Element of the *Hercules General Plan* provides direction for land use decisions regarding recreation, open space, and natural resources. The following objectives and policies that pertain to terrestrial biological resources are applicable to the project:

- **Objective 2:** Preserve seasonal freshwater wetlands.

    - **Policy 2a:** The City shall require project proponents to design construction footprints to avoid any wetlands and buffer zones around the wetlands. If avoidance is not possible projects shall be redesigned so as to impact the least amount of wetlands. Any areas that are classified as wetlands and will be affected by project development shall be recreated either on or off site in accordance with DFG and USACE.

- **Objective 3:** Protect the Refugio Creek riparian corridor from encroaching development.

    - **Policy 3a:** Design of building footprints along any riparian corridors shall be outside the [DFG]- and/or [USACE]-pre-approved buffer zone. Sensitive riparian habitats shall be marked by a qualified biologist to deter any destruction by equipment during construction.

- **Objective 4:** Protect riparian and wetland communities from degradation through introduction of urban pollutants in stormwater runoff.

    - **Policy 4a:** The City shall require project proponents to design facilities to prevent the degradation of riparian and wetland communities from urban pollutants in storm runoff.

- **Objective 5:** Preserve salt marsh zones along San Pablo Bay.

    - **Policy 5a:** The City shall review development proposals for consistency with minimizing impacts to salt marsh zones.

- **Objective 6:** Protect native plant communities and habitats for special status plant and animal species.

    - **Policy 6c:** As much open space as possible within sites proposed for development shall be retained as informal open space for wildlife habitat, rather than as formal, landscaped parks or grounds. The City shall require that native plants from local area be used in landscaping, and in areas with a lower water table, native drought tolerant species shall be used in landscaping.

City of Hercules Tree Preservation Ordinance

Chapter 15, "Removal of Mature Trees," of the City of Hercules Municipal Code governs the protection of trees as described below.

Section 4-15.02 defines a mature tree as follows:

1. Any living tree with a trunk diameter measuring twelve (12) inches or greater when measured at "breast height," which is roughly four and one-half (4-1/2) feet above the surface of the ground.

2. "Tree removal" shall include any one or more of the following:

    a. Complete removal of a mature tree;

    b. Any action foreseeably leading to the death of a mature tree or permanent damage to its health; or

    c. Removal of more than one-third (1/3) of the foliage of a mature tree, except where such removal of foliage is necessary for periodic maintenance appropriate to the particular tree species in question.

3. "Undeveloped or partially developed property" includes all properties which are available for future development or redevelopment, but does not include developed residential or non-residential properties. (Ord. 331 Section 1 [part], 1996)

Section 4-15.03 prohibits the removal of trees:

> Except as provided in Section 4-15.04 or 4-15.05, no mature tree shall be removed from any undeveloped or partially developed property, whether public or private, within the City of Hercules for any reason. (Ord. 331 Section 1 [part], 1996)

Section 4-15.04 identifies the following exceptions:

1. If a mature tree poses an immediate and substantial threat to the safety of persons or property, the property owner may contact the Public Works Director and request approval to remove the tree. After consultation with the City Manager if at all possible, the Public Works Director shall confirm that an emergency situation exists. The Public Works Director may then authorize removal. The Public Works Director may consult with a certified arborist if deemed necessary to confirm the necessity for tree removal. The removal of a mature tree under emergency conditions with approval by the Public Works Director shall be reported to the City Council at the next regularly scheduled City Council meeting.

2. The prohibition in Section 4-15.03 shall not apply to trees located on the grounds of any public school within the City. (Ord. 331 Section 1 [part], 1996)

Sec. 4-15.05 contains information on tree removal in conjunction with development:

1. Mature trees may be removed in conjunction with development projects for which the City has issued all necessary land use approvals, provided however, that the City approves and the developer implements a tree replacement plan. In addition, mature trees may be removed in conjunction with development projects for which the California Department of Toxic

Substances Control, U.S. Army Corps of Engineers and/or the California Department of Fish and Game has issued a permit, provided that the following conditions are satisfied:

a. The property owner has obtained and is in compliance with a Grading Permit and Erosion and Sediment Control Plan pursuant to Chapter 7-2 of this Code;

b. The City has approved and the property owner is implementing a tree replacement plan as part of an environmental mitigation program approved by the applicable state or federal agency; and

c. The proposed pre-development activities are consistent with the City's General Plan, as determined by the Community and Business Development Director. (Ord. 331 Section 1 [part], 1996)

3.9.3 Environmental Impacts and Mitigation Measures

Thresholds of Significance

The thresholds for determining the significance of impacts for this analysis are based on the environmental checklist in Appendix G of the State CEQA Guidelines. The project was determined to result in a significant impact related to biological resources if it would do any of the following:

- have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by DFG or USFWS;

- have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations or by DFG or USFWS;

- have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the CWA (including but not limited to marshes, vernal pools, and coastal areas) or any state-protected wetlands not subject to regulation under Section 404 of the CWA through direct removal, filling, hydrological interruption, or other means;

- interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites;

- conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance;

- conflict with the provisions of an adopted HCP, NCCP, or other approved local, regional, or state HCP; or

- substantially reduce the habitat of a fish or wildlife species; cause a fish or wildlife population to drop below self-sustaining levels; threaten to eliminate a plant or animal community; or substantially reduce the number or restrict the range of an endangered, rare, or threatened species.

Analysis Methodology

The information presented in this section is based on a literature review and reconnaissance-level field surveys of the proposed pipeline alignment, corporation yard, and wastewater treatment facilities conducted by AECOM biologists on September 30 and December 10, 2009. The purpose of the surveys was to document the existing terrestrial biological resources and to evaluate the potential for sensitive biological resources to occur. The literature review included searches of biological databases, including the CNDDB (2009), the CNPS Inventory of Rare and Endangered Plants (CNPS 2009), and the USFWS endangered species database (USFWS 2008).

Under Option 1, it is assumed that all ground disturbances would be limited to the current footprints of the Pinole-Hercules WPCP and the RSD wastewater treatment plant; the lot proposed for the new corporation yard; existing paved roads, pathways, and developed areas; and a 100-foot potential disturbance area along the pipeline alignment (50 feet on both sides of the centerline of the alignment). Biological resources within the potential disturbance area could be affected by project activities such as use of heavy equipment, vehicle operations and parking, staging of equipment and materials, and foot traffic by construction workers. However, it is anticipated that most of the habitat within the potential disturbance area would be unaffected by project activity because project construction activity would generally occur within the existing paved areas.

ISSUES NOT DISCUSSED FURTHER IN THIS EIR

Terrestrial Biological Resources Impacts at the Pinole-Hercules WPCP—Under Option 2, which would not include a new corporation yard or a new pipeline, it is assumed that all ground disturbance would be limited to the footprint of the existing Pinole-Hercules WPCP, and that therefore, no terrestrial biological resources would be affected. Therefore, this issue is not discussed further in this EIR.

IMPACT ANALYSIS

IMPACT 3.9-1 Impacts on Sensitive Habitats. *Under Option 1, sensitive habitats within the 100-foot disturbance area defined for the proposed pipeline alignment include coastal salt marsh, riparian habitat, and freshwater marsh. Construction activity could affect small areas of the salt marsh habitat on Pinole Creek and the riparian and freshwater wetland habitats on Ohlone Creek, Refugio Creek, and the small tributary that drains into the upstream end of Pinole Creek if habitats are not properly marked and avoided. Construction under Option 2 would be limited to the footprint of the existing Pinole-Hercules WPCP, which does not contain any sensitive habitats; as a result, this option would not have any adverse effects on sensitive habitats.*

Option 1: New Larger Effluent Pipeline to RSD

The sites of the proposed corporation yard, Pinole-Hercules WPCP, and RSD wastewater treatment plant do not contain any sensitive habitats. Therefore, sensitive habitats would not be affected by construction activities at these locations.

Sensitive habitats in the 100-foot potential disturbance area of the proposed pipeline to RSD include coastal salt marsh, riparian habitat, and freshwater marsh. Coastal salt marsh habitat is present along Pinole Creek from the downstream end at Railroad Avenue to approximately 1,600 feet upstream. Relative to more expansive areas of coastal salt marsh outside the mouth of Pinole Creek and along the shoreline of San Pablo Bay, the habitat along Pinole Creek is limited to narrow bands of vegetation along the upper banks and provides low to marginal quality habitat because of its sparse and patchy structure. Riparian and freshwater wetland habitat are present upstream and downstream of San Pablo Avenue in Ohlone Creek and Refugio Creek, and in a small tributary that empties into the upstream end of Pinole Creek via a piped culvert.

Although sensitive habitats occur in the potential disturbance area along the proposed pipeline route, they would generally be avoided during construction. All potential effects on Pinole Creek and sensitive habitat along the pipeline alignment could be avoided unless fill, equipment, material, or workers unintentionally disturb habitat beyond the anticipated limits of construction. Riparian and freshwater marsh habitats present on Ohlone Creek, Refugio Creek, and the tributary to Pinole Creek would primarily be avoided by either attaching the pipeline to existing bridges or road crossings or by using the jack-and-bore method of horizontal drilling beneath the creek bed. Potential effects on Pinole Creek would also be minimized by suspending the new pipeline adjacent to an existing bridge (Railroad Avenue), where the present pipeline is already attached.

Although unanticipated, any degradation or loss of sensitive habitat along the proposed pipeline alignment would be considered a **potentially significant** impact.

Option 2: Pinole-Only Flows at Existing Plant

Option 2, which would not include a new corporation yard or a new pipeline alignment, would not cause any ground disturbance outside the existing footprint of the Pinole-Hercules WPCP. Therefore, this option would not affect coastal salt marsh, riparian, or freshwater marsh habitats and there would be **no direct impact**. Indirect construction-related water quality effects are evaluated in Impact 3.6-3 in Section 3.6, "Hydrology and Water Quality."

Mitigation Measure 3.9-1: Implement Measures to Minimize Potential Impacts on Sensitive Habitats along the Proposed Pipeline Alignment

Applies to: Option 1

The following measures to avoid potential loss or degradation of coastal salt marsh, riparian, and freshwater marsh habitat resulting from construction activities within the 100-foot potential disturbance area shall be implemented along the proposed pipeline alignment:

(1) Whenever ground-disturbing activity is expected to occur within 100 feet of any sensitive habitat, including wetlands or potentially jurisdictional waters as shown on Exhibits 3.9-1 through 3.9-4, a qualified biologist shall be present to monitor these activities to make sure that no loss or degradation of habitat occurs and to provide guidance on establishing and maintaining adequate setbacks from sensitive habitats.

(2) Ground-disturbing activities shall not occur within 25 feet of the sensitive habitats shown on Exhibits 3.9-1 through 3.9-4 unless those activities are entirely limited to roadways and other unvegetated surfaces.

(3) No vehicles shall be used outside of the defined disturbance area.

(4) Temporary soil and debris stockpiles shall be carefully located away from sensitive habitats, so the material will not enter or run off into waterways.

(5) Temporary soil and debris stockpiles shall be covered to prevent erosion and runoff into creeks.

(6) All staging areas, parking areas, equipment, and storage areas for fuel, lubricants, and solvents shall be located in areas away from sensitive habitats and adjacent creeks, drainages, and waterways.

(7) Construction best management practices (BMPs) shall be implemented. Specifically, silt fencing shall be installed between the construction area and sensitive habitats that could support special-status species and nesting migratory birds; fueling and vehicle/equipment maintenance areas shall be demarcated with construction fencing or lathes and colored flagging; and staging areas adjacent to sensitive habitats or water bodies shall be demarcated with construction fencing or lathes and colored flagging. Silt fencing shall be installed in all areas where construction occurs within 25 feet of sensitive habitat or actively flowing water.

Mitigation Measure: Implement Mitigation Measure 3.4-1b.

Applies to: Option 1

Implementation of Mitigation Measures 3.9-1 and 3.4-1b would reduce potentially significant impacts on coastal salt marsh, riparian, and freshwater wetland habitats along the proposed pipeline alignment under Option 1 to a **less-than-significant** level by requiring that trained biological monitors clearly identify and flag sensitive habitats; by limiting all construction activity to areas set back from sensitive habitats; by employing BMPs, including fencing, so that sensitive habitats are avoided during construction activities; and by preparing a frac-out plan with slurry containment measures.

IMPACT 3.9-2 **Potential Disturbance of Special-Status Wildlife and Nesting Raptors.** *Under Option 1, special-status wildlife and nesting raptor species have the potential to occur within the100-foot disturbance area defined for the proposed pipeline alignment. Disturbance of special-status species and nesting raptors could occur if these species are present during construction activities. Option 2 would be limited to the footprint of the existing Pinole-Hercules WPCP, which does not contain habitat to support special-status species or nesting raptors; as a result, this option would not have any adverse effects on these species.*

Option 1: New Larger Effluent Pipeline to RSD

The sites of the proposed corporation yard, Pinole-Hercules WPCP, and RSD wastewater treatment plant do not contain any special-status wildlife or habitat for nesting raptors. Therefore, special-status wildlife and habitat for nesting raptors would not be affected by construction activities at these locations.

Of the 27 total special-status wildlife species with documented occurrences in the region, 15 were determined to have potential to occur within the 100-foot area of disturbance along the proposed pipeline alignment. Nesting raptors, otherwise common but protected under the MBTA, also have a potential to occur within or immediately adjacent to the proposed pipeline alignment.

Although the 15 special-status wildlife species are not expected to occur because of existing surrounding development and habitat that is fragmented and only marginally suitable, protocol-level surveys of the salt marsh, riparian, and freshwater wetland habitats within the disturbance area were not conducted (because the project is not expected to adversely affect these habitats). Therefore, the presence of these species cannot be ruled out.

Common nesting raptors have the potential to occur in the tall stands of blue gum eucalyptus trees located along the southern half of the proposed pipeline alignment, where they are interspersed along portions of San Pablo Avenue and a stretch of the Union Pacific Railroad tracks located between San Pablo Avenue and Pinole Creek. Although the special-status raptor species with a potential to occur in the region (i.e., American peregrine falcon and white-tailed kite) are not expected to nest on or adjacent to the footprint of the proposed pipeline alignment, common raptors such as red-shouldered hawk, red-tailed hawk, great horned owl, and America kestrel could use the trees for nesting. Should a nest become active near the site before development begins, construction activities associated with the project could disturb nesting pairs in trees near the project site, potentially resulting in nest abandonment and mortality of chicks and eggs.

Because of the potential for construction activity to result in a loss, injury, or unexpected adverse damage to habitat that supports special-status species or occupied raptor nests along the proposed pipeline alignment, this impact would be **potentially significant**.

Option 2: Pinole-Only Flows at Existing Plant

Option 2, which would not include a new corporation yard or a new pipeline alignment, would not cause any ground disturbance outside the existing footprint of the Pinole-Hercules WPCP. Therefore, this option would not have any adverse affects on special-status species or nesting raptors and therefore would result in **no impact.**

Mitigation Measure: Implement Mitigation Measure 3.9-1.

Applies to: Option 1

Mitigation Measure 3.9-2: Conduct Surveys for Nesting Raptors and, If Nesting Raptors are Discovered, Cease Construction and Consult with DFG to Prevent Nest Failure

Applies to: Option 1

To reduce impacts on raptors, the City of Pinole shall retain a qualified biologist to conduct preconstruction surveys and to identify active nests within 500 feet of the proposed pipeline alignment. Preconstruction surveys for raptor species shall be conducted during the nesting season (March 15 to August 15) no more than 14 days and no fewer than 7 days before any construction activity begins. Any construction activity that occurs between August 16 and March 14 shall not require preconstruction surveys for raptors.

Should nesting raptors be discovered within the survey area, a qualified biologist shall notify DFG. No new disturbance shall occur within one-half mile of the nest until the nest is no longer active or appropriate avoidance measures are developed in consultation with DFG to ensure that the nest is adequately protected. Potential avoidance measures can include visual screening, timing restrictions for construction activity, and monitoring of active nests. Should an active raptor nest be found, monitoring (funded by the City of Pinole) of active nests by a qualified biologist shall be performed to make sure that project construction does not disturb raptors at the nest site.

Implementation of Mitigation Measure 3.9-1 would reduce potentially significant impacts on special-status wildlife species along the proposed pipeline alignment under Option 1 to a **less-than-significant** level by using trained biological monitors to clearly identify and flag habitat that could support special-status wildlife; by limiting all construction activity to areas outside of habitats that could support special-status wildlife; and by employing BMPs to avoid habitats that could support special-status wildlife.

Implementation of Mitigation Measure 3.9-2 would reduce the project's impact on nesting raptor species to a **less-than-significant** level by requiring that project activities do not impede the use of raptor nesting sites.

IMPACT 3.9-3 Potential Effects on Waters of the United States, Including Wetlands, and Waters of the State. *The proposed pipeline alignment would be located near protected waters in some locations. The project has been designed to avoid filling waters of the United States, including wetlands subject to USACE jurisdiction under the federal CWA or wetland habitats protected under state and local regulations, and therefore adverse impacts would be unlikely; however, without mitigation, complete avoidance of impacts on these waters cannot be assured. Construction activity under Option 2 would not result in the placement of fill material into any waters because none are present within the Pinole-Hercules WPCP.*

Option 1: New Larger Effluent Pipeline to RSD

The proposed pipeline alignment would cross four named creeks and two small tributaries that are likely subject to federal and state protection as jurisdictional waters. These features include Pinole Creek, Ohlone Creek, Refugio Creek, and Rodeo Creek, all which empty in San Pablo Bay, a "traditional navigable water" as defined by USACE. The two small unnamed tributaries cross the proposed pipeline alignment underneath a paved pedestrian pathway before entering Pinole Creek through piped culverts.

Pinole Creek's flows parallel the southern end of the pipeline alignment and, along the lower reach, support coastal salt marsh wetland that is regularly subjected to tidal influence. Ohlone and Refugio Creek are located farther north and inland along the alignment and support riparian and freshwater marsh wetland. All three of these creeks have either permanent or relatively permanent flow. Rodeo Creek is located at the northern end of the alignment and is a completely cemented channel with vertical walls that does not support any vegetation. Rodeo creek was nearly dry during AECOM's 2009 surveys. One small tributary enters Pinole Creek on the downstream end of the proposed pipeline alignment and consists of a small ditch that contains salt marsh vegetation. The second tributary enters Pinole Creek upstream after flowing southwest and parallel to the alignment from San Pablo Avenue to Pinole Creek. At the upstream end near San Pablo Avenue, the tributary is covered by dense riparian and wetland vegetation. At the downstream end of this apparent wetland area, the tributary enters an underground culvert that later emerges and flows through a dense thicket of nonnative Himalayan blackberry bramble before again being piped underground, underneath the pedestrian pathway, and eventually into Pinole Creek.

To avoid potential impacts on all biological resources along the alignment, including avoidance of fill, the pipeline would follow existing roadways, paved pedestrian pathways, and railroad track easements for nearly the entire alignment. Furthermore, the project would avoid all potentially jurisdictional features by either attaching the pipeline to existing bridges or road crossings, or using the jack-and-bore method of horizontal drilling beneath creeks, tributaries, drainages, and wetlands. To avoid fill in Pinole Creek, the pipeline would be suspended adjacent to an existing bridge (Railroad Avenue). The pipeline alignment would then turn southeast and be installed underneath an existing paved pedestrian pathway that parallels the northeast side of Pinole Creek and stays outside of the coastal salt marsh habitat. As stated in Chapter 2, "Project Description," sediments from pipeline excavation would be either used as backfill material or transported off-site to an appropriate facility; therefore, the City intends that no sediments would be deposited into any waters. However, without implementation of mitigation, complete avoidance cannot be assured. Therefore, this impact would be **potentially significant**.

Option 2: Pinole-Only Flows at Existing Plant

Option 2, which would not include a new corporation yard or a new pipeline alignment, would not cause any ground disturbance outside the existing footprint of the Pinole-Hercules WPCP. Since there are no wetlands or waters at the Pinole-Hercules WPCP, this option would not have any adverse affects on any wetland features and there would be **no direct impact.** Indirect construction-related water quality effects are evaluated in Impact 3.6-3 in Section 3.6, "Hydrology and Water Quality."

Mitigation Measure: Implement Mitigation Measures 3.9-1, 3.4-1b, 3.6-3a, and 3.6-3b.

Applies to: Option 1

Implementation of Mitigation Measures 3.9-1, 3.4-1b, 3.6-3a, and 3.6-3b would reduce potentially significant impacts on wetlands and potentially jurisdictional waters along the proposed pipeline alignment under Option 1 to a **less-than-significant** level by requiring that trained biological monitors clearly identify and flag waters; by limiting all construction activity to areas setback from waters; by employing BMPs including fencing so that waters are physically avoided and sediment and contaminant discharge during construction activities is avoided; and by preparing a frac-out plan that would contain any slurry spills.

IMPACT 3.9-4	Potential Effect on the Movement of any Native Resident or Migratory Wildlife Species, Migratory Corridors, or Native Wildlife Nursery Sites. *Under Option 1, the native habitat that supports native species would generally be avoided because construction activity would be temporary and would occur primarily in areas already developed. Construction under Option 2 would be limited to the footprint of the existing Pinole-Hercules WPCP, which does not contain habitat that would support the movement of native resident or migratory wildlife species. Consequently, Options 1 and 2 would have no adverse impacts on wildlife or their habitats, movement, and nurseries.*

Option 1: New Larger Effluent Pipeline to RSD

Most of the ground disturbances under Option 1 would be limited to the current footprint of the Pinole-Hercules WPCP, the RSD wastewater treatment plant, the lot proposed for the new corporation yard, and existing paved roads, pathways, and developed areas along the proposed pipeline alignment. Construction activities that would occur adjacent to sensitive habitat would be short term and temporary, and the proposed pipeline would be installed underground. As a result, the impact of construction associated with Option 1 on the movement of any native resident or migratory wildlife species, migratory corridors, or native wildlife nursery sites would be **less than significant**.

Option 2: Pinole-Only Flows at Existing Plant

Option 2 would not include a new corporation yard or a new pipeline alignment and would not cause any ground disturbance outside the existing footprint of the Pinole-Hercules WPCP. Because the Pinole-Hercules WPCP is paved and fenced, the movement of any native resident or migratory wildlife species, migratory corridors, or native wildlife nursery sites would not be affected. **No impact** would occur.

Mitigation Measure: No mitigation measures are required.

IMPACT 3.9-5	Potential Conflicts with Local Policies or Ordinances for Protecting Biological Resources or with Provisions of an Adopted Habitat Conservation Plan. *Construction of the proposed facilities under Option 1 and Option 2 would not conflict with local policies or ordinances intended to protect terrestrial biological resources or with provisions of an adopted habitat conservation plan.*

Option 1: New Larger Effluent Pipeline to RSD

Construction of the proposed facilities would occur in compliance with policies in the *Contra Costa County General Plan 2050–2020*, *City of Pinole General Plan*, and *Hercules General Plan* that are intended to protect biological resources. There are no adopted HCPs that would apply to the proposed project facilities. The municipal codes of Contra Costa County (Chapter 816-6, "Tree Protection and Preservation"), the City of Pinole (Chapter 17.64, "Tree Removal"), and the City of Hercules (Chapter 15, "Removal of Mature Trees") all protect a variety of native and nonnative trees. As discussed above, for purposes of this analysis, a 100-foot potential disturbance area (50 feet on both sides of the actual pipeline location) has been assumed. There are no protected trees within the disturbance area of the proposed pipeline alignment. Because project implementation would not conflict with local policies and ordinances adopted to protect biological resources, nor would it conflict with provisions of an HCP, **no impact** would occur.

Option 2: Pinole-Only Flows at Existing Plant

Option 2, which would not include a new corporation yard or a new pipeline alignment, would not cause any ground disturbance outside the existing footprint of the Pinole-Hercules WPCP. Therefore, this option would not result in any conflicts with policies or ordinances for protecting biological resources or with provisions of an adopted HCP. **No impact** would occur.

Mitigation Measure: No mitigation measures are required.

4 OTHER STATUTORY REQUIREMENTS

4.1 CUMULATIVE IMPACTS

This DEIR provides an analysis of cumulative impacts of the Pinole-Hercules Water Pollution Control Plant (WPCP) Improvement Project taken together with other past, present, and probable future projects producing related impacts, as required by the State CEQA Guidelines (Title 14, Section 15130 of the California Code of Regulations [14 CCR Section 15130]). The purpose of this analysis is twofold: first, to determine whether the overall long-term impacts of all such projects would be cumulatively significant; and second, to determine whether the Pinole-Hercules WPCP Improvement Project itself would cause a "cumulatively considerable" (and thus significant) *incremental* contribution to any such cumulatively significant impacts. (See the State CEQA Guidelines [CCR Sections 15064(h), 15065(c), 15130(a), 15130(b), and 15355(b)] and *Communities for a Better Environment v. California Resources Agency* [2002] 103 Cal. App. 4th 98, 120.) In other words, the required analysis first creates a broad context in which to assess the project's incremental contribution to anticipated cumulative impacts, viewed on a geographic scale well beyond the project site itself. The analysis then determines whether the project's incremental contribution to any significant cumulative impacts from all projects is itself significant (i.e., cumulatively considerable" in CEQA parlance).

Cumulative impacts are defined in the State CEQA Guidelines (14 CCR Section 15355) as "two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts." A cumulative impact occurs from "the change in the environment which results from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable probable future projects. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time" (14 CCR Section 15355[b]).

Consistent with the State CEQA Guidelines (14 CCR Section 15130[a]), the discussion of cumulative impacts in this EIR focuses on significant and potentially significant cumulative impacts. The State CEQA Guidelines (14 CCR Section 15130[b]) state that:

> The discussion of cumulative impacts shall reflect the severity of the impacts and their likelihood of occurrence, but the discussion need not provide as great detail as is provided for the effects attributable to the project alone. The discussion should be guided by the standards of practicality and reasonableness, and should focus on the cumulative impact to which the identified other projects contribute rather than the attributes of other project which do not contribute to the cumulative impact.

Cumulative effects are caused by the incremental increase in total environmental effects when the evaluated project is added to other past, present, and reasonably foreseeable future actions. Cumulative impacts can thus arise from causes that are totally unrelated to the project being evaluated, and the analysis of cumulative impacts looks at the life cycle of the effects, not the project at issue.

4.1.2 PROJECTS CONTRIBUTING TO POTENTIAL CUMULATIVE IMPACTS

The State CEQA Guidelines identify two basic methods for establishing the cumulative environment in which the project is to be considered: the use of a list of past, present, and probable future projects (the "list approach") or the use of adopted projections from a general plan, other regional planning document, or certified EIR for such a planning document (the "plan approach"). The following analysis utilized the list approach.

4.1.3 CUMULATIVE CONTEXT

CITY OF HERCULES

The city of Hercules is located approximately 17 miles northeast of San Francisco. It is bounded by the city of Pinole to the southwest, the community of Rodeo to the northeast, San Pablo Bay to the northwest, and unincorporated Contra Costa County to the southeast. The estimated population of Hercules as of January 1, 2009, was 24,480 (DOF 2009).

By 2035, Hercules' population is anticipated to reach 29,800. This population growth is expected to be accompanied by a substantial increase in employment opportunities, increasing from approximately 2,890 jobs in 2000, to 6,880 jobs in 2035. The Hercules Redevelopment Agency is currently considering redevelopment, rehabilitation, and revitalization plans in the city center (Hercules Redevelopment Agency 2009).

CITY OF PINOLE

The city of Pinole encompasses approximately 11.6 square miles within its incorporated boundaries. Located approximately 15 miles northeast of San Francisco, Pinole is bounded by the cities of Richmond and San Pablo to the southwest, the city of Hercules to the northeast, the community of El Sobrante to the south, and San Pablo Bay to the northwest (City of Pinole 2009). According to the U.S. Department of Finance, on January 1, 2009, Pinole's population was 19,383, which represents an increase of 344 from 2000 estimates (DOF 2009).

Pinole's population is anticipated to reach 21,800 by 2030. This assumes a population of 20,700 by 2020 and 21,200 by 2025. According to the *City of Pinole General Plan*, the area within the city limits has been nearly built out, and very little remaining vacant land remains for new development. As a result, new development would generally occur through land use changes that would increase development densities and would be generated primarily by infill projects (City of Pinole 2009).

CONTRA COSTA COUNTY

Contra Costa County encompasses approximately 480,000 acres and is located in the greater San Francisco Bay Area. The county is bordered by Alameda County to the south, San Joaquin County to the east, Sacramento and Solano Counties to the north, and the San Pablo Bay to the west. The northern extent of Contra Costa County is marked by the western extent of the Sacramento–San Joaquin Delta (Delta), which consists of Suisun Bay and the Carquinez Strait.

Contra Costa County can be spilt geographically into three subareas: the west county, central county, and east county. In general, the west and central county areas are used for residential, commercial, and industrial uses, while the east county area is primarily open space and agriculture. In 2000, the central county area contained the largest concentration of the three subareas, totaling approximately 414,000 people. This population was centered on subdivisions along Interstate 680 (I-680), State Route (SR) 24, and SR 4, in the cities of Pleasant Hill, Concord, San Ramon, and Walnut Creek. Of the three subareas, the east county has the lowest population, which is concentrated around Pittsburg, Antioch, and Bay Point (Contra Costa County 2005).

In 2000, approximately 25% of Contra Costa County was developed as residential areas, industrial/businesses, and streets/highways. Growth in Contra Costa County is generally moving eastward along I-80. This growth is indicated in data compiled in Table 4-1, which provides information related to county subareas and population changes from 1990 to 2000 (Contra Costa County 2005). Major factors contributing to this growth include proximity to major employment centers in Oakland and San Francisco, availability of public transportation, and new employment centers along the I-680 corridor.

Table 4-1 Contra Costa County Growth by Subarea, 1990–2000			
Element	West County	Central County	East County
Major Cities	Richmond, Pinole, Hercules	Pleasant Hill, Concord, San Ramon, Walnut Creek	Pittsburg, Oakley, Brentwood, Antioch
Population, 1990	226,000	414,000	165,000
Population, 2000	241,042	471,800	236,000
Percent Change (1990–2000)	6.7%	14.0%	34.0%
Sources: Contra Costa County 2005, data compiled by AECOM in 2009			

According to the California Department of Finance, on July 1, 2009, Contra Costa County's population was estimated at 1,068,759. The *Contra Costa County General Plan 2005–2020* indicates that by 2020, the population is anticipated to reach approximately 1,128,800 people, and that the county will have 68,760 new housing units and 109,370 new jobs. Growth is expected to occur throughout Contra Costa County, and specifically in North Richmond in the west county, the Pittsburg-Antioch-Oakley area in the east county, and the northern part of the central county (Contra Costa County 2005).

4.1.4 GEOGRAPHIC SCOPE

The geographic area that could be affected by the project varies depending on the type of environmental resource being considered. When the effects of the project are considered in combination with other past, present, and future projects to identify cumulative impacts, the other projects considered may also vary depending on the type of environmental impacts being assessed. The general geographic area associated with different environmental impacts of the project defines the boundaries of the area used for compiling the list of projects considered in the cumulative impact analysis. Table 4-2 presents the general geographic areas associated with the different resources addressed in this EIR analysis.

Table 4-2 Geographic Scope of Cumulative Impacts	
Resource Issue	Geographic Area
Air Quality and Odors	San Francisco Bay Area Air Basin (includes all of Alameda, Marin, Napa, San Francisco, San Mateo, and Santa Clara Counties, as well as the southern portion of Sonoma County and the southwest portion of Solano County) and the Bay Area Air Quality Management District
Cultural Resources	Areas adjacent to San Pablo Bay; Contra Costa County, and the cities of Pinole and Hercules
Climate Change	Global, regional, and local (project site and vicinity)
Fisheries	San Pablo Bay and Pinole Creek, Refugio Creek, Ohlone Creek, and Rodeo Creek
Geology, Soils, and Paleontological Resources	Project site and immediate vicinity
Hydrology and Water Quality	San Pablo Bay and Pinole Creek, Refugio Creek, Ohlone Creek, and Rodeo Creek
Land Use Planning	Development identified in Contra Costa County, and the cities of Pinole and Hercules
Noise	Immediate project vicinity where effects are localized
Terrestrial Biology	Contra Costa County, and the cities of Pinole and Hercules
Source: Data compiled by AECOM in 2009	

4.1.5 LIST OF RELATED PROJECTS

The list of past, present, and probable future projects used for this cumulative analysis is restricted to major projects in Contra Costa County and the cities of Pinole and Hercules. For the purposes of this discussion, these projects that may have a cumulative effect on the resources associated with Pinole-Hercules WPCP Improvement Project will often be referred to as the "related projects." These related projects are identified in Tables 4-3, 4-4, and 4-5. The analysis of cumulative environmental impacts associated with the project addresses the potential incremental contributions of the project in combination with these related projects. The projects listed in Tables 4-3, 4-4, and 4-5 are not intended to be an all-inclusive list of projects in the region, but rather an identification of projects recently constructed, under construction, approved, or planned in Contra Costa County and the cities of Pinole and Hercules that may affect the same resources as the Pinole-Hercules WPCP Improvement Project.

Table 4-3
Related Projects in the City of Pinole

Type of Project	Address	Square Feet	# of Units
Tenant improvement for King Valley—restaurant	795 Fernandez Avenue		1
New single-family residential	2500 Galbreth Road	4,039 including garage	1
New second unit for single-family residential	2504 Galbreth Road	800 + 446 garage	1
Tenant improvement for new nail salon—commercial	2801 Pinole Valley Road		1
Tenant improvement for Anna's Linens—commercial	1216 Fitzgerald Drive		1
Tenant improvement for Chuck E. Cheese's—restaurant	1470 Fitzgerald Drive	20,000	1
Tenant improvement for hair salon—commercial	624 San Pablo Avenue		1
Tenant improvement for Abby's Grill—restaurant	2320 San Pablo Avenue		1
New single-family residential	2051 Buena Vista Drive	1,017 + 395 garage	1
New single-family residential	2061 Buena Vista Drive	1,237 + 513 garage	1
New single-family residential	2071 Buena Vista Drive	1,156 + 264 garage	1
Tenant improvement for existing Shell—commercial PD	818 San Pablo Avenue, #C		NA
Tenant improvement for existing Shell—commercial PD	812 San Pablo Avenue, #B		NA
Tenant improvement for existing Shell—commercial PD	824 San Pablo Avenue, #D		NA
Tenant improvement for dental office—commercial	2801 Pinole Valley Road, #F		1
Tenant improvement for SuperCuts—commercial	2792 Pinole Valley Road	1,040	1
Tenant improvement for Grocery Outlet—commercial	1460 Fitzgerald Drive	20,057	1

Note: NA = not applicable
Source: Data provided by the City of Pinole Planning Department in 2010

4.1.6 ANALYSIS OF CUMULATIVE IMPACTS

The following sections discuss the cumulative effects anticipated from implementation of the Pinole-Hercules WPCP Improvement Project, together with the related projects and regional development, for each of the nine environmental issue areas evaluated in this EIR. The analysis conforms with Section 15130 of the State CEQA Guidelines, which specifies that the "discussion of cumulative impacts shall reflect the severity of the impacts and their likelihood of occurrence, but the discussion need not provide as great a detail as is provided of the effects attributable to the project alone."

AIR QUALITY AND ODORS

The project site is located along the shoreline of San Pablo Bay in Contra Costa County, which is within the San Francisco Bay Area Air Basin (SFBAAB). The SFBAAB also includes all of Alameda, Marin, Napa, San Francisco, San Mateo, and Santa Clara Counties, as well as the southern portion of Sonoma County and the southwest portion of Solano County. With regard to criteria air pollutants, the SFBAAB is designated as nonattainment for the national ambient air quality standards (NAAQS) and California ambient air quality standards (CAAQS) for ozone and for respirable particulate matter with an aerodynamic diameter of 10 micrometers or less (PM_{10}) and fine particulate matter with an aerodynamic diameter of 2.5 micrometers or less ($PM_{2.5}$).

The Bay Area Air Quality Management District (BAAQMD) attains and maintains air quality conditions in the SFBAAB through a comprehensive program of planning, regulation, enforcement, technical innovation, and promotion of the understanding of air quality issues. The clean-air strategy of BAAQMD involves preparing plans for the attainment of ambient air quality standards, adopting and enforcing rules and regulations concerning sources of air pollution, and issuing permits for stationary sources of air pollution.

BAAQMD's CEQA thresholds of significance are designed to limit emissions from new projects to a level that would be consistent with attainment planning efforts (i.e., accounted for in emissions inventory projections for the SFBAAB).

Temporary, Short-Term Construction Impacts

According to BAAQMD, PM_{10} is the pollutant of greatest concern generated by construction activity. During construction of the project under Options 1 and 2, emissions of criteria air pollutants would be generated from a variety of construction activities and emission sources. These emissions would be temporary and occur intermittently depending on the intensity of construction on a given day. Construction-generated fugitive dust emissions under Options 1 and 2 could violate or contribute substantially to an exceedance of the ambient air quality standards for PM_{10} and $PM_{2.5}$, or expose sensitive receptors to substantial pollutant concentrations.

Mitigation identified in Section 3.2, "Air Quality and Odors," would incorporate BAAQMD control measures into the project design to reduce construction-related emissions of fugitive PM dust. This impact would be reduced to a less-than-significant level.

Assuming that all related projects would also implement all feasible construction emissions control measures consistent with BAAQMD guidelines, construction emissions on some of the related projects may be less than significant; however, it is likely that larger projects, such as the Bayfront project, New Town Center, and Northshore Business Park, and others identified in Tables 4-4 and 4-5 would likely result in significant and unavoidable air quality impacts on their own. This impact cannot be more precisely determined because related projects would develop on their own schedules, some of which are not known. It would thus be speculative to try to add together the various projects with their differing and changing schedules. However, given the large scale of development that would occur with the related projects, taken in total and combined with the nonattainment status of the SFBAAB for ozone and PM_{10} and other development that would occur in the SFBAAB, the related projects would result in a significant and unavoidable cumulative air quality impact related to construction. Although implementation mitigation measures would substantially reduce short-term air emissions from project construction activities, they would not be sufficient to reduce the project's cumulative contribution to below a level that is not considerable, because the basin is already in a nonattainment status. Therefore, the project would result in a cumulatively considerable contribution to this significant and unavoidable cumulative air quality impact.

Long-Term Operational Impacts

The gross and net change in emissions associated with Options 1 and 2 would not exceed BAAQMD's current operational thresholds of significance. Therefore, operational emissions of criteria air pollutants and precursors would not violate or contribute substantially to an existing air quality violation or conflict with air quality planning in the SFBAAB. Thus, the impact associated with the project's operational emissions would be less than significant under Options 1 and 2.

However, long-term operational emissions from related projects, considered in light of the nonattainment status of the air basin, would be cumulatively significant. Related projects would similarly contribute to a degree, and their relative level of contribution is generally related to their size. Emissions attributable to the project and related projects and emissions from other reasonably foreseeable future projects in the SFBAAB as a whole would continue to contribute to long-term increases in emissions that would exacerbate existing and projected nonattainment conditions. Thus, the project would contribute to a significant and unavoidable cumulative long-term impact on air quality related to project operations.

Toxic Air Contaminants

Temporary, short-term construction activities under Options 1 and 2 could expose nearby sensitive receptors to toxic air contaminant (TAC) emissions. Project construction would result in emissions of diesel particulate matter (diesel PM) from the use of off-road diesel equipment required to demolish the existing on-site structures, soil excavation and site preparation, and on-site upgrades. Under both options, heavy-duty construction equipment would not operate in the immediate proximity of any single sensitive receptor for an extended period of time. Because off-road, heavy-duty equipment would be used only temporarily and intermittently (and not in one single location for any extended period of time) under both Options 1 and 2, and because of the highly dispersive properties of diesel PM, construction-related TAC emissions would not be anticipated to expose sensitive receptors to substantial concentrations of TACs. Therefore, short-term project construction activities would not result in a cumulatively considerable contribution to a significant cumulative impact related to TACs.

Long-term operations under Option 1 could expose sensitive receptors to TACs from the incremental increase in natural gas consumption and combustion by the cogeneration plant at the Pinole-Hercules WPCP. As a stationary source, the cogeneration plant would be subject to Rule 5 under BAAQMD's Regulation 2 (New Source Review of Toxic Air Contaminants), which would ensure that any incremental increase in TAC emissions associated with the project would not cause a substantial increase in health risks at nearby sensitive receptors. In addition, on-site mobile sources are site-specific; therefore, the project would not result in a cumulatively considerable contribution to a significant cumulative impact related to TACs from on-site mobile sources.

Option 2 would not result in an increase in TAC emissions from natural gas combustion that would expose sensitive receptors to increased health risks. Therefore, Option 2 would have no impacts related to long-term emission of TACs and no cumulatively considerable impacts would occur.

Carbon Monoxide

Carbon monoxide (CO) concentration is a direct function of vehicle idling time, and thus, traffic flow conditions. Transport of CO is extremely limited because it disperses rapidly with distance from the source under normal meteorological conditions. Under certain meteorological conditions, CO concentrations near roadways and/or intersections may reach unhealthy levels with respect to local sensitive land uses, such as residential areas, schools, playgrounds, child care facilities, and hospitals. As a result, BAAQMD recommends analyzing CO emissions at a local rather than a regional level.

Table 4-4
Related Projects in the City of Hercules

Project Name	Building Types	Use			
Bayfront (Waterfront)	The Bowl	Residential Units	Flex Space (sf)	Office (sf)	Retail (sf)
Corner Parcel on Bayfront Blvd., and Riverside Street / Promenade Street	Double-Loaded Corridor, Flats, and Historic Bldgs	108	1,500	12,000	
	Double-Loaded Corridor & Townhomes	100			
	Courtyard Bldgs, Townhomes, & Historic Bldgs	128	1,000	14,000	2,500
	SUBTOTAL	**336**	**2,500**	**26,000**	**2,500**
	Bayfront Boulevard & Transit Station	Residential Units	Flex Space (sf)	Office (sf)	Retail (sf)
	Double-Loaded Corridor	70	19,500		
	Courtyard Podium Building	60	20,000	17,000	11,000
	Courtyard Podium Building	40	10,500	23,000	13,000
	Train Station and Civic Building			15,000	3,000
	Vertical Mixed Use	71			8,000
	SUBTOTAL	**241**	**50,000**	**55,000**	**35,000**
	The Village	Residential Units	Flex Space (sf)	Office (sf)	Retail (sf)
	Courtyard Podium Building	120	11,000		3,000
	Double-Loaded Corridor and Townhomes	64	9,500		3,000
	Tower, Double-Loaded Corridor, and Townhomes	84	5,000		
	Double-Loaded Corridor, Flats, and Townhomes	103	32,000		
	Double-Loaded Corridor and Courtyard Units	128	19,000		3,000
	Tower and Townhomes	73			3,000
	Structured Parking Garage with Liner Units	105	5,000		3,000
	Double-Loaded Corridor	52			
	Double-Loaded Corridor	36			
	SUBTOTAL	**765**	**81,500**	**0**	**15,000**
	BAYFRONT PROJECT TOTAL	1,342	134,000	81,000	52,500
Bayfront Cury Project *	(Separate from Anderson Pacific)	Residential Units	Flex Space (sf)	Office (sf)	Retail (sf)
2 Parcels on East of Bayfront Boulevard between Railroad and Promenade Streets	Vertical Mixed Use	50			22,000
	BAYFRONT CURY PROJECT TOTAL	50	0	0	22,000
New Town Center	Market Town	Residential Units	Flex Space (sf)	Office (sf)	Retail (sf)
	Studio	49			
	One Bedroom	234			
	Two-Plus Bedrooms	117			
	Indoor Retail				57,000
	Outdoor Retail				3,000
				80,000	
	SUBTOTAL	**400**	**0**	**80,000**	**60,000**
	Cinema Town	Residential Units	Flex Space (sf)	Office (sf)	Retail (sf)
	Residential	700		100,000	210,000
	12 Screen Movie Cinema				30,000
	SUBTOTAL	**700**	**0**	**100,000**	**240,000**
	Transit Town	Residential Units	Flex Space (sf)	Office (sf)	Retail (sf)
	SUBTOTAL	**550**		**16,250**	**20,000**
	NEW TOWN CENTER PROJECT TOTAL	1,650	0	196,250	320,000
Sphere of Influence		Residential Units	Flex Space (sf)	Office (sf)	Retail (sf)
	Big League Dreams		**0**	**0**	*****
Hilltown		Residential Units	Flex Space (sf)	Office (sf)	Retail (sf)
	HILLTOWN PROJECT TOTAL	640	0	0	5,000
Sycamore North	Building Types	Residential Units	Flex Space (sf)	Office (sf)	Retail (sf)
	One Bedroom	2			
	Two Bedrooms	70			
	Three Bedrooms	24			
	Ground Floor Retail				40,000
	SYCAMORE NORTH PROJECT TOTAL	96	0	0	40,000
Sycamore Crossing	Building Types	Residential Units	Flex Space (sf)	Office (sf)	Retail (sf)
	Residential	120			
	Office			161,000	
	Retail				140,000
	Hotel		125 Rooms @ 700 sf		
	SYCAMORE CROSSING PROJECT TOTAL	120	87,500	161,000	140,000
Historic Village (Masonic Building)		Residential Units	Flex Space (sf)	Office (sf)	Retail (sf)
	HISTORIC VILLAGE PROJECT TOTAL	21	0	0	7,000
Civic Center	Building Types	Residential Units	Flex Space (sf)	Office (sf)	Retail (sf)
	Residential, Office, and Retail	50		131,150	16,100
	City Hall & Police Offices		71,100		
	Senior Center (Civic Uses)		8,100		
	Auditorium (Civic Uses)		9,750		
	CIVIC CENTER PROJECT TOTAL	50	88,950	131,150	16,100
North Shore Business Park	Building Types	Residential Units	Flex Space (sf)	Office (sf)	Retail (sf)
	BioRad		400,000		
	Tulloch Site			70,000	
	Contra Costa County Building		80,000		
	NORTH SHORE BUSINESS PARK PROJECT TOTAL	0	480,000	70,000	0
Victoria Greens		Residential Units	Flex Space (sf)	Office (sf)	Retail (sf)
	VICTORIA GREENS PROJECT TOTAL	0	65,000	0	0
HERCULES FUTURE DEVELOPMENT TOTALS		**Residential Units**	**Flex Space (sf)**	**Office (sf)**	**Retail (sf)**
		3,969	855,400	639,400	602,600
	Total Residential WW Demand (150 gpd) C/A =	595,350			
	Total Flex WW Demand (40 gpd/1,000 sf.) =		34,218		
	Total Office WW Demand (40 gpd/1,000 sf.) =			25,576	
	Total Retail WW Demand (20 gpd/1,000 sf.) =				12,052
	* per Manteca Sanitary District the City allocated 20,000 gpd for BLD				20,000
	Overall WW Demand (GPD) =	687,196			
	Overall WW Demand (MGD) =	0.6872			

Source: Data provided by City of Hercules

Table 4-5
Related Projects in Western Contra Costa County

Parcel Number	Applicant	Project Description
435061001	Phil & Janet Bailey	Divide 2 Lots into 3 Lots
420140036	Matthew Rei	Divide 2.05 Acres into Two Parcels
572070006	Eric Bjerkholt & Sophie Hahn	Divide Property into 2 Parcels
430101007	Mike Mckay	Subdivide Existing Parcel
365030108	Bellecci & Associates, Inc.	Minor Subdivision
430152044	Humann Co	Subdivide 4 Lot Subdivision
365010006	Eric Thomas	Subdivide a 62.5 Acre Site
426060012	Sergio Silva	4-Lot Subdivision
420071020	Jagjit S. Mahal	Subdivide 0.54 Acre into 2 Lots
430102003	Barbara Darlinton	Subdivide 51.445 Acres into Two Lots
408190044	Marvin Mendelsohn	4 Lot Subdivision
430251004	David F. Case	Minor Subdivision
425110002	Isloma Copes	Subdivide into Three Parcels
435150046	John Patrick	2 Lot Split
435120008	Pacific Northwest Services	Subdivide 0.41 Acre
430190008	Norman Fahmie	Subdivide into 4 Lots
365010011	Michael Klassen	2 Lot Subdivision
365010010	Eric Thomas	Subdivide into 4 Parcels
418021007	Yahyaa Dolphin	Subdivide a 1.04 Acre Parcel
426262002	Robert N. Cipolla	3 Lot Subdivision
433300006	Maninder S. Johal	Four Lot Parcel
430233006	Tomas & Patricia Rascon	2 Lot Subdivision
433200009	Mary & David Casey	Subdivide 0.72 Acre into 2 Lots
572201018	Cynthia Correia	2 Lot Minor Subdivision
572050006	Todd Hodson	Two Single Family Lots
430251003	Harry Luck	Subdivide Existing Lot into Two Smaller Parcels
430161020	Erich Reichenbach	Create 2 Parcels
420071047	Reinaldo Carvacho	Subdivide into 2 Parcels
408082008	Joshua Genser	Subdivide 26.8 Acre
431010010	Raymond Wong	Subdivide 45,597 Sq Ft Parcel into 4 Parcels
571311001	Andrew Woolman Architect	Establish Mixed Use Building in P-1
426230048	David Chang	Subdivide into Two Parcels
418021007	A. Mark Waldman	Four Lot Subdivision
435031036	Daniel Franko	Two Lot Subdivision
433230003	Jim Odie	3 Lot Minor Subdivision
425190032	William Nicora	Two Lot Minor Subdivision
430402017	Debolt Civil Engineering	COA Review for MS 2-92
430280002	Kenyon Johnson	8 Single-Family Homes

Table 4-5 Related Projects in Western Contra Costa County		
Parcel Number	Applicant	Project Description
430280002	Kelly Johnson	Condition of Compliance
430152055	Black Mountain Development	Modification to COA #5 for SD7583
426210007	Siavash Afshar	35 2-Story/total 10.09 Acres
426030036	Tekco Engineering & Associate	Subdivide 4.08 Acre into 17 Lots
433160022	Kodi Properties LLC	Subdivide 7.1 Acres
425061024	M.A. Alkhudarl	Modify Condition that Limits Square Footage
408160038	KB Homes	Single Family Residential
408160038	KB Home	Modifications to Conditions of Approval
425123028	Indy Chadha	Multi-Family Residential
425100059	Dinesh Sawhney	31 Unit Project
426040009	Robert Casteel	Subdivide into 5 Lots
426210009	Patrick Cogoghogan	Build Six Single Family Homes
426030006	KPR Balmore Manor LLC	Subdivide 6.43 Acres Into 27-Lots
426030036	KPR Balmore LLC	COA Compliance
426242005	Dave Nebout	10 Lot Subdivision
408180010	Signature Properties	374 Residential Units
433230008	Condo Conversions Company	Multifamily Residential - 44 Apartment Units
425110022	Bridget Hoffman	10 Condo Unit
430152003	Mary & David Casey	Subdivide 1.43 Acres
425210014	Hugh Afshar	Subdivide 10 Residential Units
430200020	J.R. Turner	19 Single Family Lots
435160002	Benchmark Consultants	8 Lot Single Family Development
408190044	Marvin Mendelsohn	Subdivide into 6 Units
408190050	Marvin Mendelsohn	21 Condominium Units
408190051	Marvin Mendelsohn	21 Condominium Units
408190052	Marvin Mendelsohn	21 Condominium Units
425040016	C&H Development. Inc.	Subdivide 14 Acres into 14 Lots
435100012	Laurel Lane, LLC	Subdivide into 15 Residential Lots
425210038	L-Jay Development, LLC	Subdivide into 17 Lots
430152055	Kenneth Roberts	T.M. Modification
426270029	Sunhill, LTD	COA Compliance
433160022	Eric Hesseltine	COA Modification
425061005	Jedco Consulting Engineers	Amend COA's
425061005	Jedco Engineering	Modify Condition of Compliance
433200025	Stan Ginn	COA Compliance
Source: Data provided by Contra Costa County in 2009		

Under Options 1 and 2, the number of employees or service vehicles traveling to or from the Pinole-Hercules WPCP would not increase. Therefore, project operation would not cause a net increase in vehicles at local intersections that would degrade delay times or levels of service. Accordingly, CO emissions generated by project-related vehicle trips would not exceed or substantially contribute to an exceedance of the CO NAAQS or CAAQS at local intersections. Consequently, the project would not result in a cumulatively considerable incremental contribution to a significant cumulative impact related to increases in traffic volumes on the local roadway network relative to CO concentrations.

Odor Emissions

Options 1 and 2 could expose nearby sensitive receptors to objectionable odors related to short-term construction activities. Emissions of odors are site specific and would be less than significant for the project. Diesel exhaust generated by construction equipment during demolition, grading, paving, and other miscellaneous activities may be considered offensive to some individuals. However, because odors would be temporary and would disperse rapidly with distance from the source, construction-generated odors would not frequently expose sensitive receptors to emissions of objectionable odors. Furthermore, compliance with BAAQMD Rule 15 (Emulsified Asphalt) would ensure that odors generated by paving activity would be minimized. Therefore, short-term construction-related odors would not generate objectionable odors affecting a substantial number of people.

Operations-related activities of the Pinole-Hercules WPCP under Options 1 and 2 could result in project-generated emissions of odors. The WPCP would include odor control facilities and the City of Pinole would properly maintain wastewater treatment facilities to minimize the generation of odors. Options 1 and 2 would not substantially increase either the amount of odiferous compounds generated by the WPCP or the number of odor complaints. Therefore, the project would not result in a cumulatively considerable incremental contribution to a significant cumulative impact related to odor emissions.

CULTURAL RESOURCES

The cumulative context for cultural resources is defined as the Pinole-Hercules WPCP, the corporation yard site, and the proposed pipeline alignment as well as Contra Costa County and the cities of Pinole and Hercules. Cultural resources in the project region generally consist of prehistoric sites, historic sites, historic structures, and isolated artifacts. During the 19th and 20th centuries, localized urbanization and intensive agricultural use in the region caused the destruction or disturbance of numerous prehistoric sites, while many structures now considered to be historic were erected. From the latter half of the 20th century to the present, prehistoric and historic structures have been disturbed and destroyed. During this period, the creation and enforcement of various regulations protecting cultural resources have substantially reduced the rate and intensity of these impacts; however, even with these regulations, cultural resources are still degraded or destroyed as cumulative development in the region proceeds.

As described in Section 3.2, “Cultural Resources,” three prehistoric cultural resources have been documented adjacent to or in the immediate vicinity of the pipeline alignment and corporation yard site under Option 1. Each of these sites has been documented as having once contained human remains and/or potentially interment-associated artifacts, or retains the types of soils and artifactual materials within which human remains are often noted in the San Francisco Bay Area. Given the proximity of these sites to the proposed pipeline alignment and corporation yard site, ground-disturbing activities on both of these project components could encounter and disturb intact archaeological deposits and/or human interments. Mitigation measures outlined in Section 3.2 would reduce potentially significant impacts on documented National Register of Historic Places (NRHP)/ California Register of Historical Resources (CRHR)-eligible cultural resources to a less-than-significant level. These measures require that if potentially significant cultural or historic-era resources are uncovered during construction, all ground-disturbing activities must cease until the extent, character, and potential significance of the find is determined and appropriate mitigation is developed by professional archaeological consultant.

No documented cultural sites, features, artifacts or other properties that could be eligible for listing in the NRHP or CRHR have been identified within the existing Pinole-Hercules WPCP. Therefore, Option 2 would have no impacts on documented NHRP/CRHR-eligible cultural resources and no cumulatively considerable impacts would occur.

Unrecorded prehistoric and historic-era cultural resources and undocumented human remains could be discovered or disturbed during project-related ground-disturbing activities under Options 1 and 2. Mitigation measures outlined in Section 3.2 would reduce significant impacts resulting from inadvertent damage or destruction of unknown cultural resources during construction to a less-than-significant level through monitoring of ground-disturbing activities and the recovery of potentially important scientific data and/or the preservation in place of NRHP/CRHR-eligible cultural resources. In addition, potential impacts on human remains would be reduced to a less-than-significant level because if remains were encountered, the procedures of the California Health and Safety Code would be followed. Implementing these mitigation measures would ensure that development of the project would not incrementally contribute to any significant cumulative impacts on important cultural resources in the project region.

These mitigation measures are fairly standard and are designed to ensure compliance with Section 15064.5 of the State CEQA Guidelines and with related provisions of the Public Resources Code, and it is assumed that similar measures would be applied to related projects and other projects in the region, as appropriate. Moreover, where federal agency approvals are required to implement projects, additional protection would also be anticipated under the National Historic Preservation Act, as commonly implemented by federal agencies, making measures such as those described herein fairly standard as well. Therefore, implementing the project would not result in any cumulatively considerable incremental contributions to any significant cumulative impacts on cultural resources.

Climate Change

Emissions of greenhouse gases (GHGs) have the potential to adversely affect the environment because such emissions contribute, on a cumulative basis, to global climate change. The proper context for addressing this issue in an EIR is as a discussion of cumulative impacts: Although the emissions of one single project will not cause global climate change, GHG emissions from multiple projects throughout the world could result in a cumulative impact with respect to global climate change. In turn, global climate change has the potential to result in rising sea levels, which can inundate low-lying areas; to affect rainfall and snowfall, leading to changes in water supply; to affect habitat, leading to adverse effects on biological resources; and to result in other effects.

Because of the length of the cumulative global climate change analysis, it is presented in this EIR as a stand-alone section. Accordingly, please see Section 3.3, “Climate Change.” Section 3.3 contains a two-part analysis; the projected GHG emissions from Options 1 and 2 are analyzed with respect to their potential to contribute to global climate change. Additionally, the potential effects of global climate change on Options 1 and 2 are identified based on available scientific data.

Fisheries and Aquatic Resources

The project area includes portions of San Pablo Bay, which comprises the northern part of the greater San Francisco Bay and inland areas in the cities of Pinole, Hercules, and Rodeo adjacent to the bay itself. San Pablo Bay is a major drainage for the Sacramento and San Joaquin Rivers via Suisun Bay and the Carquinez Strait, as well as numerous smaller tributaries in Marin, Sonoma, Napa, Solano, and Contra Costa Counties. The Delta contributes freshwater flow into San Pablo Bay, as do many smaller streams that flow from inland areas surrounding San Pablo Bay.

The pipeline alignment under Option 1 would cross four small tributaries to San Pablo Bay: Pinole Creek, Ohlone Creek, Refugio Creek, and Rodeo Creek. Construction activities along the proposed pipeline alignment could result in sedimentation of surface water bodies and introduction of pollutants into surface waters along the pipeline route, which could adversely affect the water quality of these creeks and fish and benthic macroinvertebrate communities. Implementation of mitigation measures in Section 3.4, “Fisheries and Aquatic Resources,” would reduce potentially significant impacts under Option 1 to a less-than-significant level by minimizing the potential for pollutants and/or sediments associated with construction-related activities to enter the creeks; identifying protocols for immediately cleaning up any spills; requiring that a biological monitor be present for construction activities adjacent to creek channels; and containing slurry should a frac-out occur during jack-and-bore drilling.

Although there are no assurances that the related projects would incorporate the same degree or methods of treatment as the project, each related project that would potentially affect fisheries and aquatic resources within San Pablo Bay or its tributaries would, at a minimum, be required to implement construction best management practices (BMPs). Depending on the severity of the related projects’ impacts, consultation with the U.S. Fish and Wildlife Service with respect to nonanadromous, freshwater fish species and with the National Marine Fisheries Service with respect to anadromous (ocean-going) fish species could also be conducted for the related projects. Therefore, the project would not result in a cumulatively considerable incremental contribution to a significant cumulative impact related to fisheries and aquatic resources.

Under Option 2, all work would occur within the footprint of the Pinole-Hercules WPCP. Therefore, Option 2 would have no impacts on and fish and benthic macroinvertebrate communities and no cumulatively considerable impacts would occur.

GEOLOGY, SOILS, AND PALEONTOLOGICAL RESOURCES

Geology and Soils

The project facilities are located within the Coast Ranges geomorphic province of California. The geologic formations and soil types vary depending on project location, and therefore are site specific. The project site is not underlain by or adjacent to any known Alquist-Priolo Earthquake Fault Zones; however, under both Options 1 and 2, the proposed facilities could be subject to seismic ground shaking from an earthquake along the Hayward Fault. In addition, the project components are subject to hazards related to liquefaction; subsidence; and unstable, expansive, and corrosive soils. Implementation of mitigation measures contained in Section 3.5, “Geology, Soils, and Paleontological Resources,” would reduce these impacts to less-than-significant levels through completion of site-specific geotechnical studies, implementation of construction and design measures developed in response to the studies, compliance with the California Building Standards Code, and on-site monitoring to ensure compliance with design measures.

Implementation of the various related projects and other projects in the region could expose additional structures and people to seismic and soils hazards. However, each project considered in this cumulative analysis must individually meet building code requirements as well as the requirements of local policies (i.e., grading and erosion control plans). Therefore, no additive effect would result and no cumulatively considerable impact related to seismic or soil hazards would occur.

Paleontological Resources

Fossil discoveries resulting from excavation and earthmoving activities associated with development are occurring with increasing frequency throughout the state. The value or importance of different fossil groups varies depending on the age and depositional environment of the rock unit that contains the fossils, their rarity, the extent to which they have already been identified and documented, and the ability to recover similar materials under more controlled conditions (such as for a research project). Unique, scientifically important fossil discoveries are relatively rare; the likelihood of encountering them is site specific and is based on the type of specific rock formations found underground. These rock formations vary from location to location.

With respect to Option 1, the formation that underlies the proposed corporation yard is not considered paleontologically sensitive. However, the proposed pipeline alignment is underlain by a variety of formations that range from recent Holocene (present day to 11,000 years old) to Miocene (approximately 24 million years old) as shown on Exhibit 3.5-1. With the exception of the Holocene-age formations, all of the sediments that underlie the proposed pipeline alignment are considered paleontologically sensitive rock units. The fact that vertebrate fossils have been recovered throughout Contra Costa County in sediments referable to these formations suggests that there is a potential to uncover additional similar fossil remains during construction-related earthmoving activities at the project site. Implementation of mitigation measures in Section 3.5 would reduce potentially significant impacts related to damage or destruction of unique paleontological resources to a less-than-significant level because construction workers would be alerted to the possibility of encountering paleontological resources; and in the event that resources were encountered, fossil specimens would be recovered and recorded and would undergo appropriate curation. Therefore, the project would not result in a cumulatively considerable contribution to a significant cumulative impact related to paleontological resources.

Under Option 2, all work would occur within the footprint of the Pinole-Hercules WPCP, which is underlain by Holocene-age Bay mud and artificial fill. By definition, to be considered a fossil, an object must be more than 11,000 years old. Because these formations consist of Holocene-age sediments that are less than 11,000 years old, unique paleontological resources would not be present. Therefore, Option 2 would have no project-related or cumulatively considerable impacts on paleontological resources.

HYDROLOGY AND WATER QUALITY

Local hydrology, drainage, and water quality conditions are often affected by regional activities, in addition to local activities and related projects. Past and present projects from the greater San Francisco Bay (urban development) to the Delta (water supply diversions, agricultural diversions, flood control projects, urban development, river channelization) affect hydrology and water quality conditions in Contra Costa County. As discussed under “Fisheries and Aquatic Resources,” above, the project area includes portions of San Pablo Bay and Pinole, Refugio, Ohlone, and Rodeo Creeks. The following evaluation of cumulative hydrology and water quality impacts is made in light of the extent to which local and regional activities can affect hydrologic conditions in the county. However, the focus is on effects on San Pablo Bay and Pinole, Refugio, Ohlone, and Rodeo Creeks and how the project and related projects may affect the hydrology and water quality conditions locally.

Surface and Groundwater Water Quality

Option 1 would involve substantial grading, excavation, and facility construction activities and would require temporary staging areas. Based on the size and duration of the construction activities under Option 1, the potential exists for temporary increases in soil erosion and for discharges of construction-related contaminants to enter adjacent surface water or groundwater. Contaminated and/or high-turbidity runoff could enter the localized surface ditches or creeks, thereby adversely affecting water quality. In addition, long-term operation of the proposed corporation yard under Option 1 has the potential to cause the discharge of contaminants in stormwater runoff.

Construction activities at the Pinole-Hercules WPCP could require groundwater dewatering under both Option 1 and Option 2. The potential exists for this groundwater to be discharged to adjacent surface water, and thereby to adversely affect water quality. A storm water pollution prevention plan (SWPPP) must be prepared for the project, consistent with the existing statewide National Pollutant Discharge Elimination System (NPDES) discharge permits from the San Francisco Bay Regional Water Quality Control Board (RWQCB). Implementing the mitigation measures in Section 3.6, “Hydrology and Water Quality,” would reduce the potentially significant stormwater quality impacts from construction activities under Options 1 and 2 and long-term impacts from operation of the proposed corporation yard under Option 1 to a less-than-significant level. Although there are no assurances that the related projects would incorporate the same degree or methods of treatment as the project, each related project that would discharge stormwater runoff would be required to comply with NPDES discharge permits from the San Francisco Bay RWQCB. Therefore, the project would not result in a cumulatively considerable incremental contribution to a significant cumulative impact.

Under Option 1, construction of the proposed corporation yard would create new paved impervious surfaces that would increase the amount of stormwater runoff within the city of Pinole. Additional stormwater runoff may contribute to localized drainage-related problems such as erosion, damage to stormwater drainage facilities or ditches and natural swales from increased runoff rates, or localized inundation of property and structures from increased drainage volumes. Implementation of mitigation measures in Section 3.6 would reduce potential impacts on water quality from an increase in stormwater runoff to a less-than-significant level by ensuring that stormwater runoff from the construction activities and impervious surfaces would be appropriately controlled and routed to off-site drainage channels. As a condition of the NPDES permit, a stormwater control plan would be prepared to comply with the Contra Costa County Clean Water Program associated implementation of the San Francisco Bay RWQCB new MRP adopted in October 2009. Option 2 does not include activities that would create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems, or cause increased erosion. Therefore, the project would not result in a cumulatively considerable incremental contribution to a significant cumulative impact related to surface water quality.

Ammonia, copper, and cyanide concentrations in the project-related discharges may cause exceedance of applicable regulatory water quality criteria in the initial zone of mixing and a 0–1% increase in these constituent concentrations in the far field of San Pablo Bay. However, the project-related discharges would not increase levels of these constituents enough to cause federal or state numeric or narrative water quality criteria to be exceeded by a frequency, magnitude, and geographic extent that would result in adverse effects on one or more beneficial uses of San Pablo Bay. The discharges also would not result in substantial, permanent degradation of existing water quality that would cause adverse impacts on one or more beneficial uses of San Pablo Bay. The project-related discharges would not increase levels of biochemial oxygen demand, oil and grease, total coliform, and total suspended solids sufficiently to cause federal or state water quality criteria/objectives to be exceeded by a frequency, magnitude, and geographic extent that would result in adverse effects on one or more beneficial uses of San Pablo Bay. The discharges also would not result in substantial, permanent degradation of existing water quality that would cause adverse impacts on one or more beneficial uses of San Pablo Bay. Dioxin, mercury, and selenium concentrations in project-related discharges would meet applicable regulatory criteria at end-of-pipe and would not measurably change background constituent concentrations in San Pablo Bay relative to existing conditions. Furthermore, the project-related discharges would result in no net increase in dioxin, mercury, and selenium loading to San Pablo Bay, and thus would not increase levels or loadings of these water quality parameters enough to cause federal or state numeric or narrative water quality criteria to be exceeded with a frequency, magnitude, and geographic extent that would result in adverse effects on one or more beneficial uses of San Pablo Bay. The discharges also would not result in substantial, permanent degradation of existing water quality that would cause adverse effects on one or more beneficial uses of San Pablo Bay.Although there are no assurances that the related projects would incorporate the same degree or methods of treatment as the project, each related project that would discharge these constituents into San Pablo Bay would be required to comply with state and local regulations. Therefore, the project would not result in a cumulatively considerable incremental contribution to a significant cumulative impact.

Flood Protection

The Pinole-Hercules WPCP and the Pinole Shores Drive site of the proposed corporation yard are located within a Federal Emergency Management Agency (FEMA)–designated Zone X. Zone X is determined to be outside the 500-year flood and protected by levee from 100-year flood. However, as noted by the Contra Costa County Flood Control and Water Conservation District, the WPCP may be exposed to flows from overtopping of the Pinole Creek levee.

Under Option 1, the proposed corporation yard would increase the amount of stormwater runoff within the city of Pinole. This additional stormwater runoff may contribute to localized inland flooding during periods of peak runoff or overtopping of Pinole Creek levees. Under both Options 1 and 2, additional wastewater treatment facilities would be constructed inland of the Pinole Creek levee. This area is potentially subject to flooding from overtopping of levees at a frequency greater than 1% per year, thereby contributing to exposure of facilities to flood hazards. Implementation of mitigation measures described in Section 3.6 would reduce the potentially significant impact related to flooding hazards to a less-than-significant level because it would ensure that facilities would be designed to minimize exposure of property to flooding and flood hazards or creation of such hazards.

Some of the related projects in the region may also result in the placement of structures in areas designated by FEMA as Zone X. In addition, related projects may be exposed to flows from overtopping of the Pinole Creek levee. However, as with the project, the related projects would be required by law to comply with all applicable state and local regulations regarding flooding and flooding hazards. Therefore, implementation of the related projects would not result in a cumulatively considerable impact.

LAND USE PLANNING

The Pinole-Hercules WPCP and the proposed corporation yard are located within Pinole city limits. The pipeline alignment proposed under Option 1 would be installed within the boundaries of Pinole, Hercules, and unincorporated Contra Costa County. Proposed, planned, and approved development in Contra Costa County and the cities of Pinole and Hercules must be considered for the purpose of evaluating land use impacts on a cumulative level. Under cumulative conditions, future projects anticipated by the existing *Contra Costa County General Plan 2005–2020, City of Pinole General Plan*, and *Hercules General Plan* will increase development and provide additional housing, employment, and shopping opportunities.

The Pinole-Hercules WPCP is fenced and consists only of industrial uses. With regard to Option 1, the site of the proposed corporation yard does not include any on-site residential land uses and the proposed pipeline would be located underground. Therefore, the project would not physically divide an established community and would not contribute to a cumulative impact on this basis.

All work related to on-site WPCP improvements would occur within the fenced footprint of the WPCP under Options 1 and 2. Construction of the proposed corporation yard and pipeline alignment under Option 1 would be consistent with the applicable land use designations in the *Contra Costa County General Plan 2005–2020, City of Pinole General Plan*, and *Hercules General Plan* and would not conflict with any applicable land use plans or policies.

Future growth under cumulative conditions may result in a variety of physical impacts related to consistency with adopted land use plans. Impacts involving adopted land use plans or policies and zoning generally would not combine to result in cumulative impacts. The determination of significance for impacts related to these issues, as described by Appendix G of the State CEQA Guidelines, and referenced earlier in Section 3.7, "Land Use Planning," is whether a project would conflict with any applicable land use plan or policy adopted for the purpose of avoiding or mitigating environmental impacts. Such a conflict is site specific; it is addressed on a project-by-project basis. Implementing the project would not result in cumulatively considerable land use planning impacts.

NOISE

Options 1 and 2 would result in short-term construction activities that could expose sensitive receptors to noise levels in excess of the applicable noise standards and/or result in a noticeable increase in ambient noise levels. Construction activities would result in a substantial (i.e., more than 3–5 decibels) temporary increase in ambient noise levels at nearby noise-sensitive land uses. Furthermore, if construction activities were to occur during the more noise-sensitive hours (e.g., evening, nighttime, and early morning), construction-generated noise levels could result in annoyance and/or sleep disruption to occupants of the nearby existing noise-sensitive land uses.

Implementation of mitigation measures in Section 3.8, “Noise,” would generally limit construction activities to the maximum extent feasible, except for the drilling machine required for horizontal directional drilling, to the less-sensitive daytime hours and require the installation of temporary noise barriers at the location of drilling locations where sensitive receptors would be affected; however, these measures would not be sufficient to avoid significant construction noise impacts along the pipeline routes and in the vicinity of the WPCP. It is similarly anticipated that compliance with applicable standards alone would not avoid significant construction noise impacts associated with the related projects. Therefore, significant noise impacts associated with construction activities from the related projects could occur.

However, as explained in Section 3.8, noise levels are not directly additive and attenuate rapidly with distance. Thus, if construction of related projects were to occur simultaneously, these projects would likely not result in cumulative impacts unless sites were being developed close to one another and exposing sensitive receptors to significant noise levels at the same time. Because the project is not expected to combine with any related projects to produce construction noise at nearby sensitive receptors, the project would not result in a cumulatively considerable incremental contribution to any such significant cumulative noise impacts.

Operation of several stationary noise sources (i.e., noise generated by stationary on-site uses) would be part of Options 1 and 2. Under Options 1 and 2, on-site noise-generating stationary equipment at the Pinole-Hercules WPCP would be enclosed in permanent structures or equipped with appropriate noise attenuation measures. Off-site noise levels would not differ substantially from existing noise levels. Noise levels from area sources (e.g., landscape maintenance equipment) would not be anticipated to differ substantially from existing equipment-related noise levels.

New stationary noise sources at the corporation yard include generators; air compressors; heavy equipment; gas or diesel motors; a maintenance shop; and heating, ventilation, and air conditioning (HVAC) equipment. Increases in stationary-source noise attributable to the proposed corporation yard would result in a negligible and imperceptible increase in noise for all operational noise sources except mechanical HVAC sources. With shielding provided by on-site structures, and assuming that a mechanical HVAC room would be part of the building design to reduce HVAC noise levels to acceptable levels, noise levels attributed to HVAC mechanical systems would not be anticipated to exceed the City of Pinole’s noise-level performance standards.

Stationary-source noise associated with future development of related projects could potentially create noise levels exceeding the applicable noise standards or resulting in annoyance at existing and future noise-sensitive receptors. Noise levels are not directly additive and attenuate rapidly with distance. Stationary-source noise would be localized to those portions of the Pinole-Hercules WPCP under Options 1 and 2 and the proposed corporation yard under Option 1 where the noise would not be detectable and would not combine with other projects in the vicinity to produce cumulative noise. Therefore, the project would not result in a cumulatively considerable incremental contribution to a significant cumulative impact related to long-term increases in stationary-source noise levels at existing sensitive receptors.

TERRESTRIAL BIOLOGY

Past development in the greater San Francisco Bay Area, ranging from conversion of land for flood control projects and habitat restoration to recent development projects, has resulted in substantial conversion of native habitat to other uses. Future projects would be expected to mitigate impacts on threatened and endangered species and other sensitive biological resources that are provided with regulatory protections; however, many types of habitats and species are provided no protection, and it can be expected that a net loss of native habitat for plants and wildlife, agricultural lands, and open space areas that provide value to biological resources will continue.

Under Option 1, construction of the proposed pipeline could affect small areas of the salt marsh habitat on Pinole Creek and the riparian and freshwater wetland habitats on Ohlone Creek, Refugio Creek, and the small tributary that drains into the upstream end of Pinole Creek if habitats are not properly marked and avoided. Implementation of mitigation measures in Section 3.9, "Terrestrial Biology," would reduce potentially significant impacts to a less-than-significant level by requiring that trained biological monitors clearly identify and flag sensitive habitats; by limiting all construction activity to areas set back from sensitive habitats; and by employing BMPs, including fencing so that sensitive habitats are avoided during construction activities. Therefore, the project would not result in a cumulatively considerable incremental contribution to a significant cumulative impact related to disturbance of sensitive habitats.

Under Option 1, special-status wildlife and nesting raptor species, such as red-shouldered hawk, red-tailed hawk, great horned owl, and America kestrel, have the potential to occur along the pipeline alignment. Implementation of mitigation measures in Section 3.9 would reduce potentially significant impacts under Option 1 to a less-than-significant level because trained biological monitors would clearly identify and flag habitat that could support special-status wildlife; all construction activity would be limited to areas outside of habitats that could support special-status wildlife; and BMPs would be employed to avoid habitats that could support special-status wildlife. Therefore, the project would not result in a cumulatively considerable incremental contribution to a significant cumulative impact related to disturbance of special-status wildlife and nesting raptor species.

The project has been designed to avoid filling waters of the United States, including wetlands subject to U.S. Army Corp of Engineers jurisdiction under the federal Clean Water Act or wetland habitats protected under state and local regulations, and therefore adverse impacts would be unlikely; however, without mitigation, complete avoidance of impacts on these waters cannot be assured. Implementation of mitigation measures in Section 3.9 would reduce potentially significant impacts under Option 1 to a less-than-significant level by requiring that trained biological monitors clearly identify and flag waters; by limiting all construction activity to areas set back from waters; and by employing BMPs so that waters are avoided during construction activities and so that sediment disturbed during construction activities does not enter the waters. Therefore, the project would not result in a cumulatively considerable incremental contribution to a significant cumulative impact related to fill of waters of the United States and waters of the state.

Under Option 2, all work would occur within the footprint of the Pinole-Hercules WPCP. Therefore, Option 2 would have no impacts on sensitive habitats; special-status wildlife and nesting raptor species; or waters of the United States, including wetlands, and waters of the state. No cumulatively considerable impacts would occur.

4.2 GROWTH-INDUCING IMPACTS

4.2.1 INTRODUCTION

CEQA Section 21000(b)(5) specifies that growth-inducing impacts of a project must be addressed in an EIR. Section 15126.2(d) of the State CEQA Guidelines further suggests that an EIR evaluate the growth-inducing impacts of a project as follows:

> Discuss the ways in which the proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment. Included in this area projects which would remove obstacles to population growth (a major expansion of a waste water treatment plant might, for example, allow for more construction in service areas). Increases in the population may tax existing community service facilities, requiring construction of new facilities that could cause significant environmental effects. Also discuss the characteristic of the characteristic of some projects may encourage and facilitate other activities that could significantly affect the environment, either individually or cumulatively. It must not be assumed that growth in any area is necessarily beneficial, detrimental, or of little significance to the environment.

Direct growth inducement would result if a project were to involve construction of new housing. Indirect growth inducement would result, for instance, if implementing a project would result in any of the following:

- substantial new permanent employment opportunities (e.g., commercial, industrial, or governmental enterprises);

- a construction effort with substantial short-term employment opportunities that indirectly stimulates the need for additional housing and services to support the new temporary employment demand; and/or

- removal of an obstacle to additional growth and development, such as removing a constraint on a required public utility or service (e.g., construction of a major sewer line with excess capacity through an undeveloped area) or adding development adjacent to undeveloped land.

Growth inducement itself is not an environmental effect, but it may foreseeably lead to environmental effects. These environmental effects may include increased demand on other community and public services and infrastructure, increased traffic and noise, degradation of air or water quality, degradation or loss of plant or animal habitats, or conversion of agricultural and open space land to urban uses.

4.2.2 GROWTH-INDUCING IMPACTS OF THE PROJECT

By implementing either Option 1 or Option 2, the City of Pinole would construct and operate improvements that would eliminate the need for blending and avoid the use of the existing shallow-water outfall. Therefore, the project would implement the necessary facilities to improve treatment processes at the Pinole-Hercules WPCP to meet regulatory discharge requirements of the San Francisco Bay RWQCB.

Project implementation would result in an increase in the instantaneous wet-weather flow capacity to 20 million gallons per day (mgd) and the peak wet-weather capacity to 14.59 mgd, from the existing peak wet-weather flow capacity of 10.3 mgd. This increase in wet-weather capacity would allow the plant to appropriately treat flows that occur during high-rainfall events; however, the current dry-weather capacity of 4.06 mgd would not be increased. Therefore, the project would not induce growth in the Pinole-Hercules WPCP's sewer district.

Project construction would require up to eight workers at any given time; however, the existing construction workforce in the San Francisco Bay Area is more than sufficient to meet this need. Therefore, the project would not foster short-term economic growth associated with construction employment opportunities. Furthermore, because the project would not require new employees during the operational phase, it would not foster long-term economic growth associated with operational employment. Finally, the project would not substantially increase population growth in the surrounding region because it would not result in the provision of new infrastructure that could be used to serve new county residents beyond the current growth projections of the cities of Pinole and Hercules.

4.3 SIGNIFICANT AND UNAVOIDABLE ADVERSE IMPACTS

Public Resources Code Section 21100(b)(2)(A) requires that an EIR include a detailed statement setting forth "In a separate section…Any significant effect on the environment that cannot be avoided if the project is implemented." Accordingly, this section provides a summary of significant environmental impacts of the project that cannot be mitigated to a less-than-significant level.

4.3.1 SIGNIFICANT AND UNAVOIDABLE IMPACTS OF THE PROJECT

Chapter 3 provides a description of the potential environmental impacts of the project and recommends various mitigation measures to reduce impacts, to the extent feasible. After implementation of the recommended mitigation measures, all but two of the impacts associated with the project would be reduced to a less-than-significant level. The impacts discussed below are considered significant and unavoidable; that is, no feasible mitigation is available to reduce the project's impact to a less-than-significant level. Alternatives to the project that may be capable of reducing or avoiding this impact are discussed in Chapter 5.

PROJECT IMPACTS

NOISE

Impact 3.8-1: Short-Term Increases in Construction Source Noise Levels. Construction-generated noise levels could exceed the City of Pinole daytime noise standard of 65 dB Leq at the closest sensitive receptor approximately 500 feet from the WPCP facility. Construction-generated noise levels could exceed the daytime noise standard of 86 dB Leq at the closest sensitive receptors approximately 50 feet and 60 feet (i.e., residences on Railroad Avenue in Rodeo [Contra Costa County] and on Woodfield Drive near Pinole Creek [City of Hercules]) from the proposed pipeline route, respectively. Construction-generated noise levels could exceed 86 dB Leq daytime and 66 dB Leq nighttime at the closest sensitive receptors approximately 50 feet and 485 feet (i.e., residences on Railroad Avenue in Rodeo [Contra Costa County] and on Forest Circle [City of Hercules], south of San Pablo Avenue) respectively, from horizontal directional drilling activities at the creek crossings. Mitigation Measure 3.8-1 requires that construction activities be limited to daytime hours to the maximum extent feasible, that construction equipment be fitted with noise control devices, that temporary noise barriers be erected between the horizontal directional drilling equipment and the nearest residences and on the east side of the Pinole-Hercules WPCP, that advance notice to nearby residents be provided, and that a disturbance coordinator be designated to respond to complaints. However, even after implementation of these mitigation measures, noise levels along the pipeline route and at the nearest residence east of the Pinole-Hercules WPCP would still exceed the Contra Costa County, City of Pinole, and City of Hercules noise thresholds. This would be a significant and unavoidable short-term construction-related impact of the project.

CUMULATIVE IMPACTS

AIR QUALITY

Long-term operational emissions from related projects, considered in light of the nonattainment status of the air basin, would be cumulatively significant. Related projects would similarly contribute to a degree, and their relative level of contribution is generally related to their size. Emissions attributable to the project, when combined with emissions from the related projects and emissions from other reasonably foreseeable future projects in the SFBAAB as a whole, would continue to contribute to long-term increases in emissions that would exacerbate existing and projected nonattainment conditions. Thus, the project would contribute to a significant and unavoidable cumulative long-term impact on air quality related to project operations.

Given the large scale of development that would occur with some of the related projects, taken in total and combined with the nonattainment status of the SFBAAB for ozone and PM_{10} and other development that would occur in the SFBAAB, the related projects would result in a significant and unavoidable cumulative air quality impact from construction activities. Although mitigation measures would reduce construction-related air emissions associated with the project to a less-than-significant level, they would not be sufficient to reduce the project's cumulative contribution to below a level that is not considerable, because the basin is already in a nonattainment status. Therefore, the project would result in a cumulatively considerable contribution to this significant and unavoidable cumulative air quality impact.

5 ALTERNATIVES

5.1 INTRODUCTION TO ALTERNATIVES

State CEQA Guidelines (Section 15126.6[a]) requires that an EIR describe "a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects, and evaluate the comparative merits of the alternatives." The purpose of the alternatives analysis is to determine whether or not a variation of the project would reduce, or eliminate, significant project impacts, within the basic framework of the project objectives (State CEQA Guidelines Section 15126.6[b]).

Alternatives considered in an EIR should be feasible, and should attain most of the basic project objectives. As described in Section 2.4 of Chapter 2, "Project Description," of this DEIR, the Pinole-Hercules Water Pollution Control Plant (WPCP) Improvement Project is intended to achieve the following primary objectives:

- construct improvements to eliminate blending and avoid use of the existing shallow water outfall; and
- comply with conditions set forth in the San Francisco Bay Regional Water Quality Control Board (RWQCB) National Pollutant Discharge Elimination System (NPDES) permit (Order Number R2-2007–0024).

5.2 RANGE OF ALTERNATIVES CONSIDERED

The range of alternatives considered in an EIR is governed by the "rule of reason," requiring evaluation of only those alternatives "necessary to permit a reasoned choice" (State CEQA Guidelines Section 15126.6[f]). Further, an EIR "need not consider an alternative whose effect cannot be reasonably ascertained and whose implementation is remote and speculative" (State CEQA Guidelines Section 15126.6[f][3]). The analysis should focus on alternatives that are feasible (i.e., that may be accomplished in a successful manner within a reasonable period of time) and that take economic, environmental, social, and technological factors into account. Alternatives that are remote or speculative will not be discussed. Furthermore, the alternatives analyzed for a project should focus on reducing or avoiding significant environmental impacts associated with the project as proposed (State CEQA Guidelines Section 15126.6[b]).

CEQA requires that, among other alternatives, a "no project" alternative be evaluated in relation to the project. Moreover, the "no project" analysis must "discuss the existing conditions, as well as what would be reasonably expected to occur in the foreseeable future if the project were not approved, based on current plans and consistent with available infrastructure and community services." (State CEQA Guidelines Section 15126.6[e]). Accordingly, a no project alternative is analyzed in this DEIR at a sufficient level of detail to allow for a meaningful evaluation, analysis, and comparison with the two project options.

The existing Pinole-Hercules WPCP is owned and operated by the City of Pinole under a joint powers agreement with the City of Hercules. The facility treats wastewater from both cities to secondary standards prior to discharge to San Pablo Bay. Currently, the Pinole-Hercules WPCP is permitted to treat 4.06 million gallons per day (mgd) average dry-weather flow and 10.3 mgd wet-weather flow, but facilities cannot handle the instantaneous peak wet-weather flow, which has approached 20 mgd in the past during high rainfall events. There are two operational discharge outfalls. One of these (Deepwater Outfall 001) is shared with the Rodeo Sanitary District (RSD) wastewater treatment plant and is permitted by the RWQCB. The second outfall (Shallow Water Outfall 002) is not permitted and has been used in the past during emergency situations during wet-weather conditions when influent flows are high.

As described in Section 2.3 of Chapter 2, "Project Description," of this DEIR, all wastewater treatment plants that discharge to surface waters are issued a NPDES permit that sets specific discharge requirements to ensure protection of public health, environmental health, and water quality. Discharge from the Pinole-Hercules WPCP is regulated by the San Francisco Bay RWQCB under a NPDES permit, which was adopted as Order R2-2007-0024 in March 2007. Order R2-2007-0024 mandates corrective measures to increase wet-weather treatment capacity and correct issues related to effluent discharge at the WPCP. The RWQCB has set a compliance time schedule, requiring that all facilities are completed and operational by June 1, 2016.

Because the project is required to attain the requirements stipulated under RWQCB Order Number R2-2007–0024, the project alternatives are designed to allow the WPCP to meet effluent water quality standards, cease blending operations, and discontinue the use of Shallow Water Outfall 002. As described in Section 2.6 of Chapter 2, "Project Description," of this EIR, the City of Pinole considered six alternatives to meet the NPDES permit requirements. Based on the results of that analysis, which considered biological resources, cultural resources, land use and planning, water quality, and financial feasibility, two options were selected for detailed environmental analysis in this DEIR. Chapter 2, "Project Description," presents the details of Option 1: New Larger Effluent Pipeline to RSD and Option 2: Pinole-Only Flows at Existing Plant. Chapter 3, "Affected Environment, Environmental Consequences, and Mitigation Measures," discusses the environmental setting, environmental impacts associated with construction and operation of either Option 1 or Option 2, and feasible mitigation for impacts (where necessary) for each environmental issue area. The No-Project Alternative and five other alternatives considered in the opportunity and constraints analysis are discussed below in Sections 5.3 through 5.8. A comparison of the environmental impacts of each alternative to the project is provided in brackets at the end of each issue area.

5.3 NO-PROJECT ALTERNATIVE

5.3.1 DISCUSSION

Under the No-Project Alternative, no facility upgrades would be constructed. The Pinole-Hercules WPCP would continue to treat flows from the cities of Pinole and Hercules and would be permitted to treat and discharge 4.06 mgd average dry-weather flow and 10.3 mgd average wet-weather flow. Treated effluent from the WPCP would continue to be conveyed northeast through the existing pipeline to the RSD, where flows from the two treatment facilities are combined and discharged into San Pablo Bay through a permitted deep water outfall (Outfall 001).

The WPCP would continue to occasionally utilize the shallow water discharge outfall (Outfall 002), located at the west side of the WPCP property boundary when the plant's treatment capacity is exceeded. This occurs during winter storm events that produce influent levels above the plant's 10.3 mgd permitted wet-weather capacity. During these high influent flow periods, the excess influent would continue to be treated to a primary level, blended with secondary treated wastewater, disinfected, and then dechlorinated prior to release into San Pablo Bay from the shallow water outfall, which would be in violation of Oder R2-2007-0024. The Pinole-Hercules WPCP Joint Powers Authority (JPA) would continue to consult with the RWQCB and take actions to resolve issues related to peak wet-weather flow and the current inadequate processing and discharge facilities.

5.3.2 ENVIRONMENTAL IMPACTS

AIR QUALITY AND ODORS

The No-Project Alternative would involve no construction and would therefore result in ***no impacts*** to construction-generated fugitive dust emissions, long-term operational emissions, mobile source carbon monoxide (CO) emissions, or exposure of sensitive receptors to toxic air contaminants (TACs). The potentially significant construction-generated emissions under to Option 1 or Option 2 would be mitigated to a less-than-significant level by implementation of all feasible Bay Area Air Quality Management District (BAAQMD) recommended dust control measures. However, the No-Project Alternative would avoid that mitigable impact. In addition, because there would be no change to the WPCP capacity, treatment process, or facilities (including outfalls), the No-Project Alternative would also avoid the other less-than-significant impacts related to long-term operational emissions of criteria air pollutants and precursors, local mobile source CO emissions, possible exposure of people to objectionable odors, and exposure of sensitive receptors to toxic air contaminants. *[Less than Options 1 and 2]*

CULTURAL RESOURCES

No construction would occur under the No-Project Alternative; therefore, this alternative would avoid the potentially significant impact under Option 1 related to the potential to encounter and disturb previously undocumented portions of three prehistoric cultural resources adjacent to or in the immediate vicinity of the proposed effluent pipeline to RSD and the relocated corporation yard. Furthermore, without the proposed construction, there would be no potentially significant impacts to undocumented cultural resources, including human remains. Therefore, there would be ***no impact*** on cultural resources from the No-Project Alternative. The potential cultural resource impacts under Options 1 and 2 would be mitigated to a less-than-significant level. Nonetheless, the No-Project Alternative would avoid those cultural resource impacts and would therefore result in lesser impacts to cultural resources. *[Less than Options 1 and 2]*

CLIMATE CHANGE

The No-Project Alternative would not include any new construction activities and the existing buildings, pipelines, outfalls, and other facilities would remain in their current state. Therefore, there would be no potential for construction-related greenhouse gas (GHG) emissions, no conflict with the goals of the Assembly Bill (AB) 32 Scoping plan, and no cumulatively considerable contribution to GHG emissions. The continued long-term operation of the existing WPCP would not result in an increase in GHG emissions nor an exceedance of the BAAQMD’s proposed threshold of significance (1,100 metric tons of carbon dioxide-equivalent per year [MT CO_2e/yr]). The future effects of climate change, including sea level rise, increased intensity of storm surges, and increased variability in precipitation patterns could adversely affect the Pinole-Hercules WPCP. However, information about future projected impacts of climate change is limited at this time and the analysis of how future conditions resulting from climate change could adversely affect the WPCP is considered to be too speculative to support a significance determination. Because no facilities would be constructed, the No-Project Alternative would result in ***no impact*** on climate change and would avoid the less-than-significant climate change impacts related to Options 1 and 2. *[Less than Options 1 and 2]*

FISHERIES AND AQUATIC RESOURCES

Under the No-Project Alternative, Shallow Water Outfall 002 would continue to be used in during emergency situations, including wet-weather conditions when influent flows are high, to release blended effluent to San Pablo Bay. Outfall 002 is located in critical habitat for winter-run evolutionarily significant unit (ESU) Chinook salmon. By continuing to release effluent from the shallow water outfall, the No-Project Alternative would result in ***potentially significant*** impacts on fisheries and would not result in the beneficial effects to fisheries that would occur under Options 1 or 2. During wet-weather conditions when influent flows are high, the No-Project Alternative would continue to discharge ammonia, copper, and cyanide in concentrations that may exceed applicable regulatory water quality criteria to productive shallow water habitats where fish and benthic macroinvertebrates abundance may be higher. Additionally, this alternative would continue to cause localized dissolved oxygen and temperature effects in the near-shore area that may alter migration patterns of fish. Therefore, the No-Project Alternative would result in ***potentially significant*** impacts on fisheries and would have greater impacts fisheries impacts than Option 1 or Option 2. *[Greater than Options 1 and 2]*

Continued discharges from the Deep Water Outfall 001 under the No-Project Alternative would unlikely cause lethal exposure or adverse long-term population or community level effects on any aquatic species. The continued discharges of ammonia, copper, and cyanide as well as oxygen-demanding substances and dissolved oxygen from Outfall 001 would not adversely affect beneficial uses related to aquatic life and the No-Project Alternative would have a ***less-than-significant*** impact. Further, the temperature of the effluent would not change and, therefore, would not change the thermal conditions in the existing plume and would not result in exposure durations to temperature conditions that could cause acute or chronic thermal effects on fish or benthic macroinvertebrates moving past or residing near the diffuser. This impact would be ***less than significant***. *[Similar to Options 1 and 2]*

The No-Project Alternative would involve no construction activities, including no construction near/in creeks, and would therefore have no construction-related impacts on fish and benthic macroinvertebrates. *[Less than Options 1 and 2]*

GEOLOGY AND SOILS

The No-Project Alternative would not include any construction activities; existing buildings, pipelines, outfalls, and other facilities would remain in their current state. Therefore, there would be no potential for construction-related erosion and no potential increase in the risk exposure to injury or property damage because of a seismic event. Options 1 and 2 would not result in any significant, unmitigable impacts related to geology and soils; therefore, the No-Project Alternative is considered to have similar impacts to proposed Options 1 and 2. *[Similar to Options 1 and 2]*

HYDROLOGY AND WATER QUALITY

No construction would occur under this alternative; therefore, there would be ***no impacts*** associated with temporary construction-related water quality effects, new paved impervious surfaces, increases in stormwater runoff, increases in flooding or exposure to flood hazards, or alteration of on- or off-site drainage patterns. *[Less than Options 1 and 2]*

Under the No-Project Alternative, volume and quality secondary-treated effluent discharged from the Deep Water Outfall 001 would remain the same and there would be ***no impacts*** associated with changes in concentrations or amounts of pollutants discharged to San Pablo Bay. However, Shallow Water Outfall 002 would continue to be used in during emergency situations, including wet-weather conditions when influent flows are high, to release blended effluent to San Pablo Bay. This would likely result in future violations of RWQCB discharge requirements, which would represent a ***significant*** water quality impact. *[Greater than Options 1 and 2]*

LAND USE

Under the No-Project Alternative, no development would occur; the Pinole-Hercules WPCP would continue to operate as it does currently; and there would be no change in existing land uses. Therefore, there would be ***no impact*** related to potential conflicts with land use plans adopted to avoid or mitigate an environmental effect or adopted habitat conservation plans. In addition, ***no impact*** related to the division of a community would result. This is similar to Options 1 and 2, for which no land use impacts were identified. *[Similar to Options 1 and 2]*

NOISE

Under the No-Project Alternative, no new construction activities would occur, no new noise-generating uses or sensitive noise receptors would be developed, and no additional traffic would be generated. Therefore, there would be no increase in short-term or long-term noise levels or exposure to sensitive receptors to increased noise levels and ***no impact*** related to noise would occur. The No-Project Alternative would avoid the significant and unavoidable impact related to short-term increases in construction noise levels as well as less-than-significant impacts related to traffic noise levels, stationary- and area-source noise levels, and groundborne vibration associated with Options 1 and 2. The No-Project Alternative would result in lesser noise impacts than Option 1 or Option 2. *[Less than Options 1 and 2]*

TERRESTRIAL BIOLOGY

No construction would occur under the No-Project Alternative, and there would be ***no impact*** on special-status plants or wildlife, nesting raptors, waters of the United States or migratory corridors. This is similar to Option 2, which would have limited construction within the footprint of the existing WPCP, which does not contain special-status plants or wildlife, waters of the United States or habitat to support migratory wildlife. Therefore, Option 2 would result in no impacts on terrestrial biological resources. However, Option 1, which includes construction of a new pipeline to RSD, would result in less than significant or mitigable terrestrial biological resource impacts. The No-Project Alternative would avoid the impacts associated with Option 1 and would therefore result in lesser impacts on terrestrial biology than Option 1. *[Similar to Option 2, Less than Option 1]*

5.3.3 ABILITY TO ACCOMPLISH PROJECT OBJECTIVES

The No-Project Alternative would not attain the project objectives to eliminate blending, avoid use of the existing shallow water outfall and comply with the NPDES permit (Order Number R2-2007-0024). Under this alternative, during high influent flow periods when the conveyance pipeline capacity to RSD is exceeded, WPCP would continue to treat excess influent to a primary level, blend with secondary treated wastewater, disinfect, dechlorinate, and release to San Pablo Bay from the shallow water outfall (Outfall 002). This practice would continue to violate the NPDES permit, which would likely lead to enforcement actions from the RWQCB.

5.4 FULL TERTIARY FACILITIES

5.4.1 DISCUSSION

The Full Tertiary Facilities Alternative would involve upgrading the entire Pinole-Hercules WPCP from secondary to tertiary treatment. The current effluent discharge pipeline to the RSD would no longer be used and RSD Outfall 001 would no longer be used. Instead, a new permitted outfall would be constructed in Pinole Creek for discharge of tertiary-treated effluent into the creek.

The Pinole-Hercules WPCP upgrade to treat all wastewater flows to tertiary recycled water standards would involve the use of tertiary filters or a membrane bioreactor. The plant's peak wet-weather capacity would be increased from 10.3 mgd to 14.59 mgd. If the tertiary filter options were selected, any influent flow in excess of 14.59 mgd would bypass primary treatment and flow directly to the secondary aeration basins. If the membrane bioreactor option were selected, equalization basins would be used to modulate flows to the membrane bioreactor so the inflows do not exceed 14.59 mgd. Ultraviolet (UV) disinfection would be implemented. All treated, disinfected wastewater would be discharged to Pinole Creek approximately 3,000 feet upstream of the San Francisco Bay and used to augment streamflow and enhance the riparian values of the waterway. The treatment regime proposed for this alternative would produce a better quality wastewater than what is currently generated by the Pinole-Hercules WPCP. It would also increase the discharge flowrate, and thereby increase the stream flow in Pinole Creek, at least during the wet season.

5.4.2 ENVIRONMENTAL IMPACTS

AIR QUALITY AND ODORS

The Full Tertiary Facilities Alternative would result in similar air quality impacts as Option 1. Construction activities associated with implementation of this alternative would generate intermittent emissions of criteria air pollutants and precursors, including respirable particulate matter (PM_{10}) and fine particulate matter ($PM_{2.5}$), which would result in ***potentially significant impacts*** due to violation or substantial contribution to an existing or projected air quality violation, exposure of sensitive receptors to substantial pollutant concentrations, and/or conflict with implementation of regional air quality plans. However, as with Option 1, all feasible BAAQMD-recommended dust control measures would be required to be implemented, which would reduce this alternative's construction emissions impact to a ***less-than-significant*** level.

This alternative would have the same peak wet-weather treatment capacity as Option 1 (14.59 mgd). Therefore, as with Option 1, it is estimated that this alternative's net increase in operational criteria air pollutant and ozone precursor emissions would not exceed BAAQMD's currently adopted thresholds of significance. Therefore, operational emissions would not result in or substantially contribute to emissions concentrations that exceed the national ambient air quality standards (NAAQS) or California ambient air quality standards (CAAQS) and would not conflict with air quality planning efforts in the San Francisco Bay Area Air Basin (SFBAAB). Also similar to Option 1, implementation of this alternative would not cause a net increase in vehicles at local intersections that would degrade delay times or level of service (LOS). Accordingly, this alternative would not substantially contribute to the degradation of nearby intersections or local CO concentrations that exceed the 1-hour or 8-hour CO CAAQS or NAAQS. Implementation of this alternative would not result in a substantial increase in the exposure of receptors to emissions of TACs from construction activities, on-site stationary, and/or increased motor vehicle trips generated by the project. The temporary, short-term construction and long-term operation of this alternative would not result in an increase in the frequency in which sensitive receptors would be exposed to objectionable odorous emissions. Furthermore, this alternative would not conflict with or obstruct implementation of the State Implementation Plan (SIP). The Full Tertiary Facilities Alternative would therefore result in similar ***less-than-significant*** air quality impacts as Option 1. *[Similar to Option 1]*

CULTURAL RESOURCES

The Full Tertiary Facilities Alternative would result in similar impacts to Cultural Resources as Option 1. According to a California Historical Resources Information System Northwest Information Center record search and a reconnaissance survey, no previously documented cultural resources have been noted within or in the vicinity of the proposed Pinole Creek pipeline alignment. However, because Native American populations in particular tended to settle and engage in subsistence activities along creeks and in the vicinity of other water sources, the area around the present-day channel of Pinole Creek may contain potentially significant subsurface traces of prehistoric activities and/or human remains. Therefore, this alternative could result in accidental damage or destruction of undocumented cultural resources and/or undocumented human remains. As with Option 1, mitigation is available to reduce these ***potentially significant*** cultural resource impacts to a ***less-than-significant*** level. *[Similar to Option 1]*

CLIMATE CHANGE

Construction activities associated with the Full Tertiary Facilities Alternative would generate temporary GHG emissions similar to those associated with Option 1. Construction-related GHG emissions would cease following completion of construction. Because construction-related emissions would be temporary and finite in nature, below screening levels being considered and/or discussed by other government agencies and associations, and not conflict with the AB 32 Scoping plan or any local GHG reduction efforts, this alternative's construction-related GHG emissions would not be a cumulatively considerable contribution to climate change, and therefore, would be a ***less-than-significant*** impact.

Implementation of the Full Tertiary Facilities Alternative would change the amount of electricity and natural gas consumed by operation of the WPCP and the associated level of GHG emissions. This alternative would have the same peak wet-weather treatment capacity as Option 1 (14.59 mgd) and would, therefore, be anticipated to use a similar amount of electricity and natural gas to treat additional wastewater. However, similar to Option 1, the operations under this alternative would not result in a net increase in operational GHG emissions that would exceed the BAAQMD's proposed threshold of significance of 1,100 MT CO2e/yr. In addition, because this alternative would not conflict with applicable measures in the California Air Resources Board's (ARB's) Scoping plan, operational GHG emissions would not be a cumulatively considerable contribution to climate change. As a result, this impact would be ***less than significant***.

The future effects of climate change, including sea level rise, increased intensity of storm surges, and increased variability in precipitation patterns could adversely affect the Pinole-Hercules WPCP. However, there is too much uncertainty at this time to conclude whether there would be an impact, and the extent to which it may occur. For these reasons, the analysis of how future conditions resulting from climate change could adversely affect the WPCP is considered to be ***too speculative*** to support a significance determination. *[Similar to Option 1]*

FISHERIES AND AQUATIC RESOURCES

By discontinuing use of shallow water outfall, the Full Tertiary Facilities Alternative would result in the similar ***beneficial effects*** to fisheries that would occur under proposed Options 1 or 2, including: eliminating the use of the shallow water outfall: eliminating constituent discharges to productive shallow water habitats where fish and BMI abundance may be higher; reducing dissolved oxygen effects to productive near-shore shallow water habitats here fish and BMI abundance may be higher; and reducing the potential for localized dissolved oxygen and temperature effects and resultant potential for the discharge to alter migration patterns of fish moving through the near-shore areas. This alternative would also eliminate use of Deepwater Outfall 1, thereby avoiding the less-than-significant fisheries impacts related to discharge of ammonia, copper, cyanide as well as discharge-related effects on dissolved oxygen levels and thermal plume. Furthermore, this alternative would treat to tertiary levels, which would improve the water quality of the effluent discharge over the secondary-treatment of Options 1 or 2. *[Less than Options 1 and 2]*

Pinole Creek supports native rainbow trout in its headwaters (upstream of the Pinole-Hercules WPCP) and steelhead have also been observed in the creek, although the size of the run is not known. However, passage to the upper reaches is restricted by a natural bedrock waterfall located approximately 0.4 mile upstream of the intersection of Alhambra Valley and Bear Creek roads upstream of the City of Pinole and may also be limited by a 100-foot-long concrete box culvert under Interstate 80. Salmon have not been observed in Pinole Creek. (Leidy et al. 2005). Rainbow trout have not been observed in the lower reaches of the creek and, due to the marginal habitat in the vicinity of the WPCP, are unlikely to occur there. However, there is a potential for anadromous salmonids, including ESA-listed ESUs, and other ESA- and CESA-listed species (e.g., delta smelt, longfin smelt) to stray into the creek.

The Full Tertiary Facilities Alternative would result in construction-related activities that could introduce pollutants and/or sediments into Pinole Creek, which could negatively influence all life stages of anadromous salmonids. This would be a ***potentially significant*** fisheries impact. However, mitigation would be implemented including construction best management practices (BMPs) to minimize potential adverse water quality effects and thereby minimizing the risk of adversely affecting special-status fish species. These measures would reduce the construction impacts to a ***less-than-significant*** level. *[Similar to Options 1 and 2]*

Although the tertiary treatment regime constructed under this alternative would produce better quality wastewater than the secondary treatment that would continue under Options 1 or 2, and although the discharge to Pinole Creek is meant to augment streamflow and enhance riparian values, discharge to the creek would also result in potential operations-related impacts to flow and water temperatures in Pinole Creek. The potential hydrologic impacts and increases in temperature in Pinole Creek could have adverse effects on anadromous salmonids that require cool water habitat, that could be ***potentially significant***. *[Greater than Options 1 and 2]*

GEOLOGY AND SOILS

As with Options 1 and 2, the proposed facilities under the Full Tertiary Facilities Alternative would not be located within or adjacent to a fault zoned under the Alquist-Priolo Earthquake Fault Zone Act, and the Pinole Creek Fault is not considered to be active by California Geological Survey (CGS). Therefore, this impact is considered ***less than significant***. *[Similar to Options 1 and 2]*

The facilities proposed under this alternative would be constructed in a seismically active area, and project implementation would expose people and structures to risks caused by strong seismic ground shaking. Construction activities would involve grading and movement of earth in soils subject to wind and water erosion hazard. The proposed facilities could be subject to hazards from liquefaction, subsidence, and construction in potentially unstable soils. Portions of the project site are underlain by soils that have a moderate to high potential for expansion when wet and may result damage to structures and most of the soils within which the project components would be constructed are moderately to highly corrosive of concrete and steel. These impacts are considered ***potentially significant***. Similar to Options 1 and 2, mitigation would reduce these potentially significant impacts to ***less-than-significant*** levels by requiring a site-specific geotechnical report, monitoring of earthmoving activities, and a grading and erosion control plan. The geotechnical design recommendations to reduce damage from seismic events would be incorporated into buildings, structures, and infrastructure as required by the California Building Standards Code (CBC), and a geotechnical or soils engineer would provide on-site monitoring to make sure that earthwork is being performed as specified in the plans. Furthermore, a grading and erosion control plan with specific erosion and sediment control measures would be prepared, approved by the City of Pinole Planning Department, and implemented. *[Similar to Option 1]*

Construction of proposed improvements at the Pinole-Hercules WPCP under the Full Tertiary Facilities Alternative would not change the susceptibility of the plant to damage from tsunamis, and would not result in any new employees whose safety could be jeopardized by a tsunami. Therefore, this impact is considered ***less than significant***. *[Similar to Options 1 and 2]*

The Pinole-Hercules WPCP and the proposed pipeline alignment to Pinole Creek are underlain by Holocene-age Bay mud and artificial fill, which are not considered paleontologically sensitive rock formations. Therefore, construction activities for this alternative would not be anticipated to damage or destroy previously unknown, unique paleontological resources at the project site. This is considered a ***less-than-significant*** impact. *[Less than Option 1, Similar to Option 2]*

HYDROLOGY AND WATER QUALITY

Under the Full Tertiary Facilities Alternative, construction activities would have similar ***potentially significant*** impacts related to temporary soil erosion, discharges of construction-related contaminants and off-site discharge of contaminants in stormwater runoff as Option 1. Because the corporation yard would not be located under this alternative, only a small amount of additional impervious surfaces would be constructed at the Pinole-Hercules WPCP and none at a new corporation yard site; therefore, a substantial increase in stormwater runoff would not be expected, resulting in a ***less-than-significant*** impact.. However, because this alternative would discharge treated wastewater into Pinole Creek, it could create or contribute to flood hazards or inland flooding (particularly as resulted to existing housing along the southern end of the creek) and the new facilities could be subject to flooding from the overtopping of Pinole Creek levees. Therefore, this alternative could result in ***potentially significant*** hydrologic impacts not associated with Options 1 and 2. A hydrologic engineering study would be required in order to determine whether the increased flows that would be discharged into Pinole Creek could be contained within existing facilities. *[Greater than Options 1 and 2]*

This alternative would involve upgrading the Pinole-Hercules WPCP to full tertiary treatment of wastewater and discharging that wastewater to Pinole Creek rather than San Pablo Bay. Although Options 1 and 2 would result in less-than-significant water quality impacts related to effluent discharge and the concentrations and amounts of constituents, the tertiary treatment would improve the quality of discharged effluent by further reducing constituents of concern (ammonia, copper and cyanide), levels of biochemical oxygen demand, oil and grease, total coliform, total suspended solids, dioxin, mercury and selenium. However, additional studies would be required to determine the impact and benefits of using the tertiary treated water for streamflow augmentation in Pinole Creek. The stream discharge would be considered a "shallow water discharge," which is prohibited in the Basin Plan. The prohibition is "intended to protect beneficial uses in areas that receive very limited, if any, dilution." Exceptions are granted when "a discharge is approved as part of a reclamation project, or it can be demonstrated that the net environmental benefits will be derived as a result of the discharge." The discharge must also demonstrate that the wastewater treatment and conveyance system is sufficiently reliable to prevent the discharge of inadequately treated wastewater and prevent negative environmental consequences. However, the Basin Plan does include language stating that recycled water can be used for stream flow augmentation. Per Section 4.16 of the Basin Plan, "the year-round, dependable recycled water resource may also be appropriate for stream flow augmentation to enhance beneficial uses of streams." Nonetheless, additional study would be required regarding the shallow water discharge, an exception to the Basin Plan would be required as would approval from RWQCB. Therefore, this alternative could result in ***potentially significant*** water quality impacts not associated with Options 1 and 2. *[Greater than Options 1 and 2]*

LAND USE

Under the Full Tertiary Facilities Alternative, similar to Options 1 and 2, upgrades at the existing Pinole-Hercules WPCP would be consistent with the current light industrial/service commercial land use designation of the City of Pinole General Plan. In addition, a new pipeline would be constructed to discharge into Pinole Creek. The new pipeline would be subject to Contra Costa County General Plan and the City of Pinole General Plan. The pipeline route would be constructed below, and run parallel to the Union Pacific Railroad (UPRR), requiring coordination with UPRR to ensure compliance with right-of-way procedures, safety measures, and other planning guidelines. Any construction within 100 feet of the shoreline would require a permit from BCDC. Similar to Option 1, upgrades at the Pinole-Hercules WPCP would be consistent with land use designations and would not result in a disturbance of or division of a community. Further, the new pipeline would be an underground facility utilizing existing rights-of-way. Therefore, this alternative would result in ***no impact*** related to the division of a community. Additionally, there would be no change in existing land uses under the Full Tertiary Facilities Alternative and thus ***no impact*** related to potential conflicts with land use plans adopted to avoid or mitigate an environmental effect or adopted habitat conservation plans. Similar to Options 1 and 2, this alternative would result in no land use impacts. *[Similar to Options 1 and 2]*

NOISE

Similar to Options 1 and 2, construction of the Full Tertiary Facilities Alternative could result in the exposure of persons to or generation of noise levels in excess of applicable standards. Although construction of this alternative would likely occur during daytime hours, the exact hours of construction are not yet specified. Consequently, if construction activities were to occur during the more noise-sensitive hours (e.g., evening, nighttime, and early morning), construction-generated noise levels could result in annoyance and/or sleep disruption to occupants of nearby noise-sensitive land uses and create a substantial temporary increase in ambient noise levels in the project vicinity. Although mitigation would be implemented to restrict construction to less-sensitive daytime hours to the maximum extent feasible, construct temporary noise barriers at the location of HDD activities and to the east of the WPCP, and designate a disturbance coordinator to respond to noise complaints, construction-generated noise levels would still exceed the applicable standards at nearby sensitive receptors and this alternative would result in a ***significant and unavoidable*** short-term construction noise impact. Also similar to Options 1 and 2, construction of the Full Tertiary Facilities Alternative would result in a small number of additional daily trips on local roadways, which would represent a negligible increase in noise levels and would not result in a doubling of average daily traffic volumes. This would be a ***less-than-significant*** impact. In addition, construction-generated vibration levels would not exceed recommended standards nor result in exposure of persons to or generation of excessive groundbourne vibration or groundbourne noise levels. As a result, this impact would also be ***less than significant.***

Also similar to Options 1 and 2, long-term operation of the Full Tertiary Facilities Alternative would generate few traffic trips in comparison to existing traffic volumes, which would not result in a perceivable change in the traffic noise contours, not exceed applicable standards, nor result in a permanent increase in ambient noise levels at existing noise-sensitive receptors. Therefore, this alternative would result in ***less-than-significant*** long-term operational noise impacts. *[Similar to Options 1 and 2]*

TERRESTRIAL BIOLOGY

Under the Full Tertiary Facilities Alternative, upgrades would be made to the Pinole-Hercules WPCP and a new pipeline would be constructed. However, under this alternative the pipeline to RSD would no longer be used and a new pipeline would be constructed to outfall into Pinole Creek. The footprint of the existing Pinole-Hercules WPCP does not contain sensitive habitat or habitat to support special-status species or nesting raptors. Therefore, construction within the WPCP footprint would not have adverse impacts on terrestrial biological resources. However, the disturbance area for the pipeline to Pinole Creek could include sensitive habitats such as coastal salt marsh, riparian, and freshwater marsh. The portion of Pinole Creek that would potentially be affected by installation of the pipeline does not support extensive riparian vegetation or trees. However, there is some potential for trees in the vicinity to be used by nesting raptors. Construction activities for this alternative could result in impacts to riparian and wetland habitat (subject U.S. Army Corps of Engineers [USACE] jurisdiction) along Pinole Creek if habitats are not properly marked and avoided. This alternative could also result in disturbance of special-status species and nesting raptors. Implementation of mitigation would reduce these ***potentially significant*** impacts to a ***less-than-significant*** level by requiring biological monitoring, flagging of sensitive habitat areas, construction setbacks from sensitive habitats, pre-construction nesting raptor surveys, and employment of BMPs during construction activities. Installation of a new outfall into Pinole Creek could result in permanent adverse ***potentially significant*** impacts to waters of the United States and riparian habitat and would require a permit under Section 404 of the Clean Water Act for discharge of dredged or fill material into waters of the United States, Section 401 water quality certification, a Streambed Alteration Agreement under Section 1602 of the California Fish and Game Code, and a Bay Conservation and Development Commission (BCDC) permit. Because construction activity would be temporary, would primarily occur in areas already developed, and the pipeline would be installed underground, this alternative would have a ***less-than-significant*** impact on the movement of any native resident or migratory wildlife species, migratory corridors, or native wildlife nursery sites. Further, this alternative would not conflict with local policies or ordinances intended to protect terrestrial biological resources or with provisions of an adopted habitat conservation plan. Because the Full Tertiary Facilities Alternative would include construction of a new pipeline and outfall to Pinole Creek, this alternative would have increased potential to impact terrestrial resources. Although the impacts would likely be mitigable, they would result in greater impacts than those associated with Option 1. *[Greater than Option 1]*

5.4.3 ABILITY TO ACCOMPLISH PROJECT OBJECTIVES

The Full Tertiary Facilities Alternative would attain both of the stated project objectives, eliminating use of Shallow Water Outfall 002 and complying with the NPDES permit. This alternative would have similar impacts to Option 1 with regard to air quality and odors, cultural resources, climate change, geology and soils, land use and noise. Although the full tertiary treatment under this alternative would result in better effluent water quality than Options 1 or 2, the pipeline and discharge to Pinole Creek would result in potentially greater impacts to hydrology and water quality, fisheries and aquatic resources as well as terrestrial biological resources along the creek corridor. The estimated total cost of this alternative would be $126.2 million.

5.5 SMALL TERTIARY OR HYBRID SOLUTION

5.5.1 DISCUSSION

The Small Tertiary or Hybrid Solution Alternative would involve the addition of a small tertiary facility to handle the increased wet-weather flows at the Pinole-Hercules WPCP. The existing pipeline to RSD Outfall 001 would be rehabilitated with no increase in capacity and would continue to be used. The secondary treated effluent would be discharged through the existing RSD Deepwater Outfall 001. The existing effluent pump station and gravity pipe to RSD would be upgraded to handle 14.59 mgd. This flowrate represents an increase in discharge through Outfall 001.

The treatment plant upgrades specified for this alternative would be implemented to treat 14.59 mgd maximum day wet-weather flows to secondary standards. The instantaneous peak wet-weather treatment capacity of the Pinole-Hercules WPCP would be increased to 20 mgd. Tertiary filters or a membrane bioreactor would be installed to treat the additional 5.41 mgd (20–14.59 mgd) to tertiary recycled water standards. To ensure effective operation of the tertiary filters, all influent flows would undergo secondary treatment. As such, the existing secondary system would be upgraded to treat 20 mgd. Flows from the new small tertiary or hybrid plant would be conveyed to a new pipeline and new outfall in Pinole Creek approximately 1,800 feet upstream of San Francisco Bay and used to augment streamflow and enhance the riparian values of the waterway. UV disinfection would be utilized for all tertiary flows to Pinole Creek. The treatment regime proposed for this alternative would produce approximately the same water quality for deepwater disposal (as currently generated) and a higher water quality for the portions of flow that would be discharged to Pinole Creek.

5.5.2 ENVIRONMENTAL IMPACTS

AIR QUALITY AND ODORS

The Small Tertiary or Hybrid Solution Alternative would result in similar air quality impacts as Option 1. Construction activities associated with implementation of this alternative would generate intermittent emissions of criteria air pollutants and precursors, including PM_{10} and $PM_{2.5}$, which could result in ***potentially significant impacts*** due to violation or substantial contribution to an existing or projected air quality violation, exposure of sensitive receptors to substantial pollutant concentrations, and/or conflict with implementation of regional air quality plans. However, as with Option 1, all feasible BAAQMD-recommended dust control measures would be required to be implemented, which would reduce the alternative's construction emissions impact to a ***less-than-significant*** level.

This alternative would have the same peak wet-weather treatment capacity as Option 1 (14.59 mgd). Therefore, as with Option 1, it is estimated that this alternative's net increase in operational criteria air pollutant and ozone precursor emissions would not exceed BAAQMD's currently adopted thresholds of significance. Operational emissions would not result in or substantially contribute to emissions concentrations that exceed the NAAQS or CAAQS and would not conflict with air quality planning efforts in the SFBAAB. Implementation of this alternative would not cause a net increase in vehicles at local intersections that would degrade delay times or LOS. Accordingly, this alternative would not substantially contribute to the degradation of nearby intersections or local CO concentrations that exceed the 1-hour or 8-hour CO CAAQS or NAAQS. Implementation of this alternative would not result in a substantial increase in the exposure of receptors to emissions of TACs from construction activities, on-site stationary, and/or increased motor vehicle trips generated by the proposed project. The temporary, short-term construction and long-term operation of this alternative would not result in an increase in the frequency in which sensitive receptors would be exposed to objectionable odorous emissions. Furthermore, this alternative would not conflict or obstruct with implementation of the SIP. The Small Tertiary or Hybrid Solution Alternative would therefore result in similar ***less-than-significant*** air quality impacts as Option 1. *[Similar to Option 1]*

CULTURAL RESOURCES

The Small Tertiary or Hybrid Solution Alternative would result in similar impacts to Cultural Resources as Option 1. According to a Northwest Information Center record search and a reconnaissance survey, no previously documented cultural resources have been noted within or in the vicinity of the proposed Pinole Creek pipeline alignment. However, because Native American populations in particular tended to settle and engage in subsistence activities along creeks and in the vicinity of other water sources, the area around the present-day channel of Pinole Creek may contain potentially significant subsurface traces of prehistoric activities and/or human remains. Therefore, this alternative could result in accidental damage or destruction of undocumented cultural resources and/or undocumented human remains. As with Option 1, mitigation is available to reduce these ***potentially significant*** cultural resource impacts to a ***less-than-significant*** level. *[Similar to Option 1]*

CLIMATE CHANGE

Construction activities associated with the Small Tertiary or Hybrid Solution Alternative would generate temporary GHG emissions. Construction-related GHG emissions would cease following completion of construction. Because construction-related emissions would be temporary and finite in nature, below screening levels being considered and/or discussed by other government agencies and associations, and not conflict with the AB 32 Scoping plan or any local GHG reduction efforts, this alternative's construction-related GHG emissions would not be a cumulatively considerable contribution to climate change, and therefore, would be a ***less-than-significant*** impact.

Implementation of the Small Tertiary or Hybrid Solution Alternative would change the amount of electricity and natural gas consumed by operation of the Pinole-Hercules WPCP and the associated level of GHG emissions. This alternative would have the same peak wet-weather treatment capacity as Option 1 (14.59 mgd) and would, therefore, be anticipated to use a similar amount of electricity and natural gas to treat additional wastewater. However, similar to Option 1, this alternative would not result in a net increase in operational GHG emissions that would exceed the BAAQMD's proposed threshold of significance of 1,100 MT CO2e/yr. In addition, because this alternative would not conflict with applicable measures in ARB's scoping plan, operational GHG emissions would not be a cumulatively considerable contribution to climate change. As a result, this impact would be ***less than significant***.

The future effects of climate change, including sea level rise, increased intensity of storm surges, and increased variability in precipitation patterns could adversely affect the Pinole-Hercules WPCP. However, there is too much uncertainty at this time to conclude whether there would be an impact, and the extent to which it may occur. For these reasons, the analysis of how future conditions resulting from climate change could adversely affect the WPCP is considered to be ***too speculative*** to support a significance determination. *[Similar to Option 1]*

FISHERIES AND AQUATIC RESOURCES

By discontinuing use of Shallow Water Outfall 002, the Small Tertiary or Hybrid Solution Alternative would result in the similar ***beneficial effects*** to fisheries that would occur under proposed Options 1 or 2, including: eliminating constituent discharges to productive shallow water habitats where fish and BMI abundance may be higher; reducing dissolved oxygen effects to productive near-shore shallow water habitats here fish and BMI abundance may be higher; and reducing the potential for localized dissolved oxygen and temperature effects and resultant potential for the discharge to alter migration patterns of fish moving through the near-shore areas. In addition, this alternative would treat a portion of the effluent to tertiary levels, which would improve the water quality of the effluent discharged over the secondary-treatment of Options 1 or 2 and would be discharged to Pinole Creek to augment streamflow and enhance riparian values. *[Less than Options 1 and 2]*

The Small Tertiary or Hybrid Solution Alternative would result in similar construction activities as Option 1, causing ***potentially significant*** indirect impacts related to water quality on habitat and fish and benthic macroinvertebrate communities. In addition, due to the new pipeline and outfall to Pinole Creek, this alternative would result in construction-related activities that could introduce pollutants and/or sediments into Pinole Creek, which could negatively influence all life stages of anadromous salmonids. However, mitigation would be implemented including construction BMPs to minimize potential adverse water quality effects that would, in turn, minimize the risk of adversely affecting special-status fish species. These measures would reduce the construction impacts to a ***less-than-significant*** level. *[Similar to Options 1 and 2]*

Similar to Option 1, the Small Tertiary or Hybrid Solution Alternative would continue to discharge effluent treated to secondary levels from Deepwater Outfall 001. This discharge would result in ***less-than-significant*** fisheries impacts related to discharge of ammonia, copper, cyanide, dissolved oxygen levels, and thermal plume. Although the tertiary treatment regime constructed under this alternative would produce better quality wastewater than the secondary treatment that would continue under Options 1 or 2, the potential operations-related effects of this alternative would include changes to flow and water temperatures in Pinole Creek. The potential hydrologic impacts and increases in temperature in Pinole Creek could have adverse effects on anadromous salmonids that cool water habitat, that could be ***potentially significant***. *[Greater than Options 1 and 2]*

GEOLOGY AND SOILS

As with Options 1 and 2, the proposed facilities under the Small Tertiary or Hybrid Solution Alternative would not be located within or adjacent to a fault zoned under the Alquist-Priolo Earthquake Fault Zone Act, and the Pinole Creek Fault is not considered to be active by CGS. Therefore, this impact is considered ***less than significant***. *[Similar to Options 1 and 2]*

The facilities proposed under this alternative would be constructed in a seismically active area, and project implementation would expose people and structures to risks caused by strong seismic ground shaking. Construction activities would involve grading and movement of earth in soils subject to wind and water erosion hazard. The proposed facilities could be subject to hazards from liquefaction, subsidence, and construction in potentially unstable soils. Portions of the project site are underlain by soils that have a moderate to high potential for expansion when wet and may result damage to structures and most of the soils within which the project components would be constructed are moderately to highly corrosive of concrete and steel. These impacts are considered ***potentially significant***. Similar to Options 1 and 2, mitigation would reduce these potentially significant impacts to ***less-than-significant*** levels by requiring a site-specific geotechnical report, monitoring of earthmoving activities, and a grading and erosion control plan. The geotechnical design recommendations to reduce damage from seismic events would be incorporated into buildings, structures, and infrastructure as required by the CBC, and a geotechnical or soils engineer would provide on-site monitoring to make sure that earthwork is being performed as specified in the plans. Furthermore, a grading and erosion control plan with specific erosion and sediment control measures would be prepared, approved by the City of Pinole Planning Department, and implemented. *[Similar to Option 1]*

The Small Tertiary or Hybrid Solution Alternative would not change the susceptibility of the Pinole-Hercules WPCP and associated facilities to damage from tsunamis, and would not result in any new employees whose safety could be jeopardized by a tsunami. Therefore, this impact is considered ***less than significant***. *[Similar to Options 1 and 2]*

The Pinole-Hercules WPCP and the proposed pipeline alignment to Pinole Creek are underlain by Holocene-age Bay mud and artificial fill, which are not considered a paleontologically sensitive rock formation. Therefore, construction activities at WPCP and along this pipeline alignment would not be anticipated to damage or destroy previously unknown, unique paleontological resources at the project site. However, the pipeline alignment to RSD Outfall 001 is underlain by paleontologically sensitive rock formations and Pleistocene- and Miocene-age vertebrate fossils have been recovered in the vicinity of the pipeline alignment. Therefore, upgrades to this pipeline could potentially damage previously unknown unique paleontological resources, which is considered a ***potentially significant*** impact. However, to mitigate this impact to a ***less-than-significant*** level, construction personnel would be trained by a qualified paleontologist; a qualified paleontologist would monitor earthmoving activities along the pipeline alignment to RSD; and, if paleontological resources are discovered, work would cease, the resource would be evaluated and a recovery plan would be implemented as required. *[Similar to Option 1]*

HYDROLOGY AND WATER QUALITY

Under the Small Tertiary or Hybrid Solution Alternative, construction activities would have the same ***potentially significant*** impacts related to temporary soil erosion, discharges of construction-related contaminants and off-site discharge of contaminants in stormwater runoff as Option 1. As with Option 1, these impacts are mitigable through development and implementation of a SWPPP and BMPs that ensure stormwater runoff from construction activities and impervious surfaces is appropriately controlled. *[Similar to Option 1]*

Because there is an existing drainage system at the Pinole-Hercules WPCP that would be used under this alternative, and because a new off-site corporation yard would not be constructed, this alternative would result in ***less-than-significant*** impacts related to long-term effects on hydrology and drainage due to new paved impervious surfaces and flooding. *[Less than Option 1]*

The Small Tertiary or Hybrid Solution Alternative would continue to treat the majority of wastewater at WPCP to secondary levels and discharge the treated effluent to Deepwater Outfall 001 in San Pablo Bay. Like Options 1 and 2, this alternative would not increase constituent levels such that state or federal numeric or narrative water quality criteria would be exceeded; would not degrade existing water quality, on a long-term basis; nor cause substantial adverse effects on one or more beneficial uses of San Pablo Bay. Therefore, this alternative would result in ***less-than-significant*** water quality impacts related constituents of concern (ammonia, copper and cyanide), levels of biochemical oxygen demand, oil and grease, total coliform, total suspended solids, dioxin, mercury and selenium released from Outfall 001.

This alternative would also involve upgrading a portion of the Pinole-Hercules WPCP to full tertiary treatment of wastewater and discharging that wastewater to Pinole Creek rather than San Pablo Bay. Although Options 1 and 2 would result in less-than-significant water quality impacts related to effluent discharge and the concentrations and amounts of constituents, the tertiary treatment would improve the quality of discharged effluent by further reducing constituents of concern (ammonia, copper and cyanide), levels of biochemical oxygen demand, oil and grease, total coliform, total suspended solids, dioxin, mercury and selenium. However, additional studies would be required to determine the impact and benefits of using the tertiary treated water for streamflow augmentation in Pinole Creek. The stream discharge would be considered a "shallow water discharge," which is prohibited in the Basin Plan. The prohibition is "intended to protect beneficial uses in areas that receive very limited, if any, dilution." Exceptions are granted when "a discharge is approved as part of a reclamation project, or it can be demonstrated that the net environmental benefits will be derived as a result of the discharge." The discharge must also demonstrate that the wastewater treatment and conveyance system is sufficiently reliable to prevent the discharge of inadequately treated wastewater and prevent negative environmental consequences. However, the Basin Plan does include language stating that recycled water can be used for stream flow augmentation. Per Section 4.16 of the Basin Plan, "the year-round, dependable recycled water resource may also be appropriate for stream flow augmentation to enhance beneficial uses of streams." Nonetheless, additional study would be required regarding the shallow water discharge, an exception to the Basin Plan would be required as would approval from RWQCB. Therefore, this alternative could result in ***potentially significant*** water quality impacts not associated with Options 1 and 2. *[Greater than Options 1 and 2]*

LAND USE

Under the Small Tertiary or Hybrid Solution Alternative, similar to Option 1, upgrades at the existing Pinole-Hercules WPCP would be consistent with the current light industrial/service commercial land use designation of the City of Pinole General Plan. In addition, a new pipeline would be constructed to discharge into Pinole Creek and the existing pipeline to RSD would be improved. These pipelines would be subject to Contra Costa County General Plan and the City of Pinole General Plan. The pipeline routes are, or would be constructed below existing rights-of-way, requiring coordination with UPRR to ensure compliance with right-of-way procedures, safety measures, and other planning guidelines. Any construction within 100 feet of the shoreline would require a permit from BCDC. Upgrades at the WPCP would be consistent with land use designations and would not result in a disturbance of or division of a community. Further, the improved and new pipelines in this alternative would be underground facilities utilizing existing rights-of-way. Therefore, this alternative would result in ***no impact*** related to the division of a community. Further, there would be no change in existing land uses under the Small Tertiary or Hybrid Solution Alternative and thus ***no impact*** related to potential conflicts with land use plans adopted to avoid or mitigate an environmental effect or adopted habitat conservation plans. This is similar to Options 1 and 2, for which no land use impacts were identified. *[Similar to Options 1 and 2]*

NOISE

Similar to Options 1 and 2, construction of the Small Tertiary or Hybrid Solution Alternative could result in the exposure of persons to or generation of noise levels in excess of applicable standards. Although construction of this alternative would likely occur during daytime hours, the exact hours of construction are not yet specified. Consequently, if construction activities were to occur during the more noise-sensitive hours (e.g., evening, nighttime, and early morning), construction-generated noise levels could result in annoyance and/or sleep disruption to occupants of nearby noise-sensitive land uses and create a substantial temporary increase in ambient noise levels in the project vicinity. Although mitigation would be implemented to restrict construction to less-sensitive daytime hours to the maximum extent feasible, construct temporary noise barriers, provide construction equipment with appropriate shielding, provide advance notice to nearby residents, and designate a disturbance coordinator to respond to complaints, construction-generated noise levels would still exceed the applicable standards at nearby sensitive receptors and this alternative would result in a ***significant and unavoidable*** short-term construction noise impact. Also similar to Options 1 and 2, construction of the Small Tertiary or Hybrid Solution Alternative would result in a small number of additional daily trips on local roadways, which would represent a negligible increase in noise levels and would not result in a doubling of average daily traffic volumes. This would be a ***less-than-significant*** impact. In addition, construction-generated vibration levels would not exceed recommended standards nor result in exposure of persons to or generation of excessive groundbourne vibration or groundbourne noise levels. As a result, this impact would also be ***less than significant.***

Also similar to Options 1 and 2, long-term operation of the Small Tertiary or Hybrid Solution Alternative would generate few traffic trips in comparison to existing traffic volumes, which would not result in a perceivable change in the traffic noise contours, not exceed applicable standards, nor result in a permanent increase in ambient noise levels at existing noise-sensitive receptors. Therefore, this alternative would result in ***less-than-significant*** long-term operational noise impacts. *[Similar to Options 1 and 2]*

TERRESTRIAL BIOLOGY

Under the Small Tertiary or Hybrid Solution Alternative, upgrades would be made to the WPCP and the pipeline to RSD. However, this alternative would also include a new pipeline to Pinole Creek. The footprints of the existing Pinole-Hercules WPCP do not contain sensitive habitat or habitat to support special-status species or nesting raptors. Therefore, construction within the WPCP footprint would not have adverse impacts on terrestrial biological resources. However, like Option 1, the100-foot disturbance area for the upgraded pipeline to RSD could include sensitive habitats such as coastal salt marsh, riparian, and freshwater marsh, the potential for nesting raptor species, and waters of the United States, including wetlands subject to USACE jurisdiction. Construction activities for this alternative could result in impacts to areas of the salt marsh habitat on Pinole Creek and the riparian and freshwater wetland habitats on Ohlone Creek, Refugio Creek, and the small tributary that drains into the upstream end of Pinole Creek if habitats are not properly marked and avoided. In addition, the 100-foot disturbance area for the pipeline to Pinole Creek could include sensitive habitats such as coastal salt marsh, riparian, and freshwater marsh. The portion of Pinole Creek that would potentially be affected by installation of the pipeline does not support extensive riparian vegetation or trees. However, there is some potential for trees in the vicinity to be used by nesting raptors. Construction activities for this alternative could therefore result in impacts to special-status species, nesting raptors, riparian and wetland habitats (subject U.S. Army Corps of Engineers jurisdiction) if habitats are not properly marked and avoided. Implementation of mitigation would reduce these ***potentially significant*** impacts to a less-than-significant level by requiring biological monitoring, flagging of sensitive habitat areas, construction setbacks from sensitive habitats, pre-construction nesting raptor surveys, and employment of BMPs during construction activities. Installation of a new outfall into Pinole Creek could result in permanent adverse ***potentially significant*** impacts to waters of the United States and riparian habitat and would require a permit under Section 404 of the Clean Water Act for discharge of dredged or fill material into waters of the United States, Section 401 water quality certification, a Streambed Alteration Agreement under Section 1602 of the California Fish and Game Code, and a Bay Conservation and Development Commission (BCDC) permit. Because construction activity would be temporary, would primarily occur in areas already developed, and the pipeline would be installed underground, this alternative would have a ***less-than-significant*** impact on the movement of any native resident or migratory wildlife species, migratory corridors, or native wildlife nursery sites. Further, this alternative would not conflict with local policies or ordinances intended to protect terrestrial biological resources or with provisions of an adopted habitat conservation plan. Because the Small Tertiary or Hybrid Solution Alternative would include construction of an upgraded pipeline to RSD as well as a new pipeline and outfall to Pinole Creek, this alternative would have increased potential to impact terrestrial resources. Although the impacts would likely be mitigable, they would result in greater impacts than those associated with Option 1. *[Greater than Option 1]*

5.5.3 ABILITY TO ACCOMPLISH PROJECT OBJECTIVES

The Small Tertiary or Hybrid Solution Alternative would attain both of the stated project objectives, eliminating use of Shallow Water Outfall 002 and complying with the NPDES permit. This alternative would have similar impacts to Option 1 with regard to air quality and odors, cultural resources, climate change, geology and soils, land use and noise. Continued discharge of secondary-treated effluent to Deepwater Outfall 001 would result in similar less-than-significant water quality and fisheries impacts as Options 1 and 2. Although the full tertiary treatment under this alternative would result in better effluent water quality than Options 1 or 2, discharge to Pinole Creek would result in potentially greater impacts to fisheries and aquatic resources, hydrology and water quality as well as terrestrial biological resources along the creek corridor. The Small Tertiary Treatment or Hybrid Solution Alternative would have an estimated total cost of $142.7 million.

5.6 ALL FLOWS TO WEST COUNTY WASTEWATER DISTRICT FACILITIES

5.6.1 DISCUSSION

The All Flows to West County Wastewater District Facilities Alternative would involve decommissioning the existing Pinole-Hercules WPCP and diverting all existing wastewater flows generated by the Cities of Pinole and Hercules, via a new pipeline, to the West County Wastewater District (WCWD) facilities. The existing effluent pipeline to RSD Outfall 001 would no longer be used by Pinole or Hercules and the Pinole-Hercules WPCP would be shut down and dismantled. The majority of the new pipeline route to the West County Water Pollution Control Plant would follow San Pablo Avenue (a multilane parkway) and secondary roads; however, the pipeline would cross three streams: Garrity, Rheem, and San Pablo Creeks. Wastewater from the cities would be combined with wastewater from the West County service area and undergo secondary treatment. The WCWD facilities would have to be expanded from the existing 12.5 mgd (average dry-weather flow) and 21 mgd (peak wet-weather flow) to 14 mgd (average dry-weather flow) and 110 mgd (peak wet-weather flow). Combined flows would be discharged through a deepwater outfall currently used by WCWD and the City of Richmond and operated by the West County Agency. The outfall is located off Port Richmond in the Central San Francisco Bay. The volume of treated wastewater discharged through the West County Agency outfall would increase under this Alternative, but the quality of wastewater in the commingled flows is unclear at this time.

5.6.2 ENVIRONMENTAL IMPACTS

AIR QUALITY AND ODORS

The All Flows to West County Wastewater District Facilities Alternative would result in similar air quality impacts as Option 1 due to upgrades needed at WCWD and construction of a new pipeline. However, construction impacts would potentially be greater due to a longer pipeline as well as the need to dismantle the existing Pinole-Hercules WPCP. Construction activities associated with implementation of this alternative would generate intermittent emissions of criteria air pollutants and precursors, including PM_{10} and $PM_{2.5}$, which could result in ***potentially significant*** impacts due to violation or substantial contribution to an existing or projected air quality violation, exposure of sensitive receptors to substantial pollutant concentrations, and/or conflict with implementation of regional air quality plans. However, as with Option1, all feasible BAAQMD-recommended dust control measures would be required to be implemented, which would reduce the alternative's construction emissions impact to a ***less-than-significant*** level.

The WCWD facilities would have greater capacity than the Pinole-Hercules WPCP because it would treat flows from the West County service area as well as the Cities of Pinole and Hercules. However, the anticipated dry and wet-weather flows from Pinole and Hercules would be the same as in Options 1 or 2 and the WCWD treatment facilities would be similar to those at the existing WPCP (secondary treatment). Therefore, it is anticipated that this alternative's net increase in operational criteria air pollutant and ozone precursor emissions would not exceed BAAQMD's currently adopted thresholds of significance. Operational emissions would not result in or substantially contribute to emissions concentrations that exceed the NAAQS or CAAQS and would not conflict with air quality planning efforts in the SFBAAB. Implementation of this alternative would not cause a net increase in vehicles at local intersections that would degrade delay times or LOS. Accordingly, this alternative would not substantially contribute to the degradation of nearby intersections or local CO concentrations that exceed the 1-hour or 8-hour CO CAAQS or NAAQS. Implementation of this alternative would not result in a substantial increase in the exposure of receptors to emissions of TACs from construction activities, on-site stationary, and/or increased motor vehicle trips generated by the proposed project. The temporary, short-term construction and long-term operation of this alternative would not result in an increase in the frequency in which sensitive receptors would be exposed to objectionable odorous emissions. Furthermore, this alternative would not conflict or obstruct with implementation of the SIP. The All Flows to West County Wastewater District Facilities Alternative would therefore result in similar ***less-than-significant*** air quality impacts as Option 1. *[Similar to Option 1]*

CULTURAL RESOURCES

The All Flows to West County Wastewater District Facilities Alternative would result in similar impacts to Cultural Resources as Option 1. Previously undocumented portions of these resources could be encountered and disturbed during ground-disturbing activities. Additionally, because Native American populations in particular tended to settle and engage in subsistence activities along creeks and in the vicinity of other water sources, the area around the present-day channels of Garrity, Rheem, and San Pablo Creeks may contain potentially significant subsurface traces of prehistoric activities and/or human remains. Therefore, this alternative could result in accidental damage or destruction of undocumented cultural resources and/or undocumented human remains. As with Option 1, mitigation is available to reduce these ***potentially significant*** cultural resource impacts to a ***less-than-significant*** level. *[Similar to Option 1]*

CLIMATE CHANGE

Decommissioning the Pinole-Hercules WPCP and construction activities associated with the new pipeline and upgrades to the WCWD under the All Flows to West County Wastewater District Facilities Alternative would generate temporary GHG emissions. Construction-related GHG emissions would cease following completion of demolition and construction. Because construction-related emissions would be temporary and finite in nature, below screening levels being considered and/or discussed by other government agencies and associations, and not conflict with the AB 32 Scoping plan or any local GHG reduction efforts, this alternative's construction-related GHG emissions would not be a cumulatively considerable contribution to climate change, and therefore, would be a ***less-than-significant*** impact.

Implementation of the All Flows to West County Wastewater District Facilities Alternative would change the amount of electricity and natural gas consumed and the associated level of GHG emissions. Under this alternative, the wastewater flows from the Cities of Pinole and Hercules would be combined with the WCWD service area. However, the anticipated dry and wet-weather flows from Pinole and Hercules would be the same as in Options 1 or 2 and the WCWD treatment facilities would be similar to those at the existing Pinole-Hercules WPCP (secondary treatment). Therefore, this alternative is anticipated to use a similar amount of electricity and natural gas to treat additional wastewater as Option 1 and would, therefore, not result in a net increase in operational GHG emissions that would exceed the BAAQMD's proposed threshold of significance of 1,100 MT CO2e/yr. In addition, because this alternative would not conflict with applicable measures in ARB's scoping plan, operational GHG emissions would not be a cumulatively considerable contribution to climate change. As a result, this impact would be ***less than significant***.

The future effects of climate change, including sea level rise, increased intensity of storm surges, and increased variability in precipitation patterns could adversely affect the WCWD. However, there is too much uncertainty at this time to conclude whether there would be an impact, and the extent to which it may occur. For these reasons, the analysis of how future conditions resulting from climate change could adversely affect the WCWD is considered to be ***too speculative*** to support a significance determination. *[Similar to Option 1]*

FISHERIES AND AQUATIC RESOURCES

By discontinuing use of the shallow water outfall, the All Flows to West County Wastewater District Facilities Alternative would result in the similar ***beneficial effects*** to fisheries that would occur under proposed Options 1 or 2, including: eliminating the shallow water outfall: eliminating constituent discharges to productive shallow water habitats where fish and BMI abundance may be higher; reducing dissolved oxygen effects to productive near-shore shallow water habitats here fish and BMI abundance may be higher; and reducing the potential for localized dissolved oxygen and temperature effects and resultant potential for the discharge to alter migration patterns of fish moving through the near-shore areas. *[Similar to Options 1 and 2]*

The All Flows to West County Wastewater District Facilities Alternative would result in similar construction activities as Option 1; the new pipeline would need to cross three streams: Garrity, Rheem, and San Pablo Creeks. For purposes of this analysis, it is assumed that all three creeks would be crossed by either suspending the pipeline underneath existing bridges or using jack-and-bore with HDD. Therefore, similar to Option 1, construction activities under this alternative could cause ***potentially significant*** indirect impacts related to water quality on habitat and fish and benthic macroinvertebrate communities. However, mitigation would be implemented including construction BMPs to minimize potential adverse water quality effects that would, in turn, minimize the risk of adversely affecting special-status fish species. These measures would reduce the construction impacts to a ***less-than-significant*** level. *[Similar to Options 1 and 2]*

Similar to Option 1, the All Flows to West County Wastewater District Facilities Alternative would continue to discharge effluent treated to secondary levels and the same the peak flows from Pinole and Hercules would be the same. However, because effluent would be discharged to central San Francisco Bay rather than San Pablo Bay, additional study would be required to determine the existing conditions and potential impacts related to water quality, habitat and potential direct impacts to fish and BMI at the outfall location. Therefore, this alternative is considered to have ***potentially significant*** fisheries impacts related to discharge of ammonia, copper, cyanide, dissolved oxygen levels, and thermal plume. *[Greater than Options 1 and 2]*

GEOLOGY AND SOILS

The All Flows to West County Wastewater District Facilities Alternative would require a new pipeline to the WCWD. The alignment of this pipeline would cross the Hayward Fault, which is classified as active by USGS and CGS and is zoned under the Alquist-Priolo Act (CGS 2003, Hart and Bryant 1999). Therefore, the project could result in risks to people and structures caused by surface fault rupture located within or adjacent to a fault zoned under the Alquist-Priolo Earthquake Fault Zone Act. Therefore, this impact is considered ***potentially significant***. *[Greater than Options 1 and 2]*

The facilities proposed under this alternative would be constructed in a seismically active area, and project implementation would expose people and structures to risks caused by strong seismic ground shaking. Construction activities would involve grading and movement of earth in soils subject to wind and water erosion hazard. The proposed facilities could be subject to hazards from liquefaction, subsidence, and construction in potentially unstable soils. Portions of the project site are underlain by soils that have a moderate to high potential for expansion when wet and may result damage to structures and most of the soils within which the project components would be constructed are moderately to highly corrosive of concrete and steel. These impacts are considered ***potentially significant***. Similar to Options 1 and 2, mitigation would reduce these potentially significant impacts to ***less-than-significant*** levels by requiring a site-specific geotechnical report, monitoring of earthmoving activities, and a grading and erosion control plan. The geotechnical design recommendations to reduce damage from seismic events would be incorporated into buildings, structures, and infrastructure as required by the CBC, and a geotechnical or soils engineer would provide on-site monitoring to make sure that earthwork is being performed as specified in the plans. Furthermore, a grading and erosion control plan with specific erosion and sediment control measures would be prepared, approved by the City of Pinole Planning Department, and implemented. *[Similar to Option 1]*

The All Flows to West County Wastewater District Facilities Alternative would not change the susceptibility of the WCWD and associated facilities to damage from tsunamis, and would not result in any new employees whose safety could be jeopardized by a tsunami. Therefore, this impact is considered ***less than significant***. *[Similar to Options 1 and 2]*

The pipeline alignment to the WCWD is underlain by paleontologically sensitive rock formations and Pleistocene- and Miocene-age vertebrate fossils have been recovered in the vicinity of the pipeline alignment. Therefore, construction of this pipeline could potentially damage previously unknown unique paleontological resources, which is considered a ***potentially significant*** impact. However, to mitigate this impact to a ***less-than-significant*** level, construction personnel would be trained by a qualified paleontologist; a qualified paleontologist would monitor earthmoving activities; and, if paleontological resources are discovered, work would cease, the resource would be evaluated and a recovery plan would be implemented as required. *[Similar to Option 1]*

HYDROLOGY AND WATER QUALITY

The construction activities associated with the All Flows to West County Wastewater District Facilities Alternative would have the same ***potentially significant*** impacts related to temporary construction-related soil erosion, discharges of construction-related contaminants and off-site discharge of contaminants in stormwater runoff as Option 1. As with Option 1, these impacts are mitigable through development and implementation of a SWPPP and BMPs that ensure stormwater runoff from construction activities is appropriately controlled. *[Similar to Option 1]*

Because this alternative would use the existing WCWD drainage system, and because a new corporation yard would not be constructed, this alternative would result ***less-than-significant*** impacts related to long-term effects on hydrology and drainage due to new paved impervious surfaces and flooding hazards. *[Less than Option 1]*

The All Flows to West County Wastewater District Facilities Alternative would continue to treat wastewater to secondary levels; however, discharge would occur from a deep water outfall in Central San Francisco Bay rather than San Pablo Bay. Because of the difference in location of the effluent discharge, additional study would be required to determine the existing conditions and potential impacts related to water quality at the outfall location. Therefore, this alternative is considered to have ***potentially significant*** water quality impacts related constituents of concern (ammonia, copper and cyanide), levels of biochemical oxygen demand, oil and grease, total coliform, total suspended solids, dioxin, mercury and selenium. *[Greater than Options 1 and 2]*

LAND USE

The force main alignment from the existing Pinole-Hercules WPCP to the WCWD would be subject to the Contra Costa County General Plan, the City of Pinole General Plan, the City of San Pablo General Plan, the City of Richmond General Plan, and the North Richmond Shoreline Specific Plan. In addition, encroachment and right-of-way requirements from both UPRR and the Burlington Northern Santa Fe Railway would need to be met. Currently, the West County Wastewater District does not include the Cities of Pinole and Hercules, which are bound by the City of Pinole and Hercules Sanitary Service District. Therefore, an agreement between the sanitary service districts through the Contra Costa County LAFCOs would be required.

Upgrades to the existing West County Water Pollution Control Plant would occur within the existing plant and be consistent with existing land use designations. The new pipeline in this alternative would be an underground facility utilizing existing rights-of-way. Therefore, this alternative would result in ***no impact*** related to the division of a community. However, the new pipeline to the WCWD in this alternative would require new agreements between jurisdictions and further analysis would be required to address the potential land use conflicts with all the land use plans listed above. In addition, it is unknown what would become of the decommissioned Pinole-Hercules WPCP and whether or not a new use at the site would be consistent with the land use designation. Therefore, this alternative could result in ***potentially significant*** land use impacts related to potential conflicts with land use plans adopted to avoid or mitigate an environmental effect or adopted habitat conservation plans and could result in greater land use impacts than Options 1 or 2. *[Greater than Options 1 and 2]*

NOISE

Similar to Options 1 and 2, construction of the All Flows to West County Wastewater District Facilities Alternative could result in the exposure of persons to or generation of noise levels in excess of applicable standards. Although construction of this alternative would likely occur during daytime hours, the exact hours of construction are not yet specified. Consequently, if construction activities were to occur during the more noise-sensitive hours (e.g., evening, nighttime, and early morning), construction-generated noise levels could result in annoyance and/or sleep disruption to occupants of nearby noise-sensitive land uses and create a substantial temporary increase in ambient noise levels in the project vicinity. Although mitigation would be implemented to restrict construction to less-sensitive daytime hours to the maximum extent feasible, to construct temporary noise barriers, provide construction equipment with appropriate shielding, provide advance notice to nearby residents, and designate a disturbance coordinator to respond to complaints, construction-generated noise levels would still exceed the applicable standards at nearby sensitive receptors and this alternative would result in a ***significant and unavoidable*** short-term construction noise impact. Also similar to Options 1 and 2, construction of the All Flows to West County Wastewater District Facilities Alternative would result in a small number of additional daily trips on local roadways, which would represent a negligible increase in noise levels and would not result in a doubling of average daily traffic volumes. This would be a ***less-than-significant*** impact. In addition, construction-generated vibration levels would not exceed recommended standards nor result in exposure of persons to or generation of excessive groundbourne vibration or groundbourne noise levels. As a result, this impact would also be ***less than significant.***

Also similar to Options 1 and 2, long-term operation of the All Flows to West County Wastewater District Facilities Alternative would generate few traffic trips in comparison to existing traffic volumes, which would not result in a perceivable change in the traffic noise contours, not exceed applicable standards, nor result in a permanent increase in ambient noise levels at existing noise-sensitive receptors. Therefore, this alternative would result in ***less-than-significant*** long-term operational noise impacts. *[Similar to Options 1 and 2]*

TERRESTRIAL BIOLOGY

Under the All Flows to West County Wastewater District Facilities Alternative, the existing Pinole-Hercules WPCP would be decommissioned and all existing flows would be diverted, via a new pipeline, to the West County Wastewater District facilities. The footprint of the existing Pinole-Hercules WPCP does not contain sensitive habitat or habitat to support special-status species or nesting raptors. Therefore, decommissioning or construction activities within the Pinole-Hercules WPCP footprint would not have adverse impacts on terrestrial biological resources. In addition, the majority of the pipeline route to the WCWD would follow San Pablo Avenue (a multilane parkway) and secondary roads; therefore, construction of this pipeline would result in limited effects on terrestrial biological resources. However, the pipeline would cross three streams: Garrity, Rheem, and San Pablo Creeks. For purposes of this analysis, it is assumed that all three creeks would be crossed by either suspending the pipeline underneath existing bridges or using jack-and-bore with HDD. Therefore, similar to Option 1, the100-foot disturbance area for the new pipeline could include sensitive habitats such as coastal salt marsh, riparian, and freshwater marsh, the potential for nesting raptor species, and waters of the United States, including wetlands subject to USACE jurisdiction. Construction activities for this alternative could result in impacts to sensitive habitat areas along the creeks if habitats are not properly marked and avoided. This alternative could also result in disturbance of special-status species and nesting raptors and/or impacts to waters of the United States. Implementation of mitigation would reduce these ***potentially significant impacts*** to a less-than-significant level by requiring biological monitoring, flagging of sensitive habitat areas, construction setbacks from sensitive habitats, pre-construction nesting raptor surveys, and employment of BMPs during construction activities. In addition, because construction activity would be temporary, would primarily occur in areas already developed, and the pipeline would be installed underground, this alternative would have a ***less-than-significant*** impact on the movement of any native resident or migratory wildlife species, migratory corridors, or native wildlife nursery sites. Further, this alternative would not conflict with local policies or ordinances intended to protect terrestrial biological resources or with provisions of an adopted habitat conservation plan. *[Similar to Option 1]*

5.6.3 ABILITY TO ACCOMPLISH PROJECT OBJECTIVES

The All Flows to West County Wastewater District Facilities Alternative would attain both of the stated project objectives, eliminating use of Shallow Water Outfall 002 and complying with the NPDES permit. This alternative would have similar impacts to Option 1 with regard to air quality and odors, cultural resources, climate change, noise, and terrestrial biological resources. However, sending effluent to WCWD would generate greater impacts than Options 1 and 2 with regard to fisheries and aquatic resources and water quality due to the need for additional study to address discharge to central San Francisco Bay (rather than San Pablo Bay). In addition, this alternative would result in greater impacts related to geology and soils and land use due to the new pipeline alignment to WCWD, which would cross additional jurisdictions as well as the active Hayward Fault. The All Flows to West County Wastewater District Facilities Alternative would have an estimated total cost of $120.5 million to $136.5 million.

5.7 CITY OF HERCULES ONLY TO WEST COUNTY WASTEWATER DISTRICT FACILITIES

5.7.1 DISCUSSION

The City of Hercules Only to West County Wastewater District Facilities Alternative would involve constructing a new pipeline to transport the wastewater generated by the City of Hercules to the WCWD wastewater treatment plant. Wastewater flows generated by the City of Pinole would continue to be treated at the Pinole-Hercules WPCP, which would undergo only minor facility upgrades and be operated solely to treat wastewater generated by the City of Pinole. (The environmental impacts associated with treatment of Pinole-only flows are evaluated in this EIR under Option 2.) It is expected that wastewater flows from the City of Hercules would be approximately 2.25 mgd (average dry-weather flow) and up to 14.6 mgd (peak wet-weather flow). Wastewater from Hercules would be combined with wastewater from the WCWD service area and undergo secondary treatment by WCWD. The current dry-weather capacity of the WCWD facilities (12.5 mgd, average dry-weather flow) is sufficient to handle the combined flow. The current permitted wet-weather capacity of the WCWD facilities (21 mgd, peak wet-weather flow) would be expanded to handle up to 96 mgd. The commingled flows would be discharged through a deepwater outfall currently used by WCWD and the City of Richmond and operated by the West County Agency. The outfall is located off Port Richmond in the Central San Francisco Bay. The volume of treated wastewater discharged through the West County outfall would increase under this alternative. The quality of wastewater produced by the commingled flows is unclear at this time.

5.7.2 ENVIRONMENTAL IMPACTS

AIR QUALITY AND ODORS

The City of Hercules Only to West County Wastewater District Facilities Alternative would result in similar air quality impacts as Option 1 due to upgrades needed at the existing Pinole-Hercules WPCP and upgrades to the pipeline to RSD Outfall 001. However, construction impacts would be greater due to the addition of a pipeline to the WCWD as well as the need for upgrades at the WCWD facilities. Construction activities associated with implementation of this alternative would generate intermittent emissions of criteria air pollutants and precursors, including PM_{10} and $PM_{2.5}$, which could result in ***potentially significant*** impacts due to violation or substantial contribution to an existing or projected air quality violation, exposure of sensitive receptors to substantial pollutant concentrations, and/or conflict with implementation of regional air quality plans. However, as with Option1, all feasible BAAQMD-recommended dust control measures would be required to be implemented, which would reduce this alternative's construction emissions impact to a ***less-than-significant*** level.

The WCWD facilities would have increased wet season capacity because it would treat flows from the WCWD service area as well as from Hercules. However, the anticipated dry and wet-weather flows from Hercules would be the same as in Options 1 or 2 and the WCWD treatment facilities would be similar to those at the existing WPCP (secondary treatment). Further, the Pinole-Hercules WPCP capacity and treatment level (secondary treatment) would remain unchanged and the anticipated dry and wet-weather flows from Pinole would be the same as in Options 1 or 2. Therefore, it is anticipated that this alternative's net increase in operational criteria air pollutant and ozone precursor emissions would not exceed BAAQMD's currently adopted thresholds of significance. Operational emissions would not result in or substantially contribute to emissions concentrations that exceed the NAAQS or CAAQS and would not conflict with air quality planning efforts in the SFBAAB. Implementation of this alternative would not cause a net increase in vehicles at local intersections that would degrade delay times or LOS. Accordingly, this alternative would not substantially contribute to the degradation of nearby intersections or local CO concentrations that exceed the 1-hour or 8-hour CO CAAQS or NAAQS. Implementation of this alternative would not result in a substantial increase in the exposure of receptors to emissions of TACs from construction activities, on-site stationary, and/or increased motor vehicle trips generated by the proposed project. The temporary, short-term construction and long-term operation of this alternative would not result in an increase in the frequency in which sensitive receptors would be exposed to objectionable odorous emissions. Furthermore, this alternative would not conflict or obstruct with implementation of the SIP. The City of Hercules Only to West County Wastewater District Facilities Alternative would therefore result in similar ***less-than-significant*** air quality impacts as Option 1. *[Similar to Option 1]*

CULTURAL RESOURCES

The City of Hercules Only to West County Wastewater District Facilities Alternative would result in similar impacts to Cultural Resources as Option 1. Previously undocumented portions of these resources could be encountered and disturbed during ground-disturbing activities. Additionally, because Native American populations in particular tended to settle and engage in subsistence activities along creeks and in the vicinity of other water sources, the area around the present-day channels of Pinole, Ohlone, Refugio, Rodeo, Garrity, Rheem, and San Pablo Creeks may contain potentially significant subsurface traces of prehistoric activities and/or human remains. Therefore, this alternative could result in accidental damage or destruction of undocumented cultural resources and/or undocumented human remains. As with Option 1, mitigation is available to reduce these ***potentially significant*** cultural resource impacts to a ***less-than-significant*** level. *[Similar to Option 1]*

CLIMATE CHANGE

Construction activities associated with the upgraded pipeline, new pipeline, and upgrades to the WCWD under the City of Hercules Only to West County Wastewater District Facilities Alternative would generate temporary GHG emissions. Construction-related GHG emissions would cease following completion construction. Because construction-related emissions would be temporary and finite in nature, below screening levels being considered and/or discussed by other government agencies and associations, and not conflict with the AB 32 Scoping plan or any local GHG reduction efforts, this alternative's construction-related GHG emissions would not be a cumulatively considerable contribution to climate change, and therefore, would be a ***less-than-significant*** impact.

Implementation of the City of Hercules Only to West County Wastewater District Facilities Alternative would change the amount of electricity and natural gas consumed and the associated level of GHG emissions. Under this alternative, the wastewater flows from the City of Hercules would be combined with the WCWD service area and the Pinole-Hercules WPCP would continue to treat flows from Pinole within its existing capacity. However, the anticipated dry and wet-weather flows from Pinole and Hercules would be the same as in Options 1 or 2 and the WCWD treatment facilities would be similar to those at the existing WPCP (secondary treatment). Therefore, this alternative is anticipated to use a similar amount of electricity and natural gas to treat additional wastewater as Option 1 and would, therefore, not result in a net increase in operational GHG emissions that would exceed the BAAQMD's proposed threshold of significance of 1,100 MT CO2e/yr. In addition, because this alternative would not conflict with applicable measures in ARB's scoping plan, operational GHG emissions would not be a cumulatively considerable contribution to climate change. As a result, this impact would be ***less than significant***.

The future effects of climate change, including sea level rise, increased intensity of storm surges, and increased variability in precipitation patterns could adversely affect the Pinole-Hercules WPCP or the WCWD facilities. However, there is too much uncertainty at this time to conclude whether there would be an impact, and the extent to which it may occur. For these reasons, the analysis of how future conditions resulting from climate change could adversely affect the WPCP or WCWD facilities is considered to be ***too speculative*** to support a significance determination. *[Similar to Option 1]*

FISHERIES AND AQUATIC RESOURCES

By discontinuing use of the shallow water outfall, the City of Hercules Only to West County Wastewater District Facilities Alternative would result in the similar ***beneficial effects*** to fisheries that would occur under proposed Options 1 or 2, including: eliminating use of the shallow water outfall: eliminating constituent discharges to productive shallow water habitats where fish and BMI abundance may be higher; reducing dissolved oxygen effects to productive near-shore shallow water habitats here fish and BMI abundance may be higher; and reducing the potential for localized dissolved oxygen and temperature effects and resultant potential for the discharge to alter migration patterns of fish moving through the near-shore areas. *[Similar to Options 1 and 2]*

The City of Hercules Only to West County Wastewater District Facilities Alternative would result in the same pipeline construction activities as Option 1, as well as a new pipeline to the WCWD. The new pipeline to RSD would cross Rodeo, Refugio, and Ohlone Creeks, and the new pipeline to WCWD would need to cross Garrity, Rheem, and San Pablo Creeks. Construction activities could cause ***potentially significant*** indirect impacts related to water quality on habitat and fish and benthic macroinvertebrate communities. However, mitigation would be implemented including construction BMPs to minimize potential adverse water quality effects that would, in turn, minimize the risk of adversely affecting special-status fish species. These measures would reduce the construction impacts to a ***less-than-significant*** level. *[Similar to Options 1 and 2]*

Similar to Option 1, the City of Hercules Only to West County Wastewater District Facilities Alternative would continue to discharge effluent treated to secondary levels and the peak flows from Pinole and Hercules would be the same. However, because the Hercules effluent would be discharged to central San Francisco Bay rather than San Pablo Bay, additional study would be required to determine the existing conditions and potential impacts related to water quality, habitat and potential direct impacts to fish and BMI at the WCWD outfall location. Therefore, this alternative is considered to have ***potentially significant*** fisheries impacts related to discharge of ammonia, copper, cyanide, dissolved oxygen levels, and thermal plume. *[Greater than Options 1 and 2]*

GEOLOGY AND SOILS

The City of Hercules Only to West County Wastewater District Facilities Alternative would require a new pipeline to the WCWD. The alignment of this pipeline would cross the Hayward Fault, which is classified as active by USGS and CGS and is zoned under the Alquist-Priolo Act (CGS 2003, Hart and Bryant 1999). Therefore, the project could result in risks to people and structures caused by surface fault rupture located within or adjacent to a fault zoned under the Alquist-Priolo Earthquake Fault Zone Act. Therefore, this impact is considered ***potentially significant***. *[Greater than Options 1 and 2]*

The facilities proposed under this alternative would be constructed in a seismically active area, and project implementation would expose people and structures to risks caused by strong seismic ground shaking. Construction activities would involve grading and movement of earth in soils subject to wind and water erosion hazard. The proposed facilities could be subject to hazards from liquefaction, subsidence, and construction in potentially unstable soils. Portions of the project site are underlain by soils that have a moderate to high potential for expansion when wet and may result damage to structures and most of the soils within which the project components would be constructed are moderately to highly corrosive of concrete and steel. These impacts are considered ***potentially significant***. Similar to Options 1 and 2, mitigation would reduce these potentially significant impacts to ***less-than-significant*** levels by requiring a site-specific geotechnical report, monitoring of earthmoving activities, and a grading and erosion control plan. The geotechnical design recommendations to reduce damage from seismic events would be incorporated into buildings, structures, and infrastructure as required by the CBC, and a geotechnical or soils engineer would provide on-site monitoring to make sure that earthwork is being performed as specified in the plans. Furthermore, a grading and erosion control plan with specific erosion and sediment control measures would be prepared, approved by the City of Pinole Planning Department, and implemented. *[Similar to Option 1]*

The City of Hercules Only to West County Wastewater District Facilities Alternative would not change the susceptibility of the West County or Pinole-Hercules WPCP and associated facilities to damage from tsunamis, and would not result in any new employees whose safety could be jeopardized by a tsunami. Therefore, this impact is considered ***less than significant***. *[Similar to Options 1 and 2]*

The pipeline alignment to the WCWD and the pipeline alignment to RSD Outfall 001 are underlain by paleontologically sensitive rock formations and Pleistocene- and Miocene-age vertebrate fossils have been recovered in the vicinity. Therefore, construction of a new pipeline to the WCWD and upgrades to the RSD pipeline could potentially damage previously unknown unique paleontological resources, which is considered a ***potentially significant*** impact. However, to mitigate this impact to a ***less-than-significant*** level, construction personnel would be trained by a qualified paleontologist; a qualified paleontologist would monitor earthmoving activities; and, if paleontological resources are discovered, work would cease, the resource would be evaluated and a recovery plan would be implemented as required. *[Similar to Option 1]*

HYDROLOGY AND WATER QUALITY

The construction activities associated with the City of Hercules Only to West County Wastewater District Facilities Alternative would have the same ***potentially significant*** impacts related to temporary soil erosion, discharges of construction-related contaminants and off-site discharge of contaminants in stormwater runoff as Option 1. As with Option 1, these impacts are mitigable through development and implementation of a SWPPP and BMPs that ensure stormwater runoff from construction activities is appropriately controlled. *[Similar to Option 1]*

Because this alternative would use the existing drainage facilities at the WCWD and because a new corporation yard would not be constructed, this alternative would result in ***less-than-significant*** impacts related to long-term effects on hydrology and drainage due to new paved impervious surfaces and flooding. *[Less than Option 1]*

The City of Hercules Only to West County Wastewater District Facilities Alternative would continue to treat wastewater to secondary levels; however, discharge would occur from Outfall 001 in San Pablo Bay as well as a deep water outfall in Central San Francisco Bay. Like Options 1 and 2, this alternative would not increase constituent levels such that state or federal numeric or narrative water quality criteria would be exceeded; would not degrade existing water quality, on a long-term basis; nor cause substantial adverse effects on one or more beneficial uses of San Pablo Bay. However, additional study would be required to determine the existing conditions and potential impacts related to water quality at the Central San Francisco Bay (WCWD) outfall location. Therefore, this alternative is considered to have ***potentially significant*** water quality impacts related constituents of concern (ammonia, copper and cyanide), levels of biochemical oxygen demand, oil and grease, total coliform, total suspended solids, dioxin, mercury and selenium. *[Greater than Options 1 and 2]*

LAND USE

The City of Hercules Only to West County Wastewater District Facilities Alternative, similar to Option 1, upgrades at the existing Pinole-Hercules WPCP would be consistent with the current light industrial/service commercial land use designation of the City of Pinole General Plan. In addition, the existing pipeline improvements would not change the alignment; the pipeline would remain underground and would continue to be subject to Contra Costa County General Plan and the City of Pinole General Plan. Upgrades at the Pinole-Hercules WPCP and improvements to the existing pipeline to RSD would be consistent with land use designations and would not result in a disturbance of or division of a community. Further, upgrades to the existing WCWD facilities would occur within the existing plant boundaries and would be consistent with the existing land use designation. The new pipeline to the WCWD would also be an underground facility utilizing existing rights-of-way. Therefore, this alternative would result in ***no impact*** related to the division of a community.

However, the force main alignment from the Pinole-Hercules WPCP to the WCWD facilities would be subject to the Contra Costa County General Plan, the City of Pinole General Plan, the City of San Pablo General Plan, the City of Richmond General Plan, and the North Richmond Shoreline Specific Plan. In addition, encroachment and right-of-way requirements from both UPRR and the Burlington Northern Santa Fe Railway would need to be met. Currently, the West County Wastewater District does not include the Cities of Pinole and Hercules, which are bound by the City of Pinole and Hercules Sanitary Service District. An agreement between the sanitary service districts through the Contra Costa County LAFCOs would be required. Because this alternative would require new agreements between jurisdictions, further analysis would be required to address the potential land use conflicts with all the land use plans listed above. Therefore, this alternative could result in ***potentially significant*** land use impacts related to potential conflicts with land use plans adopted to avoid or mitigate an environmental effect or adopted habitat conservation plans and could result in greater land use impacts than Options 1 or 2. *[Greater than Options 1 and 2]*

NOISE

Similar to Options 1 and 2, construction of the City of Hercules Only to West County Wastewater District Facilities Alternative could result in the exposure of persons to or generation of noise levels in excess of applicable standards. Although construction of this alternative would likely occur during daytime hours, the exact hours of construction are not yet specified. Consequently, if construction activities were to occur during the more noise-sensitive hours (e.g., evening, nighttime, and early morning), construction-generated noise levels could result in annoyance and/or sleep disruption to occupants of nearby noise-sensitive land uses and create a substantial temporary increase in ambient noise levels in the project vicinity. Although mitigation would be implemented to restrict construction to less-sensitive daytime hours to the maximum extent feasible, to construct temporary noise barriers, provide construction equipment with appropriate shielding, provide advance notice to nearby residents, and designate a disturbance coordinator to respond to complaints, construction-generated noise levels would still exceed the applicable standards at nearby sensitive receptors and this alternative would result in a ***significant and unavoidable*** short-term construction noise impact. Also similar to Options 1 and 2, construction of the City of Hercules Only to West County Wastewater District Facilities Alternative would result in a small number of additional daily trips on local roadways, which would represent a negligible increase in noise levels and would not result in a doubling of average daily traffic volumes. This would be a ***less-than-significant*** impact. In addition, construction-generated vibration levels would not exceed recommended standards nor result in exposure of persons to or generation of excessive groundbourne vibration or groundbourne noise levels. As a result, this impact would also be ***less than significant.***

Also similar to Options 1 and 2, long-term operation of the City of Hercules Only to West County Wastewater District Facilities Alternative would generate few traffic trips in comparison to existing traffic volumes, which would not result in a perceivable change in the traffic noise contours, not exceed applicable standards, nor result in a permanent increase in ambient noise levels at existing noise-sensitive receptors. Therefore, this alternative would result in ***less-than-significant*** long-term operational noise impacts. *[Similar to Options 1 and 2]*

TERRESTRIAL BIOLOGY

Under the City of Hercules Only to West County Wastewater District Facilities Alternative, upgrades would be made to the Pinole-Hercules WPCP and the pipeline to RSD would be upgraded. This alternative would also include a new pipeline to the WCWD facilities. The footprint of the existing Pinole-Hercules WPCP does not contain sensitive habitat or habitat to support special-status species or nesting raptors. Therefore, construction within the WPCP footprint would not have adverse impacts on terrestrial biological resources. However, like Option 1, the 100-foot disturbance area for the upgraded pipeline to RSD could include sensitive habitats such as coastal salt marsh, riparian, and freshwater marsh, the potential for nesting raptor species, and waters of the United States, including wetlands subject to USACE jurisdiction. Construction activities for this alternative could result in impacts to areas of the salt marsh habitat on Pinole Creek and the riparian and freshwater wetland habitats on Ohlone Creek, Refugio Creek, and the small tributary that drains into the upstream end of Pinole Creek if habitats are not properly marked and avoided. The majority of the pipeline route to the WCWD would follow San Pablo Avenue (a multilane parkway) and secondary roads; therefore, construction of this pipeline would result in limited effects on terrestrial biological resources. However, the pipeline would cross three streams: Garrity, Rheem, and San Pablo Creeks. For purposes of this analysis, it is assumed that all three creeks would be crossed by either suspending the pipeline underneath existing bridges or using jack-and-bore with HDD. Therefore, similar to Option 1, the disturbance area for the new pipeline could include sensitive habitats such as coastal salt marsh, riparian, and freshwater marsh, the potential for nesting raptor species, and waters of the United States, including wetlands subject to USACE jurisdiction. Construction activities for this alternative could result in impacts to sensitive habitat areas along the creeks if habitats are not properly marked and avoided. This alternative could also result in disturbance of special-status species and nesting raptors and/or impacts to waters of the United States. Implementation of mitigation would reduce these ***potentially significant*** impacts to a ***less-than-significant*** level by requiring biological monitoring, flagging of sensitive habitat areas, construction setbacks from sensitive habitats, pre-construction nesting raptor surveys, and employment of BMPs during construction activities. In addition, because construction activity would be temporary, would primarily occur in areas already developed, and the pipeline would be installed underground, this alternative would have a ***less-than-significant*** impact on the movement of any native resident or migratory wildlife species, migratory corridors, or native wildlife nursery sites. Further, this alternative would not conflict with local policies or ordinances intended to protect terrestrial biological resources or with provisions of an adopted habitat conservation plan. *[Similar to Option 1]*

5.7.3 ABILITY TO ACCOMPLISH PROJECT OBJECTIVES

The City of Hercules Only to West County Wastewater District Facilities Alternative would attain both of the stated project objectives, eliminating use of Shallow Water Outfall 002 and complying with the NPDES permit. This alternative would have similar impacts to Option 1 with regard to air quality and odors, cultural resources, climate change, noise, and terrestrial biological resources. However, sending the City of Hercules effluent to WCWD would generate greater impacts than Options 1 and 2 with regard to fisheries and aquatic resources and water quality due to the need for additional study to address discharge to Central San Francisco Bay (rather than

San Pablo Bay). In addition, this alternative would result in greater impacts related to geology and soils and land use due to the new pipeline alignment to WCWD, which would cross additional jurisdictions as well as the active Hayward Fault. The City of Hercules Only to West County Wastewater District Facilities Alternative would have an estimated total cost of $106.7 million to $114.3 million.

5.8 FLOW EQUALIZATION AT THE EXISTING PLANT

5.8.1 DISCUSSION

The Flow Equalization at the Existing Plant Alternative has similar elements to both Option 1 (New Larger Effluent Pipe to Rodeo) and Option 2 (Pinole-Only Flows at Existing Plant), described in detail in Chapter 2, "Project Description," of this DEIR. However, this alternative differs in location and sizes of facility upgrades. This alternative would involve minor improvements to the Pinole-Hercules WPCP, the plant would continue to provide secondary treatment, and a flow equalization tank would be installed. However, under this alternative, the tank would be 4 million gallons in size in order to handle influent flows from both cities. The tank would be constructed underground in one of three locations: (1) underneath the parking lot at Bayfront Park immediately southeast of the WPCP, (2) on a portion of the privately owned storage facility immediately east of the WPCP, or (3) along the existing road right-of-way next to the UPRR tracks immediately northeast of the WPCP. In order to install the tank at location 3, a pipeline would be required to cross Pinole Creek. That pipeline would be suspended underneath the existing bridge, and therefore work in the bed or bank of Pinole Creek would not be required. Under this alternative, the Pinole-Hercules WPCP would continue to treat flows generated by both the City of Hercules and the City of Pinole. Therefore, this alternative would include upgrading the peak wet-weather capacity of the Pinole-Hercules WPCP to 14.59 mgd. Inflows greater than 14.59 mgd would receive primary treatment before delivery to the flow equalization tank.

5.8.2 ENVIRONMENTAL IMPACTS

AIR QUALITY AND ODORS

The Flow Equalization at the Existing Plant Alternative would result in similar air quality impacts as Option 1. Construction activities associated with implementation of this alternative would generate ***potentially significant*** intermittent emissions of criteria air pollutants and precursors, including PM_{10} and $PM_{2.5}$, which could violate or contribute substantially to an existing or projected air quality violation, expose sensitive receptors to substantial pollutant concentrations, and/or conflict with implementation of regional air quality plans. However, as with Option 1, all feasible BAAQMD-recommended dust control measures would be required to be implemented, which would reduce the alternative's construction emissions impact to a ***less-than-significant*** level.

This alternative would have the same peak wet-weather treatment capacity as Option 1 (14.59 mgd). Therefore, as with Option 1, this alternative's net increase in operational criteria air pollutant and ozone precursor emissions would not exceed BAAQMD's currently adopted thresholds of significance. Therefore, operational emissions would not result in or substantially contribute to emissions concentrations that exceed the NAAQS or CAAQS and would not conflict with air quality planning efforts in the SFBAAB. Implementation of this alternative would not cause a net increase in vehicles at local intersections that would degrade delay times or LOS. Accordingly, this alternative would not substantially contribute to the degradation of nearby intersections or local CO concentrations that exceed the 1-hour or 8-hour CO CAAQS or NAAQS. Implementation of this alternative would not result in a substantial increase in the exposure of receptors to emissions of TACs from construction activities, on-site stationary, and/or increased motor vehicle trips generated by the proposed project. The temporary, short-term construction and long-term operation of this alternative would not result in an increase in the frequency in which sensitive receptors would be exposed to objectionable odorous emissions. Furthermore, this alternative would not conflict or obstruct with implementation of the SIP. The Flow Equalization at the Existing Plant Alternative would therefore result in similar ***less-than-significant*** air quality impacts as Option 1. *[Similar to Option 1]*

CULTURAL RESOURCES

The Flow Equalization at the Existing Plant Alternative would result in similar impacts to Cultural Resources as Option 1. Prehistoric cultural resources have been documented adjacent to the pipeline alignment to RSD. Previously undocumented portions of these resources could be encountered and disturbed during ground-disturbing activities. Such disturbances could result in a significant impact. Additionally, because Native American populations in particular tended to settle and engage in subsistence activities along creeks and in the vicinity of other water sources, the area around the present-day channel of Pinole Creek may contain potentially significant subsurface traces of prehistoric activities and/or human remains. Therefore, this alternative could result in accidental damage or destruction of undocumented cultural resources and/or undocumented human remains. As with Option 1, mitigation is available to reduce these ***potentially significant*** cultural resource impacts to a ***less-than-significant*** level. *[Similar to Option 1]*

CLIMATE CHANGE

Construction activities associated with the Flow Equalization at the Existing Plant Alternative would generate temporary GHG emissions. Construction-related GHG emissions would cease following completion of construction. Because construction-related emissions would be temporary and finite in nature, below screening levels being considered and/or discussed by other government agencies and associations, and not conflict with the AB 32 Scoping plan or any local GHG reduction efforts, this alternative's construction-related GHG emissions would not be a cumulatively considerable contribution to climate change, and therefore, would be a ***less-than-significant*** impact.

Implementation of the Flow Equalization at the Existing Plant Alternative would change the amount of electricity and natural gas consumed by operation of the WPCP and the associated level of GHG emissions. This alternative would have the same peak wet-weather treatment capacity as Option 1 (14.59 mgd) and would, therefore, be anticipated to use a similar amount of electricity and natural gas to treat additional wastewater. However, similar to Option 1, this alternative would not result in a net increase in operational GHG emissions that would exceed the BAAQMD's proposed threshold of significance of 1,100 MT CO2e/yr. In addition, because this Alternative would not conflict with applicable measures in ARB's scoping plan, operational GHG emissions would not be a cumulatively considerable contribution to climate change. As a result, this impact would be ***less than significant***.

The future effects of climate change, including sea level rise, increased intensity of storm surges, and increased variability in precipitation patterns could adversely affect the Pinole-Hercules WPCP. However, there is too much uncertainty at this time to conclude whether there would be an impact, and the extent to which it may occur. For these reasons, the analysis of how future conditions resulting from climate change could adversely affect the WPCP is considered to be ***too speculative*** to support a significance determination. *[Similar to Option 1]*

FISHERIES AND AQUATIC RESOURCES

By discontinuing use of Shallow Water Outfall 002, the Flow Equalization at the Existing Plant Alternative would result in similar ***beneficial effects*** to fisheries that would occur under proposed Options 1 or 2, including: eliminating constituent discharges to productive shallow water habitats where fish and BMI abundance may be higher; reducing dissolved oxygen effects to productive near-shore shallow water habitats here fish and BMI abundance may be higher; and reducing the potential for localized dissolved oxygen and temperature effects and resultant potential for the discharge to alter migration patterns of fish moving through the near-shore areas. *[Similar to Options 1 and 2]*

The Flow Equalization at the Existing Plant Alternative would result in the same construction activities as Option 2. If the tank were installed at location 3 describe above, a pipeline would be required across Pinole Creek, and therefore construction activities could cause ***potentially significant*** indirect impacts related to water quality on habitat and fish and benthic macroinvertebrate communities. However, mitigation would be implemented including construction BMPs to minimize potential adverse water quality effects that would, in turn, minimize the risk of adversely affecting special-status fish species. These measures would reduce the construction impacts to a ***less-than-significant*** level. *[Similar to Option 1]*

Similar to Option 2, the Flow Equalization at the Existing Plant Alternative would continue to discharge effluent treated to secondary levels from Outfall 001. Because the level of treatment would be the same and the peak flows would be the same, it is anticipated that, like Option 1, this alternative would result in ***less-than-significant*** fisheries impacts related to discharge of ammonia, copper, cyanide, dissolved oxygen levels, and thermal plume. *[Similar to Option 1]*

GEOLOGY AND SOILS

As with Options 1 and 2, the proposed facilities under the Flow Equalization at the Existing Plant Alternative would not be located within or adjacent to a fault zoned under the Alquist-Priolo Earthquake Fault Zone Act, and the Pinole Creek Fault is not considered to be active by CGS. Therefore, this impact is considered ***less than significant***. *[Similar to Options 1 and 2]*

The facilities proposed under this alternative would be constructed in a seismically active area, and project implementation would expose people and structures to risks caused by strong seismic ground shaking. Construction activities would involve grading and movement of earth in soils subject to wind and water erosion hazard. The proposed facilities could be subject to hazards from liquefaction, subsidence, and construction in potentially unstable soils. Portions of the project site are underlain by soils that have a moderate to high potential for expansion when wet and may result damage to structures and most of the soils within which the project components would be constructed are moderately to highly corrosive of concrete and steel. These impacts are considered ***potentially significant***. Similar to Options 1 and 2, mitigation would reduce these potentially significant impacts to ***less-than-significant*** levels by requiring a site-specific geotechnical report, monitoring of earthmoving activities, and a grading and erosion control plan. The geotechnical design recommendations to reduce damage from seismic events would be incorporated into buildings, structures, and infrastructure as required by the CBC, and a geotechnical or soils engineer would provide on-site monitoring to make sure that earthwork is being performed as specified in the plans. Furthermore, a grading and erosion control plan with specific erosion and sediment control measures would be prepared, approved by the City of Pinole Planning Department, and implemented. *[Similar to Option 1]*

The Flow Equalization at the Existing Plant Alternative would not change the susceptibility of the Pinole-Hercules WPCP and associated facilities to damage from tsunamis, and would not result in any new employees whose safety could be jeopardized by a tsunami. Therefore, this impact is considered ***less than significant***. *[Similar to Options 1 and 2]*

The Pinole-Hercules WPCP is underlain by Holocene-age Bay mud and artificial fill, which is not considered a paleontologically sensitive rock formation. Therefore, construction activities at WPCP would not be anticipated to damage or destroy previously unknown, unique paleontological resources at the project site. However, the pipeline alignment to RSD Outfall 001 is underlain by paleontologically sensitive rock formations and Pleistocene- and Miocene-age vertebrate fossils have been recovered in the vicinity of the pipeline alignment. Therefore, upgrades to this pipeline could potentially damage previously unknown unique paleontological resources, which is considered a ***potentially significant*** impact. However, to mitigate this impact to a ***less-than-significant*** level, construction personnel would be trained by a qualified paleontologist; a qualified paleontologist would monitor earthmoving activities along the pipeline alignment to RSD; and, if paleontological resources are discovered, work would cease, the resource would be evaluated and a recovery plan would be implemented as required. *[Similar to Option 1]*

HYDROLOGY AND WATER QUALITY

The construction activities associated with the Flow Equalization at the Existing Plant Alternative would have the same ***potentially significant*** impacts related to temporary soil erosion, discharges of construction-related contaminants and off-site discharge of contaminants in stormwater runoff as Option 2. As with Option 2, these impacts are mitigable through development and implementation of a SWPPP and BMPs that ensure stormwater runoff from construction activities is appropriately controlled. This alternative would also result in the same ***less-than-significant*** impacts as Option 2 related to long-term effects on hydrology and drainage due to new paved impervious surfaces that would increase the amount of stormwater runoff. *[Similar to Option 1]*

The Flow Equalization at the Existing Plant Alternative would continue to treat wastewater to secondary levels and discharge to Outfall 001 in San Pablo Bay. Like Options 1 and 2, this alternative would not increase constituent levels such that state or federal numeric or narrative water quality criteria would be exceeded; would not degrade existing water quality, on a long-term basis; nor cause substantial adverse effects on one or more beneficial uses of San Pablo Bay. Therefore, this alternative would result in ***less-than-significant*** water quality impacts related constituents of concern (ammonia, copper and cyanide), levels of biochemical oxygen demand, oil and grease, total coliform, total suspended solids, dioxin, mercury and selenium. *[Similar to Options 1 and 2]*

LAND USE

Under the Flow Equalization at the Existing Plant Alternative, similar to Option 1, upgrades at the existing Pinole-Hercules WPCP would be consistent with the current light industrial/service commercial land use designation of the City of Pinole General Plan. In addition, a new pipeline to RSD and a new pipeline to discharge into Pinole Creek would be constructed. The new pipelines would be subject to Contra Costa County General Plan and the City of Pinole General Plan. The pipeline routes would be constructed below existing rights-of-way, requiring coordination with UPRR to ensure compliance with right-of-way procedures, safety measures, and other planning guidelines. Any construction within 100 feet of the shoreline would require a permit from BCDC. Similar to Option 1, upgrades at the WPCP would be consistent with land use designations and would not result in a disturbance of or division of a community. Further, the new pipelines in this alternative would be underground facilities utilizing existing rights-of-way. Therefore, this alternative would result in ***no impact*** related to the division of a community.

Under this alternative, the 4-million gallon flow equalization tank could be constructed underground in one of three locations: (1) Bayfront Park, (2) on a portion of the privately owned RV park immediately east of the WPCP, or (3) along the existing road right-of-way next to the UPRR tracks immediately northeast of the WPCP. Because the tank would be constructed underground, therefore, this alternative would result in a ***less-than-significant*** impact related to potential conflicts with land use plans adopted to avoid or mitigate an environmental effect or adopted habitat conservation plans. The Flow Equalization at the Existing Plant Alternative would result in similar land use impacts than Options 1 or 2. *[Similar to Options 1 and 2]*

NOISE

Similar to Options 1 and 2, construction of the Flow Equalization at the Existing Plant Alternative could result in the exposure of persons to or generation of noise levels in excess of applicable standards. Although construction of this alternative would likely occur during daytime hours, the exact hours of construction are not yet specified. Consequently, if construction activities were to occur during the more noise-sensitive hours (e.g., evening, nighttime, and early morning), construction-generated noise levels could result in annoyance and/or sleep disruption to occupants of nearby noise-sensitive land uses and create a substantial temporary increase in ambient noise levels in the project vicinity. Although mitigation would be implemented to restrict construction to less-sensitive daytime hours to the maximum extent feasible and to construct temporary noise barriers, equip construction equipment with appropriate shielding, provide advance notice to nearby residents, and designate a disturbance coordinator to respond to complaints, construction-generated noise levels would still exceed the applicable standards at nearby sensitive receptors and this alternative would result in a ***significant and unavoidable*** short-term construction noise impact. Also similar to Options 1 and 2, construction of the Flow Equalization at the Existing Plant Alternative would result in a small number of additional daily trips on local roadways, which would represent a negligible increase in noise levels and would not result in a doubling of average daily traffic volumes. This would be a ***less-than-significant*** impact. In addition, construction-generated vibration levels would not exceed recommended standards nor result in exposure of persons to or generation of excessive groundbourne vibration or groundbourne noise levels. As a result, this impact would also be ***less than significant.***

Also similar to Options 1 and 2, long-term operation of the Flow Equalization at the Existing Plant Alternative would generate few traffic trips in comparison to existing traffic volumes, which would not result in a perceivable change in the traffic noise contours, not exceed applicable standards, nor result in a permanent increase in ambient noise levels at existing noise-sensitive receptors. Therefore, this alternative would result in ***less-than-significant*** long-term operational noise impacts. *[Similar to Options 1 and 2]*

TERRESTRIAL BIOLOGY

Under the Flow Equalization at the Existing Plant Alternative, upgrades would be made to the WPCP and the pipeline to RSD. The footprint of the existing Pinole-Hercules WPCP does not contain sensitive habitat or habitat to support special-status species or nesting raptors. Therefore, construction within the WPCP footprint would not have adverse impacts on terrestrial biological resources. However, the100-foot disturbance area for any of the off-site tank locations could include sensitive habitats such as coastal salt marsh, riparian, and freshwater marsh, the potential for nesting raptor species, and waters of the United States, including wetlands subject to USACE jurisdiction. Depending on the location selected for installation of the tank, construction activities for this alternative could result in impacts to areas of the salt marsh habitat on Pinole Creek and impacts to special-status species and nesting raptors, if habitats are not properly marked and avoided. Implementation of mitigation would reduce these ***potentially significant*** impacts to a less-than-significant level by requiring biological monitoring, flagging of sensitive habitat areas, construction setbacks from sensitive habitats, pre-construction nesting raptor surveys, and employment of BMPs during construction activities. Because construction activity would be temporary, would primarily occur in areas already developed, and the pipeline to tank location 3 would be installed underground, this alternative would have a ***less-than-significant*** impact on the movement of any native resident or migratory wildlife species, migratory corridors, or native wildlife nursery sites. Further, this alternative would not conflict with local policies or ordinances intended to protect terrestrial biological resources or with provisions of an adopted habitat conservation plan. *[Similar to Option 1]*

5.8.3 ABILITY TO ACCOMPLISH PROJECT OBJECTIVES

The Flow Equalization at the Existing Plant Alternative would attain both of the stated project objectives, eliminating use of Shallow Water Outfall 002 and complying with the NPDES permit. This alternative would have similar impacts to Option 1 with regard to air quality and odors, cultural resources, climate change, fisheries and aquatic resources, geology and soils, hydrology and water quality, noise, and terrestrial biological resources. However, due to the uncertain location of the flow equalization tank, this alternative would result in potential land use impacts that would not occur under Options 1 and 2. The Flow Equalization at the Existing Plant Alternative would have an estimated total cost of $136.4 million.

5.9 ENVIRONMENTALLY SUPERIOR ALTERNATIVE

The State CEQA Guidelines require identification of an environmentally superior alternative. If the No Project alternative is environmentally superior, CEQA requires identification of the “environmentally superior alternative other than the no project alternative” from among the alternatives evaluated.

Table 6-1 identifies whether each of the alternatives evaluated in this section of the DEIR would have "greater," "lesser," or "similar" impacts as compared to the Proposed Project Options 1 and 2 for each of the five environmental issues evaluated in this DEIR. As shown in Table 5-1, all of the alternatives would have greater impacts than Options 1 or 2. Based on the conclusions in Table 5-1, the No Project Alternative would be the environmentally superior alternative under CEQA. CEQA requires that if the No Project Alternative is determined to be environmentally superior, the EIR must also identify the environmentally superior alternative among the other alternatives. Although the No Project Alternative would have four lesser impacts than proposed Option 1, it would not meet the project objectives and would result in two greater impacts: fisheries and aquatic resources and hydrology and water quality. The Full Tertiary Facilities and the Small Tertiary or Hybrid Solution Alternatives would meet the project objectives but would result in three greater impacts: fisheries and aquatic resources, hydrology and water quality, and terrestrial biology. The All Flows to West County Wastewater District Facilities and the City of Hercules Only to West County Wastewater District Facilities Alternative would also meet project objectives but would result in four greater impacts: fisheries and aquatic resources, geology and soils, hydrology and water quality, and terrestrial biology. The Flow Equalization at the Existing Plant would meet project objectives but would result in one greater impact related to land use. Thus, among the five alternatives other than No Project that were evaluated in this section of the DEIR, Flow Equalization at the Existing Plant would be the environmentally superior alternative for CEQA purposes.

Table 5-1
Comparison of Impacts of the Proposed Project Options 1 and 2 to Those of the Alternatives[1]

Environmental Issues	Alternatives					
	No Project	Full Tertiary Facilities	Small Tertiary or Hybrid Solution	All Flows to West County Wastewater District Facilities	City of Hercules Only to West County Wastewater District Facilities	Flow Equalization at the Existing Plant
Air Quality and Odors	Less	Similar	Similar	Similar	Similar	Similar
Cultural Resources	Less	Similar	Similar	Similar	Similar	Similar
Climate Change	Less	Similar	Similar	Similar	Similar	Similar
Fisheries and Aquatic Resources	Greater	Greater	Greater	Greater	Greater	Similar
Geology and Soils	Similar	Similar	Similar	Greater	Greater	Similar
Hydrology and Water Quality	Greater	Greater	Greater	Greater	Greater	Similar
Land Use	Similar	Similar	Similar	Greater	Greater	Greater
Noise	Less	Similar	Similar	Similar	Similar	Similar
Terrestrial Biology	Similar	Greater	Greater	Similar	Similar	Similar
Totals						
Greater Impacts	2	3	3	4	4	1
Lesser Impacts	4	0	0	0	0	0

[1] For each environmental issue, the alternative is compared to the proposed project options based on the level of severity of impacts (i.e., greater, less, similar)

Source: Data compiled by AECOM in 2009 and 2010

6 REFERENCES

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