3.5 Hydrology and Water Quality

3.5.1 Approach to Analysis

This section presents an evaluation of the potential for increased erosion, sedimentation, and runoff due to the WTTIP projects. The analysis of water quality impacts is based on field observations and a review of existing EBMUD permits for discharges. In general, implementation of the WTTIP would not have direct long-term effects on the hydrology or water quality of regional and local surface waters. However, short-term construction impacts could result in erosion and sedimentation or discharge of construction-related pollutants to local creeks, causing water quality effects. Diversion of flood flows could also occur. Operational discharges of chloraminated water could cause adverse water quality effects. However, through compliance with existing regulations and established project procedures, as well as mitigation measures specified in this section, construction and operational impacts would be less than significant.

3.5.2 Setting

Surface Water Bodies, Drainage, and Flooding

The WTTIP project sites lie within the regional drainage of San Francisco Bay; the majority of project sites are located in Contra Costa County, and one project is located in Oakland (Alameda County). Precipitation is variable between East and West Contra Costa County due to the county's distinct topography and proximity to the California coast. The rain-shadow effect of the East Bay Hills and Mt. Diablo is evident in the average annual rainfall levels, which are highest just east of the crest of the Berkeley-Oakland Hills (33.75 inches per year) and lowest in East County (9.75 inches per year). Mt. Diablo marks the point where precipitation drops off markedly in the East County. The average annual rainfall in Oakland is 23.9 inches (World Climate, 2005). Table 3.6-2 lists the water bodies identified within and adjacent to WTTIP project sites, including seasonal drainages (see Section 3.6, Biological Resources). These water bodies are described briefly below and shown on Map Series A and B.

Contra Costa County Watersheds

San Pablo Creek Watershed

The Orinda WTP, Sobrante WTP, Orinda-Lafayette Aqueduct entry shaft, Happy Valley Pumping Plant and Pipeline, and San Pablo Pipeline are located in the San Pablo Creek watershed, which covers 43.5 square miles in West Contra Costa County. This watershed includes the cities of Orinda, San Pablo, and Richmond as well as parts of unincorporated Contra Costa County (CCCWP and EOA, 2004). Major water bodies within this watershed include San Pablo Creek, Cascade Creek, Lauterwasser Creek, Bear Creek, Castro Creek, Siesta Valley Creek, Wilkie Creek, Cascade Lake, San Pablo Reservoir, and Briones Reservoir. Impervious surfaces make up approximately 20 percent of the watershed.

San Pablo Creek originates in Orinda, flows northwest along the eastern edge of the Oakland Hills to San Pablo Reservoir, and ultimately discharges to San Francisco Bay near Richmond. Lauterwasser Creek, a perennial tributary, flows into San Pablo Creek approximately one-third mile southeast and upstream of the Orinda WTP, and upstream from the confluence of San Pablo Creek and San Pablo Reservoir. The San Pablo Creek watershed supports 10,909 acres of EBMUD-protected watershed land, including the Siesta Valley, Gateway, and Briones watersheds.

Project Sites within San Pablo Watershed

Orinda WTP. The Orinda WTP is located within 300 feet of San Pablo Creek, approximately 1.1 mile upstream of San Pablo Reservoir. San Pablo Creek supports natural channel banks along 89 percent of its length, including the reach near the Orinda WTP. Two seasonal streams discharge to San Pablo Creek between the Orinda WTP and the Orinda Sports Field (see Table 3.6-2 in Section 3.6, Biological Resources).

Adjacent to the WTP, the Federal Emergency Management Agency (FEMA) has mapped a 100-year flood zone with a base flood elevation of 352 feet at the west end of the plant and 372 feet at the east end of the plant (FEMA, 1997). Although the land elevations adjacent to the creek are higher than the base flood elevation (373 feet at the west end and 377 feet at the west end), the Orinda WTP has flooded twice between 2003 and 2006 because the City of Orinda's 48-inch storm drain culvert carrying stormwater from the west side of Camino Pablo, through the south end of the WTP, to San Pablo Creek could not carry the entire storm-related flow (Wallis, 2006).[1]

To prevent future flooding, the District is making improvements to prevent flood water from entering the filters and to protect other facilities critical to the production of drinking water and is also working with the City to improve the capacity of the storm drain culvert under Camino Pablo. Improvements include construction of paved V-shaped ditches adjacent to San Pablo Creek to facilitate flood water entering the creek and prevent erosion of the creek bank, as well as waterproofing of some underground structures.

A series of 26 onsite storm drains and a trench located to the south of the filters collect stormwater at the Orinda WTP and discharge it to San Pablo Creek. In addition, a concrete-lined trench between the existing backwash water settling basins and Camino Pablo carries stormwater drainage north to one of the small tributaries to San Pablo Creek between the ballfields and the Orinda WTP. All stormwater discharges comply with an existing National Pollutant Discharge Elimination System (NPDES) permit, as discussed below.

Sobrante WTP. The Sobrante WTP is located adjacent to San Pablo Creek, almost two miles downstream from the outlet of San Pablo Reservoir, adjacent to the 100-year flood zone associated with the creek. There is no history of flooding at the WTP. An onsite stormwater collection system collects stormwater at the Sobrante WTP and discharges it to San Pablo Creek

[1] Based on the City's *Draft Storm Drainage Master Plan* prepared in 1993, the required capacity of the culvert is 381 cubic feet per second for a 10-year storm, but the estimated existing capacity of the culvert is 120 cubic feet per second.

through a concrete culvert. EBMUD inspects the stormwater system and tests any collected water for pH and chlorine residual before discharge. All stormwater discharges comply with an existing NPDES permit, as discussed below.

Orinda-Lafayette Aqueduct. The proposed Orinda-Lafayette Aqueduct entry shaft and staging area site is at the ballfields north of the Orinda WTP, approximately 300 feet west of San Pablo Creek. The proposed staging area elevation is approximately 380 feet, which is above the San Pablo Creek base flood elevation of 355 to 363 feet in this area (FEMA, 1997). The ballfield area is mostly planted turf grass with no paving, and stormwater drainage flows to San Pablo Creek. Lauterwasser Creek and San Pablo Creek are also located below the Orinda-Lafayette Aqueduct.

Happy Valley Pumping Plant and Pipeline. The proposed Happy Valley Pipeline alignment follows Miner Road and Lombardy Lane, paralleling Lauterwasser Creek between Oak Arbor Road and Sleepy Hollow Lane. The alignment crosses Lauterwasser Creek at Sleepy Hollow Lane (FEMA, 1997) and also crosses three tributaries to the creek (see Table 3.6-2 in Section 3.6). Lauterwasser Creek is parallel and adjacent to the pipeline alignment in some locations. FEMA has mapped a 100-year flood zone with a base flood elevation ranging from 430 feet at the southernmost end of the pipeline alignment to 450 feet where the proposed alignment crosses Lauterwasser Creek. The proposed Happy Valley Pumping Plant is located between Lauterwasser Creek and a tributary to this creek, outside of mapped flood zones. Parcel maps depict a drainage easement across the southern portion of the site, and the proposed pumping plant is located outside of this easement. The site is unpaved, and although there is a drainage pipe buried beneath the site that drains to the adjacent creek, the site does not have a stormwater collection system. Stormwater drainage occurs by runoff to the adjacent creeks or to the stormwater collection system in Lombardy Lane.

San Pablo Pipeline. The proposed San Pablo Pipeline alignment follows Camino Pablo and then an existing local watershed access road adjacent to the San Pablo Reservoir for its entire length. The pipeline alignment parallels San Pablo Creek upstream of San Pablo Reservoir. Further north, the pipeline alignment is located within 200 feet of the reservoir. The pipeline alignment would cross several small streams and is not located within a mapped flood zone.

Beneficial Uses

The California Regional Water Quality Control Board (RWQCB), San Francisco Bay Region, lists San Pablo Creek as a significant surface water. Beneficial uses of San Pablo Creek and its tributaries include fish migration, noncontact water recreation, warm freshwater habitat, and wildlife habitat (RWQCB, 1995). Beneficial uses of San Pablo Reservoir include cold freshwater habitat, municipal and domestic supply, water contact recreation, noncontact water recreation, fish spawning, warm freshwater habitat, and wildlife habitat. Although the *Water Quality Control Plan for the San Francisco Bay Basin* (Basin Plan) (RWQCB, 1995) identifies water contact recreation as a beneficial use for this reservoir, such activities are prohibited by EBMUD.

Water Quality

The RWQCB lists San Pablo Creek as an impaired water body for diazinon from urban runoff and lists San Pablo Reservoir as impaired for mercury from atmospheric deposition (RWQCB, 2003d). The RWQCB Surface Water Ambient Monitoring Program monitored water quality in the San Pablo Creek watershed in 2000 and 2001 (RWQCB, 2004c).

Walnut Creek Watershed

The Walnut Creek watershed covers 145 square miles in Central Contra Costa County. The following facilities and sites are located in this watershed: Lafayette WTP, Walnut Creek WTP, the exit shaft site for the Orinda-Lafayette Aqueduct, the entire Orinda-Lafayette Pipeline, Glen Pipeline Improvements, Highland Reservoir and Pipelines, Lafayette Reclaimed Water Pipeline, Leland Isolation Pipeline, the northern portion of the Moraga Road Pipeline, Sunnyside Pumping Plant, Tice Pumping Plant and Pipeline, Withers Pumping Plant, New Leland Pressure Zone Reservoir and Pipeline, the existing Leland Reservoir, and a portion of the St. Mary's Road/Rohrer Drive Pipeline. Walnut Creek, Lafayette, Pleasant Hill, and Danville lie completely within the boundaries of this watershed. Portions of Concord and Martinez as well as small areas of Moraga and San Ramon lie within the watershed (CCCWP and EOA, 2004). This major watershed drains the west side of Mt. Diablo and the east side of the East Bay Hills. Major tributaries, some of which constitute important subwatersheds within the Walnut Creek watershed, include San Ramon Creek, Pine Creek, Lafayette Creek, Las Trampas Creek, Bollinger Canyon Creek, Galindo Creek, Murderer's Creek, and Grayson Creek.

Las Trampas and San Ramon Creeks, located in the southern portion of the watershed, flow northward, converging to become Walnut Creek east of the Highway 24 and Interstate 680 interchange, near Mt. Diablo Boulevard. Grayson and Murderer's Creeks converge with Walnut Creek north of Highway 4. Walnut Creek drains into Pacheco Creek and eventually into Carquinez Strait and Suisun Bay.

Las Trampas Creek Watershed

Several small intermittent tributaries near Las Trampas Peak form Las Trampas Creek, which flows east to join San Ramon Creek and become Walnut Creek. The 26.9-square-mile Las Trampas Creek watershed encompasses portions of Lafayette, Moraga, and Walnut Creek as well as parts of unincorporated Contra Costa County. Impervious surfaces make up approximately 25 percent of the total land area in this watershed. Major water bodies in this watershed include Hidden Valley Creek, Happy Valley Creek, Lafayette Creek, Reliez Creek, Grizzly Creek, and Tice Creek.

Hidden Valley Creek flows east into Lafayette Creek near the intersection of Mt. Diablo Boulevard and El Nido Ranch Road. Happy Valley Creek joins Lafayette Creek from the northwest, approximately 2,100 feet west of its confluence with Las Trampas Creek.

Within this watershed, stream channels contain most of the 100-year flood flows. However, overflow—mostly in the form of sheet flow—occurs along roads and in some areas due to

inadequate culvert capacities along Happy Valley, Hidden Valley, Lafayette, and Grizzly Creeks (FEMA, 2002c).

Lafayette WTP. Lafayette Creek traverses the southern portion of the Lafayette WTP, downstream of its confluence with Hidden Valley Creek. Based on FEMA maps, Hidden Valley Creek is located underground near the intersection of El Nido Ranch Road and Mt. Diablo Boulevard. An intermittent drainage also flows into Lafayette Creek east of this intersection in the western portion of the Lafayette WTP property (see Table 3.6-2 in Section 3.6). The 100-year flood elevation is approximately 368 feet at the west end of the property and approximately 350 feet at the east end (FEMA, 2002c). Existing WTP facilities are at a minimum elevation of approximately 370 feet; this elevation is higher than the maximum 100-year flood level at the west end of the site, and there is no history of flooding at the WTP. Thus, flooding of the Lafayette WTP is unlikely. A series of 18 onsite storm drains collects stormwater at the Lafayette WTP and discharges it to Lafayette Creek.

Orinda-Lafayette Aqueduct. The proposed Orinda-Lafayette Pipeline alignment follows El Nido Ranch Road to the north of Highway 24. Along most of the pipeline alignment, the nearest major creek is Hidden Valley Creek, which lies south of the highway for much of the alignment, although the proposed alignment crosses three seasonal drainages that flow towards Highway 24. The proposed pipeline alignment crosses Hidden Valley Creek near the confluence with Lafayette Creek, to the north of Highway 24, and the creek is culverted underground at the crossing. The alignment crosses a narrow 100-year flood zone south of Highway 24 (FEMA, 1981a). The proposed alignment also crosses an unnamed tributary to Lafayette Creek and Lafayette Creek along Mt. Diablo Boulevard near the Lafayette WTP (see Table 3.6-2 in Section 3.6).

Glen Pipeline Improvements. The proposed Glen Pipeline Improvements along Nordstrom Lane would parallel Happy Valley Creek, about 240 feet from the creek at its nearest point and outside of the mapped flood zones associated with the creek. The proposed alignment also crosses a concrete-lined intermittent tributary to Happy Valley Creek (see Table 3.6-2 in Section 3.6).

Highland Reservoir and Pipelines. The proposed Highland Reservoir is located approximately 1,000 feet north of, and up hill from, the Lafayette Reservoir. Neither the proposed Highland Reservoir, access road, inlet/outlet pipeline, or overflow pipeline are located within a flood zone, but the proposed inlet/outlet pipeline crosses Lafayette Creek before joining the Lafayette WTP (see Table 3.6-2 in Section 3.6). In addition, the overflow pipeline would extend into Lafayette Reservoir. The 100-year flood elevation near the Lafayette Creek crossing is approximately 350 feet (FEMA, 2002c). The proposed Highland Reservoir site is unpaved and is not served by a stormwater collection system.

Lafayette Reclaimed Water Pipeline. The proposed Lafayette Reclaimed Water Pipeline, extending between the Lafayette WTP and Lafayette Reservoir along much of the same alignment as the Highland Reservoir inlet/outlet pipeline, is not located within a flood zone, but crosses Lafayette Creek before joining the Lafayette WTP to the west of the Highland Inlet/

Outlet Pipeline crossing (see Table 3.6-2 in Section 3.6). The 100-year flood elevation near the Lafayette Creek crossing is approximately 364 feet (FEMA, 2002c).

Moraga Road Pipeline. The portion of the proposed Moraga Road Pipeline between Moraga Road at Madrone Drive and the Lafayette WTP is located within the Las Trampas Creek watershed. The proposed pipeline alignment in this watershed is not located within a flood zone. The pipeline alignment crosses several intermittent streams (see Table 3.6-2 in Section 3.6).

Sunnyside Pumping Plant. The proposed Sunnyside Pumping Plant site is located east of a topographic saddle, approximately 600 feet from the beginning of Happy Valley Creek to the east. The pumping plant is not located within a mapped flood zone. The site is unpaved and is not served by a stormwater collection system.

Tice Pumping Plant and Pipeline. The proposed Tice Pumping Plant site is located approximately 1,000 feet south of Las Trampas Creek, adjacent to a flooding zone identified as a moderate or minimal flood hazard zone (Zone X) (FEMA, 2003). The proposed pipeline alignment along Boulevard Way crosses this flood zone as well as Las Trampas Creek and the associated 100-year flood zone north of Calvin Court, upstream of its confluence with San Ramon Creek. The base flood elevation at the crossing is 189 to 190 feet. The proposed pumping plant site is unpaved and drains to a stormwater collection system along Olympic Boulevard.

Existing Leland Reservoir. Leland Reservoir is approximately 1,000 feet to the east of Reliez Creek and is not located within a mapped flood zone.

St. Mary's Road/Rohrer Drive Pipeline. The portion of the St. Mary's Road/Rohrer Drive Pipeline alignment between Bollinger Canyon Road and the alignment's eastern terminus is located in the Las Trampas Creek watershed. The portion of the alignment between Bollinger Canyon Road and Rohrer Drive parallels Las Trampas Creek and crosses Grizzly Creek, a tributary to Las Trampas Creek, near its eastern end. The roadways are not mapped within a flood zone, except where Rohrer Drive crosses Grizzly Creek.

Beneficial Uses

The Basin Plan does not specifically identify the Lafayette Reservoir. However, its beneficial uses are expected to be similar to those of San Pablo Reservoir, with water contact recreation also a prohibited activity.

Water Quality

Lafayette Reservoir is a standby water supply reservoir for EBMUD and has not been used for drinking water purposes for over 40 years (EBMUD, 2006a). Water quality monitoring has been conducted at the reservoir, as required by the California Department of Health Services' drinking water regulations for a standby drinking water supply reservoir. Its limited storage volume and relatively poor water quality make the water difficult to treat and less desirable to use except during a water supply emergency.

Inflow to the reservoir is limited to watershed runoff and, during dry years, water levels in the reservoir drop. In 1992, dry conditions caused the reservoir to drop to an elevation of 434 feet from the typical elevation of about 442 to 448 feet, resulting in the disruption of fish spawning habitat and aquatic vegetation. High levels of organics were also flushed into the reservoir when the water levels recovered, causing low dissolved oxygen and some swampy odors. Based on an EBMUD water quality study in 1998 to 1999, the reservoir exhibits anoxic[2] water quality from late May to November, resulting in high nutrient loading and an accumulation of hydrogen sulfide. Blue-green algae blooms are common year-round.

San Ramon Creek Watershed

The proposed Leland Bypass Valves and the New Leland Pressure Zone Reservoir and Pipeline are located in the San Ramon Creek watershed, which drains an area of approximately 54 square miles. San Ramon Creek generally flows north to its confluence with Las Trampas Creek, where these creeks merge to become Walnut Creek. The San Ramon Creek watershed encompasses portions of Danville, San Ramon, and Walnut Creek as well as parts of unincorporated Contra Costa County. Impervious surfaces in the San Ramon Creek watershed make up approximately 20 percent of the land area. A large majority of the mainstem banks of San Ramon Creek are constructed of earthen channels, while its tributaries are mostly natural. Major water bodies within the San Ramon Creek watershed include Bollinger Canyon Creek, Sycamore Creek, and Green Valley Creek.

Leland Bypass Valves. The proposed Leland Bypass Valve improvements are located at the Danville Pumping Plant. San Ramon Creek runs along the opposite side of Danville Boulevard from the lot that is east of the pumping plant. There is also a small drainage along the eastern property boundary of the pumping plant. The pumping plant is located in a 100-year flood zone with a base flood elevation of 193 feet (FEMA, 1996a). Stormwater at the site is collected in a series of catch basins and discharged from a headwall to the drainage along the eastern property boundary.

New Leland Pressure Zone Reservoir and Pipeline. The proposed Leland Reservoir is located approximately 750 feet to the southeast of San Ramon Creek outside of any mapped flood zones. The proposed pipeline alignment crosses San Ramon Creek north of Rudgear Road, where the creek is culverted under Interstate 680 and crosses a portion of a related moderate or minimal flood hazard zone (Zone X) (FEMA, 1996b). FEMA has mapped a 100-year flood zone adjacent to San Ramon Creek on both ends of the culverted section under Interstate 680. The proposed reservoir site is unpaved and is not served by a stormwater collection system.

Grayson Creek and Murderer's Creek Watershed

Originating in the Briones Hills and joining Walnut Creek in its lower reach north of Highway 4, Grayson Creek is the only major tributary to Walnut Creek that flows from the west. The Grayson and Murderer's Creek watershed encompasses 24 square miles within the greater Walnut Creek watershed and includes portions of Pleasant Hill, Concord, Walnut Creek, Martinez, and

[2] Anoxic water is water that is depleted of dissolved oxygen.

Lafayette as well as portions of unincorporated Contra Costa County. A concrete or earthern channel confines much of Grayson Creek. Impervious surfaces make up approximately 45 percent of the land area in the watersheds.

Walnut Creek WTP. The easternmost tributary of Grayson Creek crosses the Walnut Creek WTP outside of the project site. This portion of the tributary is channeled through a 36-inch culvert under the west side of the site, west of the existing clearwell and chlorine contact basin. Stormwater drainage at the Walnut Creek WTP site is collected onsite, diverted through catch basins and storm drains, and discharged to the creek downstream of the site. The Walnut Creek WTP is not located within any mapped flood zones.

Leland Isolation Pipeline. The proposed Leland Isolation Pipeline is located in downtown Walnut Creek, 1,000 feet to the west of Walnut Creek. Urbanization and the need for flood control infrastructure have led to substantial alteration of the main stem of Walnut Creek from its original condition. An extensive stormwater drainage system reroutes surface waters that once meandered across the valley floor in the city of Walnut Creek. Flooding in the city occurs primarily due to winter rains (FEMA, 2002a). While the flood capacity of the major hydraulic structures in the city of Walnut Creek is usually adequate, backups in adjacent channels due to inadequate capacity of the natural and seminatural channels reduce their effectiveness. The portion of the proposed pipeline on La Cassie Avenue between Locust and Main Streets is located in the 100-year flood zone associated with Walnut Creek, with a base flood elevation of approximately 134 feet, as well as in an area of moderate or minimal flood hazard (Zone X) (FEMA, 2002a, 2002b).

Withers Pumping Plant. The Withers Pumping Plant supports a seasonal drainage partially within a culvert that is tributary to Grayson Creek. The tributary crosses Reliez Valley Road north of the proposed pumping plant and joins Grayson Creek approximately 4,000 feet to the east.

Although there is an onsite stormwater collection system for the adjacent Grayson Reservoir and access road, the proposed pumping plant site is unpaved and site drainage flows to the city stormwater collection system in Reliez Valley Road. The site is not located within a mapped 100-year flood zone. Stormwater is collected in a set of V-shaped ditches around the perimeter of the reservoir that convey water to a 24-inch drain that discharges at Reliez Valley Road.

Beneficial Uses

The Basin Plan identifies Walnut Creek as a “significant surface water” (RWQCB, 1995). As tributaries to Walnut Creek, Las Trampas Creek and San Ramon Creek are also considered significant surface waters. The Basin Plan designates existing beneficial uses of Walnut Creek and its tributaries as follows: cold freshwater habitat, fish migration, fish spawning, warm freshwater habitat, and wildlife habitat. Proposed beneficial uses are contact and noncontact water recreation. The RWQCB plans to conduct water quality monitoring in Walnut Creek in 2008 and 2009 as part of the Surface Water Ambient Monitoring Program (RWQCB, 2004c).

Water Quality

The RWQCB lists Walnut Creek as an impaired water body for diazinon from urban runoff (RWQCB, 2003d). Water quality monitoring in the Walnut Creek watershed was completed in 2001 and 2002 as part of the Surface Water Ambient Monitoring Program (RWQCB, 2004c).

Upper San Leandro/Moraga Creek Watershed

The Ardith Reservoir and Donald Pumping Plant, Fay Hill Pumping Plant and Pipeline Improvements, Fay Hill Reservoir, Moraga Reservoir, much of the Moraga Road Pipeline, and a portion of the St. Mary's Road/Rohrer Drive Pipeline are located in the Upper San Leandro/ Moraga Creek watershed of South Contra Costa County. This watershed comprises the upper portion of the larger San Leandro Creek watershed located in both Contra Costa and Alameda Counties. The portion of the watershed within Contra Costa County is 20.6 square miles. Major creeks within this watershed include Moraga Creek, San Leandro Creek, Laguna Creek, Redwood Creek, Indian Creek, Rimer Creek, Buckhorn Creek, and Callahan Creek (CCCWP and EOA, 2004). The southern extent of Orinda and a major portion of Moraga are located within this watershed. Impervious surfaces make up only 15 percent of the watershed land. This watershed contains protected watershed lands of EBMUD that buffer Upper San Leandro Reservoir. Laguna Creek, located along the proposed Moraga Road Pipeline alignment and portions of the proposed St. Mary's Road/Rohrer Drive Pipeline alignment, drains to San Leandro Reservoir.

Project Sites within the Upper San Leandro/Moraga Creek Watershed

Ardith Reservoir and Donald Pumping Plant. The proposed Ardith Reservoir and Donald Pumping Plant are located on a hillside, approximately one-half mile north of Moraga Creek, outside of mapped flood zones associated with the creek. An onsite stormwater sewer system serves this largely unpaved site. Stormwater is collected in an onsite catch basin and discharged to the storm sewer system along Leslee Lane via a 16-inch storm drain.

Fay Hill Pumping Plant and Pipeline Improvements. The Fay Hill Pumping Plant and Pipeline Improvements and proposed pipeline alignment are located approximately 200 feet and 600 feet to the east of Laguna Creek, respectively. Culverts contain the creek in this area, and both the pumping plant and proposed pipeline alignment are located outside of mapped flood zones. Stormwater collection systems along Rheem Boulevard and Moraga Road serve the pumping plant.

Fay Hill Reservoir. The Fay Hill Reservoir is located approximately one-quarter mile to the east of Laguna Creek and is elevated on a hillside. Culverts contain the creek in the vicinity of the reservoir, which is located outside of mapped flood zones. The site is paved within the fenced area and is served by an onsite stormwater collection system.

Moraga Reservoir. The Moraga Reservoir is located more than one-quarter mile to the east of Laguna Creek on a hillside, outside of mapped flood zones. The site is paved within the fenced area and is served by an onsite stormwater collection system.

Moraga Road Pipeline. The portion of the proposed Moraga Road Pipeline alignment between Draeger Drive to the south and Nemea Court to the north is located within the Upper San Leandro/Moraga Creek watershed. Within this segment, the proposed pipeline alignment is located within Moraga Road, which parallels Laguna Creek and crosses the creek near Woodford Drive. Although much of the creek is culverted, FEMA has mapped flood zones along Moraga Road; there is a shallow flood zone (Zone B) on Moraga Road in the vicinity of Ascot Drive and Donald Drive, and a 100-year flood zone with base flood elevations ranging from 603 to 619 feet on Moraga Road between approximately Buckingham Drive and Campolindo Drive. These flood zones are caused primarily by inadequate culvert capacity (FEMA, 1981b).

St. Mary's Road/Rohrer Drive Pipeline. The portion of the proposed St. Mary's Road/Rohrer Drive Pipeline alignment along Moraga Road and the portion on St. Mary's Road and Bollinger Canyon Drive are located within the Upper San Leandro/Moraga Creek watershed. The St. Mary's Road alignment crosses a tributary to Laguna Creek near the intersection of Moraga Road and St. Mary's Road, then parallels the tributary along much of St. Mary's Road and crosses the tributary again at Stafford Drive. The alignment crosses Las Trampas Creek immediately before crossing Bollinger Canyon Road. The alignment crosses two 100-year flood zones at the creek crossings (FEMA, 1981c).

Beneficial Uses

Existing beneficial uses for Upper San Leandro Reservoir include cold freshwater habitat, municipal and domestic supply, fish spawning, warm freshwater habitat, and wildlife habitat. Potential and limited beneficial uses include water contact recreation and noncontact water recreation. Although the Basin Plan identifies water contact recreation as a beneficial use for this reservoir, such activities are prohibited by EBMUD.

Water Quality

Water quality in the Laguna Creek was scheduled for monitoring as part of the Surface Water Ambient Monitoring Program in 2005 and 2006 (RWQCB, 2004c).

Baxter/Cerrito/Richmond Drainages

This 18.5-square-mile area is a series of sub-basins containing Baxter Creek and Cerrito Creek, two historically important East Bay waterways. Located in the southwest portion of Contra Costa County, the area encompasses the end of the southwest-facing slopes of the East Bay Hills in addition to the alluvial plain and flat land area west to San Francisco Bay. Richmond and El Cerrito are the two municipalities that cover most of the watershed, but Kensington (an unincorporated area in Contra Costa County) is located in the headwaters of Cerrito Creek.

San Pablo Pipeline

The proposed San Pablo Pipeline alignment would connect to the West of Hills water distribution system via the existing San Pablo Tunnel; this connection point is located in El Cerrito, within a highly urbanized area of the Baxter/Cerrito Creek watershed. There are no open creeks mapped within a mile, and the site is not within a mapped flood zone.

Alameda County Watersheds

The Upper San Leandro WTP is located approximately two miles to the north of Arroyo Viejo Creek, within the watershed for this creek. Originating in the hills to the east of Interstate 580, the creek is largely contained within underground culverts and engineered channels from the highway to the creek discharge point in the Oakland Estuary (Oakland Museum of California, 2005). Only short segments are contained within the natural channel.

Regulatory Framework

Construction in Waters of the State and the United States

The federal Clean Water Act and subsequent amendments, under the enforcement authority of the U.S. Environmental Protection Agency (U.S. EPA), was enacted "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters." The Clean Water Act gave the U.S. EPA the authority to implement pollution control programs such as setting wastewater standards for industry. The act also set water quality standards for surface waters and established the NPDES program to protect water quality. Under Section 402 of the act, discharge of pollutants to waters of the state is prohibited unless the discharge is in compliance with an NPDES permit. In California, the U.S. EPA has determined that the state's water pollution control program has sufficient authority to manage the NPDES program under California law in a manner consistent with the Clean Water Act. Therefore, implementation and enforcement of the NPDES program is conducted through the State Water Resources Control Board (SWRCB) and the nine RWQCBs. The San Francisco Bay Region of the RWQCB regulates water quality in San Francisco Bay under the Porter-Cologne Water Quality Control Act through regulatory standards and objectives set forth in the Basin Plan (RWQCB, 1995). The Basin Plan identifies existing and potential beneficial uses and provides numerical and narrative water quality objectives to protect those uses.

The California Department of Fish and Game (CDFG) has jurisdiction over any activity that could affect the bank or bed of any stream that has value to fish and wildlife. If any changes are proposed along a creek or waterway within its jurisdiction, a Streambed Alteration Agreement would be required under Fish and Game Code Section 1602 (refer to Section 3.6, Biological Resources, for additional information). Section 401 of the Clean Water Act provides the SWRCB and the RWQCBs with the regulatory authority to waive, certify, or deny any proposed federally permitted activity that could result in a discharge to surface waters of the state. To waive or certify an activity, these agencies must find that the proposed discharge will comply with state water quality standards, including protection of beneficial uses and water quality objectives. If these agencies deny the proposed activity, the federal permit cannot be issued. This water quality certification is generally required for projects involving the discharge of dredged or fill material to wetlands or other water bodies, which are described in Section 3.6.

Impaired Water Bodies and Total Maximum Daily Loads

In accordance with Section 303(d) of the Clean Water Act, states must present the U.S. EPA with a list of "impaired water bodies," defined as those water bodies that do not meet water quality

standards. The law requires the development of actions, known as total maximum daily loads (TMDLs), to improve the water quality of impaired water bodies. As stated above, the RWQCB has listed San Pablo Creek and Walnut Creek as impaired water bodies because of diazinon (RWQCB, 2003d). San Pablo Reservoir is also listed for mercury.

The RWQCB has found that Bay Area urban creeks do not consistently meet the Basin Plan's narrative water quality objectives pertaining to toxicity. In response, the RWQCB has adopted a Basin Plan amendment that establishes a water quality attainment strategy and TMDL to reduce diazinon and pesticide-related toxicity in urban creeks (RWQCB, 2005).[3] The amendment specifies a concentration target of 100 nanograms per liter (as a one-hour average) as well as generic pesticide-related toxicity targets to comply with the applicable water quality objectives established to protect and support beneficial uses.

The most important feature of the TMDL strategy is pollution prevention. For NPDES permits for urban runoff from sources such as industrial facilities, construction sites, Caltrans facilities, universities, and military installations, the TMDL requires implementation of best management practices (BMPs) and control measures to reduce pesticides in urban runoff. Control measures for construction and industrial sites are required to reduce discharges based on Best Available Technology Economically Achievable. NPDES permits for these sites must also implement certain general requirements and education and outreach activities as well as appropriate monitoring.

There is no schedule for developing a TMDL for mercury in San Pablo Reservoir.

NPDES Waste Discharge Regulations

The NPDES program requires all facilities that discharge pollutants into waters of the United States to obtain a permit. The discharge permit provides two levels of control for the protection of water quality: technology-based limits and water-quality-based limits. Technology-based limits are based on the ability of dischargers in the same category to treat wastewater, while water-quality-based limits are required if technology-based limits are not sufficient to provide protection of the water body. Water-quality-based effluent limitations required to meet water quality criteria in the receiving water are based on criteria specified in the National Toxics Rule, the California Toxics Rule, and the Basin Plan. NPDES permits must also incorporate TMDL waste load allocations when they are developed.

In 1972, the NPDES regulations initially focused on municipal and industrial wastewater discharges, followed by stormwater discharge regulations, which became effective in November 1990. NPDES permits for wastewater and industrial discharges specify discharge prohibitions and effluent limitations and also include other provisions (such as monitoring and reporting programs) deemed necessary to protect water quality. In California, the SWRCB and the RWQCBs implement and enforce the NPDES program.

[3] The TMDL has been adopted by the RWQCB, but will need to be approved by the SWRCB, Office of Administrative Law, and then the U.S. EPA. The Basin Plan amendment will become effective upon U.S. EPA approval.

Contra Costa Clean Water Program

The Contra Costa Clean Water Program was established as the local entity responsible for implementing compliance with the federal Clean Water Act to control stormwater pollution. It is comprised of Contra Costa County, 16 incorporated cities, and the Contra Costa County Flood Control and Water Conservation District. The program is being conducted in compliance with the municipal NPDES Permit No. CAS0029912 issued by the San Francisco Bay RWQCB (RWQCB, 1999). The permit contains a comprehensive plan to reduce the discharge of pollutants to the "maximum extent practicable" and mandated that participating municipalities implement an approved stormwater management plan by September 1, 1993. The program incorporates BMPs that include construction controls (such as a model grading ordinance), legal and regulatory approaches (such as stormwater ordinances), public education and industrial outreach (to encourage the reduction of pollutants at various sources), inspection activities, wet-weather monitoring, and special studies.

The RWQCB added provision C.3 to the stormwater permit in February 2003 (RWQCB, 2003a). In accordance with these updated requirements, new development and redevelopment projects are required to incorporate treatment measures and other appropriate source control and site design features to reduce the pollutant load in stormwater discharges and manage runoff flows. The required schedule for compliance is based on the size and type of project. Group 1 projects are required to comply with these requirements as of February 15, 2005. This group includes previously undeveloped sites and redevelopment projects that involve the creation or replacement of one or more acre of impervious surfaces. Group 2 projects must comply with these requirements by August 15, 2006.[4] These include new and redevelopment projects that involve the creation or replacement of 10,000 square feet or more of impervious surfaces.

The C.3 requirements are the same in all Contra Costa County municipalities, and the Contra Costa Clean Water Program has developed a guidebook for implementation of the C.3 requirements (CCCWP, 2005). However, specific procedures and application requirements may differ from one municipality to another. Municipalities are phasing in the requirements from 2004 through 2006. Projects completed in a public right-of way, such as pipeline projects proposed as part of the WTTIP, are exempt from the C.3 requirements when both sides of the right-of-way are developed.

Alameda Countywide Clean Water Program

Stormwater discharges in Alameda County are regulated under NPDES Permit No. CAS0029831 adopted in 1997. The RWQCB added provision C.3 to the stormwater permit in February 2003 (RWQCB, 2003b). As with Contra Costa County, this provision incorporates updated state and federal requirements related to the quantity and quality of stormwater discharges from new development and redevelopment projects. Stormwater discharges regulated by the NPDES permit are managed in accordance with the *Stormwater Management Plan* prepared by the Alameda Countywide Clean Water Program for the fiscal years of July 2001 through June 2008 (ACCWP, 2003). The plan addresses the following major program areas: regulatory compliance, focused

[4] According to the Contra Costa Clean Water Program Stormwater C.3 Guidebook (CCCWP, 2005), RWQCB staff have stated that projects creating less than one acre of impervious area will not be subject to the hydrograph modification management plan requirements.

watershed management, public information/participation, municipal maintenance activities, new development and construction controls, illicit discharge controls, industrial and commercial discharge controls, monitoring and special studies, control of specific pollutants of concern, and local agency program areas with performance standards.

Construction Stormwater NPDES Permit

The federal Clean Water Act effectively prohibits discharges of stormwater from construction projects unless the discharge is in compliance with an NPDES permit. The SWRCB is the permitting authority in California and has adopted a statewide General Permit for Stormwater Discharges Associated with Construction Activity (Construction General Permit) that encompasses one or more acres of soil disturbance (SWRCB, 1999). Construction activity includes clearing, grading, excavation, stockpiling, and reconstruction of existing facilities involving removal or replacement.

In general, the NPDES stormwater permitting requirements for construction activities require that the landowner and/or contractor submit a notice of intent and develop and implement a stormwater pollution prevention plan (SWPPP). The SWPPP includes a site map(s) showing the construction site perimeter, existing and proposed buildings, lots, roadways, stormwater collection and discharge points, general topography both before and after construction, and drainage patterns across the site. The SWPPP must also specify both the BMPs that will be used to protect stormwater runoff as well as the placement of those BMPs; a visual monitoring program; a chemical monitoring program for nonvisible pollutants to be implemented if there is a failure of BMPs; and a sediment monitoring plan if the site discharges directly to a water body listed as impaired for sediment. Measures for erosion and sediment control, construction waste handling and disposal, and post-construction erosion and sediment control should also be addressed, along with methods to eliminate or reduce non-stormwater discharges to receiving waters.

Construction Stormwater NPDES Permit for Small Linear Projects

The SWRCB considers certain projects involving underground and overhead utilities, such as the installation of infrastructure, to be small linear underground/overhead projects (referred to as small LUPs). Small LUPs have a lower potential to affect water quality via runoff than traditional construction projects because they are typically shorter in duration and constructed within or around paved surfaces, thus resulting in minimal exposed land area at the close of the construction day. To simplify the stormwater permitting process for these projects, the SWRCB has issued the statewide LUP General Permit for small LUPs that disturb more than one acre but less than five acres of land (SWRCB, 2003a). The LUP General Permit covers projects associated with private or municipal development projects, such as those performed by the LUP owner/ operator to relocate facilities in advance of pending developments or redevelopments or to provide new facilities.

Under the LUP General Permit, the owner/operator must submit the required notices; prepare a SWPPP specifying BMPs to control and reduce discharges of construction-related pollutants in

stormwater runoff into storm drains and receiving waters; eliminate or reduce non-stormwater discharges to the storm sewers and receiving waters; and monitor the construction site to ensure that all BMPs are implemented, maintained, and effective. Permit requirements, such as notification requirements, minimum SWPPP elements, and the amount and degree of monitoring, vary depending on the complexity of the small LUP.

Regionwide General NPDES Permit for Discharges from Surface Water Treatment Facilities for Potable Supply

The SWRCB has issued the Regionwide General NPDES Permit for Discharges from Surface Water Treatment Facilities for Potable Supply (Order No. R2-2003-0062, NPDES General Permit No. CAG382001) to regulate the quality of discharges from water treatment plants to surface waters (RWQCB, 2003c). Covered discharges include filter backwash water discharge and storage/settling basin discharge; discharges from treatment unit overflow and broken waterlines within the treatment facility; leakage water; treatment unit dewatering/drainage water; treatment system flushing water during startup after facility shutdown; onsite water storage facility drainage; and excess raw water released from the treatment facility. The requirements of this general permit supersede other stormwater permitting requirements regulating discharges to the storm sewer system at a covered facility.

Pollutants limited by the general permit include chlorine residual, solids, pH, and whole effluent acute toxicity. Other pollutants of concern include PCBs which may have been used in some water storage facilities; copper, which is added (as copper sulfate) to raw water reservoirs by some water agencies to control algal growth; and zinc, which is used as pipe coating, primer, or in galvanized-steel pipe for corrosion control.

The general permit requires dischargers to develop, update annually, and implement a site-specific BMP plan for preventing and controlling pollutant discharges. The purpose of the BMP plan is to: (1) control and abate discharges of pollutants from the facility to surface waters; (2) achieve compliance with Best Available Technology Economically Achievable or Best Conventional Pollutant Control Technology requirements; and (3) achieve compliance with applicable water quality standards. The general permit requires that all field personnel, onsite supervisors, and operators receive training on the site-specific BMP plan at least annually.

To obtain coverage under the general permit, the discharger must complete a notice of intent, including a description of all discharges that would be covered by the permit, water quality data for each discharge point, receiving water information, a site location map, a flow chart showing the general route taken by the effluent from intake to discharge, and a site-specific BMP plan. If the RWQCB determines that the proposed discharge is covered under the general permit, the RWQCB will authorize the discharge by issuing a notice of general permit coverage. All dischargers must comply with the self-monitoring program required by the general permit and must file annual reports in accordance with the standard provisions and reporting requirements for NPDES surface water discharge permits.

If the discharger plans any modifications or maintenance at the facility that could result in a violation of effluent limitations or an alteration of discharge locations, the discharger is required to submit a schedule for approval by the RWQCB 30 days before the changes are made. The schedule must include a description of the modifications or maintenance, including the altered discharge characteristic or location(s) and its purpose; the period of the modification or maintenance; and steps taken to reduce, eliminate, and prevent noncompliance.

Discharge of Chlorinated Water

Chlorine is toxic to aquatic life in both freshwater and saltwater. The SWRCB considers that every discharger using chlorine has the potential to cause acute aquatic toxicity due to total residual chlorine (TRC) in freshwater and chlorine-produced oxidants (CPO) in saltwater. However, the approach to regulating residual chlorine in discharges varies among regions; as a result, the SWRCB has proposed the Total Residual Chlorine and Chlorine-Produced Oxidants Policy of California to establish TRC and CPO objectives that apply to all inland surface waters, enclosed bays, and estuaries throughout the state to protect aquatic life beneficial uses; establish consistent procedures that apply to non-stormwater NPDES permits to regulate TRC and CPO discharges; and establish a basis for equitable compliance determination to adequately enforce violations of the TRC and CPO effluent limitations in non-stormwater NPDES permits (SWRCB, 2005). The policy will also establish monitoring and reporting requirements to demonstrate compliance with effluent limitations. If adopted, the requirements of this policy will supersede all other numeric TRC or CPO objectives and implementation provisions for TRC and CPO in existing Basin Plans.

Existing Permits and Discharges

Water Treatment Plant Discharges to Surface Water

Each of the WTPs has permitted discharges to surface water that are regulated under the Regionwide General NPDES Permit for Discharges from Surface Water Treatment Facilities for Potable Supply (EBMUD, 2003a through 2003e; RWQCB, 2003e, 2003f, 2003g, 2004a, and 2004b). The Orinda WTP is the only WTP permitted for routine discharges; all of the WTPs are permitted for nonroutine discharges. These discharges are further described below.

Routine Discharges at Orinda WTP

Routine discharges from the Orinda WTP to San Pablo Creek include: (1) excess raw water from the aqueducts through the south spillway (Mokelumne River water) and (2) intermittent flows from the backwash water treatment system. These effluents are monitored, dechlorinated, and settled prior to discharge, in accordance with the WTP BMP plan. Discharges from the backwash water treatment system occur daily. The average flow rate of the permitted discharge is 20 million gallons per day (mgd), and the maximum permitted rate is 150 mgd.

Excess Raw Water. The Lafayette Aqueducts are typically operated so that no chlorine residual remains in the water reaching the Orinda WTP. As a safeguard against nonroutine and/or emergency conditions that would prevent reducing the upstream chlorine dosage or that would result in chlorinated flows reaching the Orinda WTP, the operators also dechlorinate the raw

water flow as it approaches the Orinda WTP and as it is discharged to San Pablo Creek. Both dechlorination systems use a sodium bisulfite dechlorination solution that is stored in above-ground tanks inside the chemical building, then pumped from a day tank and transported to the application point through double-contained piping.

Online analyzers monitor the flows for chlorine residual, flow rate, and pH. Should a certain set point be exceeded, an alarm will sound within the operations building. The operators monitor dechlorination effectiveness by reviewing data from the analyzers and by collecting periodic grab samples and conducting chlorine residual and pH analyses.

Discharges of excess raw water were within specified discharge limitations for the most recent reporting period, from April 1, 2004 through March 31, 2005 (EBMUD, 2005).

Backwash Water Treatment System. Filter backwash water, filter waste gate leakage, and any spillage that may occur at the truck loading station while transferring the settled sludge to the tanker for disposal all flow by gravity to the backwash water treatment system. This facility consists of a backwash water channel through which water flows to a pumping station, a dechlorination injection point, and two settling basins. The dechlorination system uses a sodium bisulfite solution, delivered to the dechlorination injection point in the same manner as the dechlorination systems for the raw water discharges. The pumps operate intermittently depending on the level of water within the wetwell of the pump station, and the dechlorination system at the inlet of the settling basins operates only when the pumps operate.

The operators adjust the dechlorination chemical feed rate prior to backwashing by manually increasing the flow. Once backwashing is completed, the operators reset the dechlorination chemical feed rate to accommodate flows associated with waste gate leakage and spillage at the truck loading station.

Only one settling basin is in service at a time. Solids collect within the basin and the supernatant (clarified water) flows by gravity to San Pablo Creek. Depending on seasonal demands, a basin may be active for four to six weeks. When a basin is out of service, the operators clean it by using basin water cannons to push the sludge to the deepest end of the basin, decanting the excess water to the active basin, and then pumping the sludge to the truck loading station for transport to the EBMUD wastewater treatment plant, Special District No. 1, in Oakland.

Online analyzers monitor the flows for chlorine residual, flow, and pH. Should a certain set point be exceeded, an alarm will sound within the operations building. The operators monitor dechlorination effectiveness by reviewing data from the analyzers and by collecting periodic grab samples and conducting chlorine residual and pH analyses.

Between April 1, 2004 and March 31, 2005, discharges from the backwash water treatment system at the Orinda WTP exceeded discharge limitations on four occasions (EBMUD, 2005):

- On August 25, 2004, the pH of the discharge was 6.4, below the lower discharge limitation of 6.5.

- On October 18, 2004, the acute toxicity results indicated a 20 percent survival, which is lower than the single sample limit of 70 percent survival. A subsequent test showed 100 percent survival.

- On March 7, 2005, equipment failure at the backwash water wetwell resulted in the discharge of chlorinated water from the north spillway (a currently unused discharge location) into San Pablo Creek.

- On March 20, 2005, the acute toxicity test indicated 80 percent survival, which is lower than the three-sample median limit of 90 percent survival. A subsequent test showed 90 percent survival.

EBMUD reported these exceedances of discharge limitations to the RWQCB. The backwash water treatment system discharge was in compliance with all other discharge limitations during the reporting period.

Nonroutine Discharges at Lafayette, Orinda, and Walnut Creek WTPs

The Lafayette, Orinda, and Walnut Creek WTPs are permitted for nonroutine discharges, including emergency discharges due to broken water lines within the facility, process upsets or overflows due to equipment leaks, equipment failures or operator error, and stormwater releases. When these discharges occur, the operators dechlorinate the flow of water using sodium sulfite tablets that are stored at each WTP. The Orinda WTP discharges to San Pablo Creek; the Lafayette WTP discharges to Lafayette Creek; and the Walnut Creek WTP discharges to Grayson Creek. All creeks are sampled upstream and downstream of the discharge.

There were two nonroutine discharges from the Lafayette WTP between April 1, 2004 and March 31, 2005 (EBMUD, 2005). On April 20, 2004, approximately 300 gallons of water from the break of a 2-inch water line entered Lafayette Creek. Dechlorination tablets were placed within the stream of water in several locations. On September 16, 2004, there was an unplanned release of water to Lafayette Creek from filter number 1 due to a malfunctioning valve position switch. The quantity of water that was released to the creek is unknown, and no water quality effects were noted.

In June 2004, there were two nonroutine discharges from the Walnut Creek WTP. Both discharges involved water with no chlorine residual. In January 2005, another nonroutine discharge occurred from a leaking air relief valve on a water line. Dechlorination tablets were placed in the path of the flowing water, and approximately 3,000 gallons of dechlorinated water entered the storm drain and eventually Grayson Creek. No nonroutine discharges were reported for the Orinda WTP.

Nonroutine Discharges at Sobrante and Upper San Leandro WTPs

The Sobrante and Upper San Leandro WTPs are permitted for nonroutine discharges, including normally unplanned or emergency discharges of chlorinated water from sedimentation basins, filters, clarifiers, and reclaim basins; the raw water line; distribution lines or facility service lines; and discharges due to taste and odor issues. Other permitted nonroutine discharges include sludge and sediment from the sedimentation basins, clarifiers, and reclaim basins; raw water; and

stormwater releases. The Sobrante WTP is also permitted for nonroutine discharges of raw water from the San Pablo Reservoir. Data from previous nonroutine emergency releases indicate that the volume of the discharges from both WTPs may range from a few hundred gallons to several thousand gallons.

Nonroutine discharges and facility stormwater runoff from the Upper San Leandro WTP are discharged to a concrete culvert that daylights at Arroyo Viejo Creek, approximately two miles to the south. Nonroutine discharges and facility stormwater runoff from the Sobrante WTP are collected in the stormwater collection system. Prior to discharge to San Pablo Creek, the stormwater collection system is inspected, and collected water is tested for pH and chlorine residual. Any rain water collected in the chemical pipe chases is collected in a sump and tested for pH and chlorine residual prior to discharge to the stormwater collection system. There has been no evidence of erosion to the streambank at the point of discharge in either San Pablo or Arroyo Viejo Creeks.

At both the Sobrante and Upper San Leandro WTPs, chlorinated water spills may occur from the filters (through the filter backwash), reclaim basins, and sludge basins. In the event that a release of chlorinated water occurred, EBMUD would stop the activity causing the discharge, obtain samples of the water discharged, and, from a point downstream of the discharge to the creek, estimate the total flow rate and volume discharged. Samples would be analyzed for total suspended solids, pH, and total chlorine residual using field test methods. At the Upper San Leandro WTP, any discharge resulting from a filter overflow would flow into a pipe gallery that has a flood alarm. Spills from the reclaim basins and the sludge basins would flow overland to the storm drain system, and eventually to Arroyo Viejo Creek.

At the Upper San Leandro WTP, there were three nonroutine discharges of unaltered raw water from the Upper San Leandro Reservoir between April 1, 2004 and March 31, 2005 (EBMUD, 2005). These discharges are exempt from the requirements of the general permit. No nonroutine discharges were reported for the Sobrante WTP.

Releases from Water Storage Tanks

Discharge of potable water from a water storage tank at one of the WTPs would also be regulated under the Regionwide General NPDES Permit for Discharges from Surface Water Treatment Facilities for Potable Supply. As required by the permit, if a water storage facility would be dewatered, then EBMUD would submit a BMP plan to the RWQCB 30 days before the dewatering operation.

When needed for maintenance purposes, potable water and "tank heel"[5] from storage tanks not located at a WTP, such as the Fay Hill and Moraga Reservoirs, are typically discharged to the local sanitary sewer in accordance with the requirements of the local sanitary district, but could also be dechlorinated and discharged to the storm sewer or a nearby creek in accordance with RWQCB requirements. Both discharge locations may also require local city or county permits as well, depending on who owns the sewer lines.

5 "Tank heel" is the sediments remaining in a reservoir once the water has been drained.

EBMUD Construction Specifications

Section 01125 of the EBMUD construction specifications, Site Safety and Regulatory Requirements, specifies that all water from or flowing from a job site shall be of such purity and cleanliness as not to introduce any contaminants into any watercourse, stream, lake, reservoir, or storm drain system. To meet this objective, construction contractors are required to provide plans, procedures, and controls related to the discharge of water and the control of stormwater during construction.

Regarding the discharge of water, Section 01125 requires the contractor to submit a water control and disposal plan for the District's acceptance prior to any work at a job site. The plan must describe measures for containment, handling, and disposal of groundwater (if encountered), runoff of water used for dust control, stormwater runoff, tank heel, wash water, and construction water or other liquid that has come into contact with any interior surface of a reservoir or inlet/outlet pipeline. A sampling and analysis plan is required for sampling to characterize the planned discharge and the discharge must comply with regulations of the RWQCB, CDFG, county flood control districts, and any other regulatory agency having jurisdiction, whichever is most stringent.

Regarding stormwater control, the contractor must comply with the appropriate construction NPDES permit (Construction General Permit or LUP General Permit). The contractor must submit required notices, a construction SWPPP, and notices of termination to the District for acceptance prior to submittal to the SWRCB. The SWPPP must describe measures that would be implemented to prevent the discharge of contaminated stormwater from the job site. EBMUD monitors contractor compliance with the approved SWPPP.

Plans and Policies

Appendix D (Tables D-1 through D-7) identifies water quality goals and policies contained in the general plans for Contra Costa County, Lafayette, Oakland, Orinda, Moraga, and Walnut Creek, as well as water quality policies from the EBMUD *East Bay Watershed Master Plan*.

Each of the municipalities within the WTTIP project areas has adopted ordinances, subsequently incorporated into their municipal codes, for the protection of water quality during construction. The applicable municipal code sections are summarized in Table 3.5-1. In general, these municipalities have adopted:

- Watercourse protection regulations to restrict the discharge of polluted materials to watercourses and encroachment of new development into watercourses. Implementation of these requirements protects surface water and groundwater recharge areas from erosion, sedimentation, and other sources of pollution. These regulations often require an encroachment permit for work over, within, or under a watercourse and within the right-of-way of the municipality.

- Grading regulations to monitor construction projects to control sedimentation in streams and creeks and, ultimately, the Bay.

- Stormwater management and discharge control requirements to implement federal, state, and local requirements related to stormwater management.

TABLE 3.5-1
APPLICABLE MUNICIPAL CODE SECTIONS

Municipality	Code Section		
	Watercourse Protection and Encroachment Permits	**Grading and Erosion Control**	**Stormwater Management**
Lafayette	Title 5, Chapter 5-4, Stormwater Pollution Regulations	Title 3, Chapter 3-7, Grading	Title 5, Chapter 5-4, Stormwater Pollution Regulations
Moraga	Title 10 of the Contra Costa County Code, Division 1010, Drainage *Preparation of Town municipal code section underway as of April 2006.*	Title 7 of the Contra Costa County Code, Division 716, Grading *Preparation of Town municipal code section underway as of April 2006.*	Title 13, Chapter 13.04, Stormwater Management
Orinda	Title 18 of the Municipal Code, Chapter 18.03, Watercourse Maintenance, Alteration, and Protection	Title 15 of the Municipal Code, Chapter 15.36, Grading	Title 18 of the Municipal Code, Chapter 18.02, Stormwater Management and Discharge Control
Walnut Creek	Title 10 of the Contra Costa County Code, Division 1010, Drainage	Title 9 of the Municipal Code, Chapter 9, Site Development	Title 9 of the Municipal Code, Chapter 16, Stormwater Management and Discharge Control
Contra Costa County	Title 10 of the Contra Costa County Code, Division 1010, Drainage	Title 7 of the Contra Costa County Code, Division 716, Grading	Title 10 of the Contra Costa County Code, Division 1014, Stormwater Management and Discharge Control
Oakland	Title 13 of the Municipal Code, Chapter 13.16, Creek Protection, Stormwater Management, and Discharge Control	Title 15 of the Municipal Code, Chapter 04.780, Grading, Excavations, and Fills	Title 13 of the Municipal Code, Chapter 13.16, Creek Protection, Stormwater Management, and Discharge Control

3.5.3 Impacts and Mitigation Measures

Significance Criteria

For the purposes of this EIR and consistent with Appendix G of the CEQA Guidelines, a WTTIP project is considered to have a significant impact if it would:

- Violate any water quality standards or waste discharge requirements;
- Substantially deplete groundwater supplies or interfere substantially with groundwater recharge;
- Substantially alter the existing drainage patterns in a manner that would result in substantial erosion or siltation on or off the site;
- Substantially alter existing drainage patterns or substantially increase the rate or amount of surface runoff in a manner that would result in flooding on or off the site;
- Create or contribute runoff water that would exceed the capacity of existing or proposed stormwater drainage systems or provide substantial additional sources of polluted runoff;

- Substantially degrade water quality;
- Place housing within a 100-year flood hazard area;
- Place structures within a 100-year flood hazard area that would impede or redirect flood flows;
- Expose people or structures to a significant risk associated with flooding;
- Be subject to inundation by seiche, tsunami, or mudflow; or
- Contaminate a public water supply.

Based on project characteristics and the water resources in the area, no significant impacts are anticipated with respect to the following topics:

- *Drainage Patterns*. None of the proposed WTTIP projects would substantially alter long-term drainage patterns or the course or streambed of a creek or other water body. The proposed facilities were sited to avoid major long-term impacts to streambeds, creeks, and other water bodies.

- *Groundwater Resources and Recharge*. As discussed in Section 3.4, Geology, Soils, and Seismicity, although dewatering would be required during construction of the proposed Orinda-Lafayette Aqueduct, long-term dewatering would not be required because the aqueduct liner is considered impermeable, and the post-construction groundwater levels would return to pre-project conditions. Therefore, no substantive change in infiltration rates or groundwater recharge would occur during operation of the aqueduct. Water quality impacts related to the discharge of groundwater produced during construction dewatering are discussed in Impact 3.5-2, below.

  The proposed Orinda-Lafayette Aqueduct would carry high-quality drinking water, and long-term operation would not require the use of hazardous materials or other materials that could degrade water quality. Therefore, no long-term impact on groundwater quality is expected.

- *Public Water Supply*. Although some proposed WTTIP projects are located within the San Pablo Creek and Upper San Leandro/Moraga Creek watersheds, which contain protected watershed lands, compliance with legal requirements for stormwater management and hazardous materials storage during construction and operation would protect the water quality of drinking water supplies. Therefore, the proposed WTTIP projects would not affect a public drinking water supply.

- *100-Year Flood Zone*. The WTTIP does not propose the construction of housing, so there would be no impact related to the construction of housing within a 100-year floodplain.

- *Flooding from Failure of a Dam or Levee*. The proposed WTTIP projects would not cause flooding due to the failure of a dam or levee. Although the Orinda WTP and entry shaft of the Orinda-Lafayette Aqueduct are within the upstream fringe of possible inundation due to dam failure at the Briones Reservoir, the amount of inundation would likely be very low. The Lafayette WTP is also located adjacent to the zone of possible inundation due to dam failure at the Lafayette Reservoir; however, no structures would be built within the zone of possible inundation except for the Lafayette Reclaimed Water Pipeline. The proposed San Pablo Pipeline (evaluated at a program level) would also be constructed within the zone of possible inundation due to dam failure at the Briones Reservoir. However, the project would not include the construction of permanent structures within the zone of inundation, and construction activities within the zone of possible inundation would be limited. There is a very low likelihood that a dam failure would occur during the construction period.

- *Inundation by Seiche, Tsunami, or Mudflow*. The proposed WTTIP projects are not near large water bodies capable of generating a seiche or tsunami. Although Round Top, an ancient volcano, is located in Sibley Volcanic Regional Preserve to the west of Orinda, this volcano was active about 10 million years ago as a result of tectonic activity to the south of the Bay Area that has subsequently shifted north. The volcano is now extinct; therefore, none of the WTTIP projects are located near a volcano or other geologic feature capable of producing mudflows.

Impacts and Mitigation Measures

Project-Level Elements

Table 3.5-2 summarizes the significance determinations of identified hydrology and water quality impacts as they apply to each project facility.

Impact 3.5-1: Potential degradation of water quality from construction in or adjacent to creeks.

Construction activities for proposed WTTIP projects would generally be confined within existing roadways or would occur adjacent to developed areas, and direct disruption to creekbeds or surface waters would be limited. However, construction activities involving soil disturbance, such as excavation, stockpiling, and grading, adjacent to or near creeks or storm drains could result in increased erosion and sedimentation, particularly if construction were to occur during the rainy season.

Where construction or trenching activities would occur along the creek banks or would cross a creek, the potential for effects to creeks would increase due to the proximity of construction activities and the limited space for the construction easement. Sedimentation to the creeks would not only degrade water quality but could also increase channel siltation, reduce the flood-carrying capacity, and affect associated habitats. In addition, temporary storage of diesel and the use of construction equipment could accidentally release construction-related chemicals, such as oil, grease, and fuel, which could degrade water quality.

However, in accordance with Section 01125 of the EBMUD construction specifications (described in the Setting), the contractor would be required to:

- Prevent silt, eroded materials, construction debris, concrete or washings thereof, or hazardous substances from being introduced into any watercourse, stream, lake, reservoir, or storm drain system

- Ensure that water does not cause erosion of soil, including imported fill

- Ensure that the discharge of soil or other materials does not have an adverse effect on receiving waters or cause or contribute to a violation of water quality standards

TABLE 3.5-2
SUMMARY OF POTENTIAL PROJECT-LEVEL HYDROLOGY AND WATER QUALITY IMPACTS

Facility	Impact 3.5-1 Degradation of Water Quality during Construction	Impact 3.5-2 Groundwater Dewatering	Impact 3.5-3 Diversion of Flood Flows	Impact 3.5-4 Discharge of Chloraminated Water during Construction	Impact 3.5-5 Operational Discharge of Chloraminated Water	Impact 3.5-6 Change in Impervious Surfaces
Lafayette WTP						
Alternative 1	SM	LTS	–	LTS	LTS	LTS
Alternative 2	SM	–	–	LTS	–	LTS
Orinda WTP						
Alternative 1	SM	LTS	–	LTS	–	LTS
Alternative 2	SM	LTS	–	LTS	LTS	LTS
Walnut Creek WTP – *Alternative 1 or 2*	SM	LTS	–	LTS	–	LTS
Sobrante WTP – *Alternative 1 or 2*	SM	LTS	–	LTS	–	LTS
Upper San Leandro WTP – *Alternative 1 or 2*	SM	–	–	LTS	–	LTS
Orinda-Lafayette Aqueduct *Alternative 2*	SM	LTS	SM	LTS	–	LTS
Ardith Reservoir and Donald Pumping Plant	SM	–	–	–	LTS	SM
Fay Hill Pumping Plant and Pipeline Improvements	SM	–	–	–	–	LTS
Fay Hill Reservoir	SM	–	–	LTS	–	SM
Glen Pipeline Improvements	SM	LTS	–	–	–	LTS
Happy Valley Pumping Plant and Pipeline	SM	LTS	SM	–	–	LTS
Highland Reservoir and Pipelines	SM	LTS	–	–	LTS	SM
Lafayette Reclaimed Water Pipeline	SM	LTS	–	–	LTS	LTS
Leland Isolation Pipeline and Bypass Valves	SM	–	SM	–	–	LTS
Moraga Reservoir	SM	–	–	LTS	–	SM
Moraga Road Pipeline	SM	LTS	SM	–	–	LTS
Sunnyside Pumping Plant	SM	–	–	–	–	LTS
Tice Pumping Plant and Pipeline	SM	LTS	SM	–	–	LTS
Withers Pumping Plant	SM	–	–	–	–	LTS

SM = Significant Impact, Can Be Mitigated
SU = Significant Impact, Unavoidable
LTS = Less-Than-Significant Impact
– = No Impact

These requirements would apply to all proposed WTTIP projects, regardless of size; for projects that disturb one or more acres of land, the contractor would further be required by Section 01125 to comply with NPDES stormwater permitting requirements (LUP General Permit for small linear projects of one to five acres, and the Construction General Permit for pipeline projects greater than five acres and other projects one acre or more). In accordance with NPDES stormwater permitting requirements, the contractor(s) would submit the required notices, develop a SWPPP, and implement site-specific BMPs in accordance with the SWPPP to control and reduce discharges of construction-related sediments and pollutants in stormwater runoff into storm drains and any receiving waters. The SWPPP would also include protection measures for the temporary onsite storage of diesel fuels used during construction. The protection measures would include requirements for secondary containment and berming of the diesel storage area or any chemical storage areas to contain a potential release and to prevent any such release from reaching an adjacent waterway or stormwater collection system. Non-stormwater discharges to the storm sewers and receiving waters would be eliminated or reduced and monitoring would be conducted to ensure that all BMPs are implemented, maintained, and effective. The control measures would also be consistent with the Contra Costa Clean Water Program.

With compliance with EBMUD construction specifications, including compliance with NPDES stormwater permitting requirements and implementation of Measures 3.5-1a and 3.5-1b where pertinent, water quality impacts related to construction adjacent to and through creeks would be less than significant. Leakage of fuels, oils, and hydraulic fluids from construction equipment can contaminate soil and subsequently contaminate stormwater when rainwater comes into contact with the contaminated soil. As specified in Measure 3.5-1a, the contractor would be required to contain surface runoff and control leakage of hydraulic fluids, oil, grease, or fuels from reaching an adjacent waterway or stormwater collection system.

Any construction under or across creek channels would occur within the right-of-way of the Contra Costa County Flood Control and Water Conservation District, and such construction could require an encroachment permit from the County, as specified in Measure 3.5-1b. This permit would require proof of correspondence with the CDFG and U.S. Army Corps of Engineers to assure that construction activities were in compliance with applicable regulations of those agencies with jurisdiction over wetlands or streambeds. Any crossing of Flood Control District or County drainage facilities would require a 5-foot minimum vertical clearance. The drainage ordinances for the various city or county jurisdictions would be accommodated to the maximum extent possible.

The expected area of construction disturbance and major stream crossings are identified below for each project. Applicable measures for each proposed project are listed in Table 3.5-3. Water quality impacts related to construction in and near creeks and water bodies would be less than significant for all WTTIP projects with incorporation of the applicable requirements and/or measures.

TABLE 3.5-3
SUMMARY OF APPLICABLE REQUIREMENTS/MEASURES – IMPACT 3.5-1

Facility	Implement Erosion Control Measures	Compliance with NPDES Permit Requirements	Control of Hydraulic Fluids (Measure 3.5-1a)	Encroachment Permit (Measure 3.5-1b)
Lafayette WTP				
Alternative 1	–	✓	✓	✓
Alternative 2	✓	–	✓	–
Orinda WTP				
Alternative 1	✓	✓	✓	–
Alternative 2	✓	✓	✓	–
Walnut Creek WTP				
Alternative 1 or 2	✓	–	✓	–
Sobrante WTP				
Alternative 1 or 2	✓	✓	✓	–
Upper San Leandro WTP				
Alternative 1 or 2	✓	–	✓	–
Orinda-Lafayette Aqueduct				
Alternative 2	✓	✓	✓	✓
Ardith Reservoir and Donald Pumping Plant	✓	–	✓	–
Fay Hill Pumping Plant and Pipeline Improvements	✓	–	✓	–
Fay Hill Reservoir	–	✓	✓	–
Glen Pipeline Improvements	✓	–	✓	✓
Happy Valley Pumping Plant and Pipeline	–	✓	✓	✓
Highland Reservoir and Pipelines	–	✓	✓	✓
Lafayette Reclaimed Water Pipeline	✓	–	✓	✓
Leland Isolation Pipeline and Bypass Valves	✓	–	✓	–
Moraga Reservoir	–	✓	✓	–
Moraga Road Pipeline	–	✓–	✓	✓
Sunnyside Pumping Plant	✓	–	✓	–
Tice Pumping Plant and Pipeline	–	✓	✓	✓
Withers Pumping Plant	✓	–	✓	–

Lafayette WTP

Alternative 1

Construction of proposed improvements at the Lafayette WTP under Alternative 1 would involve the temporary disturbance of approximately nine acres of the 15.7-acre site, all within the property boundaries. Lafayette Creek traverses the southern portion of the property, and a small tributary to Lafayette Creek crosses Mt. Diablo Boulevard. As summarized in Table 3.5-4, the Bryant and Leland Pipelines would cross Lafayette Creek and its tributary. Construction activities could result in discharges of construction-related sediments and pollutants to Lafayette Creek and its tributary, either directly or through the tributary or onsite stormwater system.

TABLE 3.5-4
CREEK CROSSINGS ASSOCIATED WITH PIPELINE ALIGNMENTS

	Construction Method		
Creek Crossing	**Microtunnel**	**Open-Cut Trench**	**Jack and Bore**
Lafayette WTP (Alternative 1)			
Lafayette Creek		✓	
Intermittent tributary		✓	
Orinda-Lafayette Aqueduct			
Two tributaries to San Pablo Creek	✓		
Three seasonal drainages		✓	
Hidden Valley Creek			✓
Tributary to Lafayette Creek		✓	
Lafayette Creek		✓	
Lauterwasser Creek	✓		
San Pablo Creek	✓		
Glen Pipeline Improvements			
Intermittent tributary		✓	
Happy Valley Pipeline			
Lauterwasser Creek		✓	
Three tributaries		✓	
Highland Pipelines			
Lafayette Creek		✓	
Lafayette Reclaimed Water Pipeline			
Lafayette Creek		✓	
Moraga Road Pipeline			
Laguna Creek		✓	
Seasonal drainages and tributaries		✓	
Tice Pipeline			
Las Trampas Creek		✓	

Alternative 2

Proposed construction activities at the Lafayette WTP under Alternative 2 would disturb less than one acre of land. Regardless, disturbance could result in the discharge of construction-related sediments and pollutants to Lafayette Creek, either directly or through the tributary or onsite stormwater system.

Orinda WTP

Alternative 1

Construction of proposed improvements at the Orinda WTP under Alternative 1 would involve temporary land disturbance of over one acre, all within the property boundaries adjacent to and mainly south of Manzanita Drive. The Orinda WTP is situated directly adjacent to San Pablo Creek, and construction activities could result in the discharge of construction-related sediments and pollutants to San Pablo Creek, either directly or through the onsite stormwater system.

Alternative 2

Proposed construction activities at the Orinda WTP under Alternative 2 would involve land disturbance and would encompass much of the 22.4-acre site north of Manzanita Drive as well as the area south of Manzanita Drive that would be temporarily disturbed under Alternative 1. Similar to Alternative 1, construction activities could result in the discharge of construction-related sediments and pollutants directly to San Pablo Creek and through the nearby seasonal streams or the onsite stormwater system.

Walnut Creek WTP – Alternative 1 or 2

Proposed construction at the Walnut Creek WTP would require temporary disturbance of less than one acre within the property boundaries. The Walnut Creek WTP is situated directly over a culverted tributary to Grayson Creek, and construction-related sediments and pollutants could be discharged to the creek, either directly or through the onsite stormwater system.

Sobrante WTP – Alternative 1 or 2

Proposed construction activities at the Sobrante WTP would involve temporary disturbance of more than one acre within the property boundaries. Construction-related sediments and pollutants could be discharged to San Pablo Creek directly or indirectly through the onsite stormwater system.

Upper San Leandro WTP – Alternative 1 or 2

Proposed construction at the Upper San Leandro WTP would involve temporary disturbance of less than one acre within the property boundaries. Although the Upper San Leandro WTP is not directly adjacent to the creek, construction-related sediments and pollutants could be discharged to Arroyo Viejo Creek indirectly through the onsite stormwater system.

Orinda-Lafayette Aqueduct – Alternative 2

Construction of the proposed Orinda-Lafayette Aqueduct would include temporary land disturbance of over two acres at the aqueduct entry shaft, and over five acres for the exit shaft and construction of the pipeline. The entry shaft would involve construction and handling of large quantities of aqueduct muck within 300 feet of San Pablo Creek. As summarized in Table 3.5-4, the microtunnel connecting the Orinda-Lafayette Aqueduct to the Los Altos Pumping Plant would cross under both tributaries to San Pablo Creek at the Orinda WTP. The pipeline would cross three seasonal drainages, would cross under Hidden Valley Creek using jack-and-bore construction at the eastern end of the alignment, and would cross Lafayette Creek and its tributary before joining the Lafayette WTP. The tunnel portion of the Orinda-Lafayette Aqueduct would cross Lauterwasser Creek and San Pablo Creek 50 to 100 feet below these creeks. Construction activities would include grading, earthmoving operations, and soil stockpiling that would potentially result in the discharge of construction-related sediments and pollutants to San Pablo Creek and its tributaries and Lauterwasser Creek near the Orinda WTP and to Hidden Valley Creek and Lafayette Creek at the aqueduct exit shaft and east end of the pipeline alignment.

Ardith Reservoir and Donald Pumping Plant

Construction activities at the proposed Ardith Reservoir and Donald Pumping Plant would involve temporary land disturbance of less than one acre. Construction activities could potentially result in the discharge of construction-related sediments and pollutants to the storm sewer system.

Fay Hill Pumping Plant and Pipeline Improvements

Construction activities at the proposed Fay Hill Pumping Plant and Pipeline Improvements would occur entirely within the pumping plant, and no soil excavation would be required. Installation of the Fay Hill Pipeline would involve temporary land disturbance of approximately 0.2 acre. Although Laguna Creek is culverted and located one-quarter mile to the west of the Fay Hill Pipeline alignment, construction activities could result in the discharge of construction-related sediment and pollutants to the storm sewer system.

Fay Hill Reservoir

Proposed replacement of the Fay Hill Reservoir would involve temporary disturbance of approximately four acres within the property boundaries. Although the reservoir is not directly adjacent to any creeks, construction-related sediments and pollutants could be discharged to the onsite stormwater system.

Glen Pipeline Improvements

Construction of the proposed Glen Pipeline Improvements would involve temporary land disturbance of less than one acre. Much of the pipeline alignment parallels Happy Valley Creek and construction would occur within 240 feet of the creek. In addition, the proposed alignment along crosses a concrete-lined intermittent tributary to Happy Valley Creek. Construction activities could result in the discharge of construction-related sediments and pollutants to Happy Valley Creek, to its tributary, or to the stormwater system in this area.

Happy Valley Pumping Plant and Pipeline

Construction of the proposed Happy Valley Pumping Plant and Pipeline would involve temporary land disturbance of approximately three acres. Between Oak Arbor Road and Sleepy Hollow Lane, the proposed pipeline alignment parallels Lauterwasser Creek and is adjacent to the creek at its closest point. As summarized in Table 3.5-4, the proposed pipeline alignment crosses Lauterwasser Creek near Sleepy Hollow Lane and three tributaries using open-trench installation methods. The proposed pumping plant is located immediately adjacent to Lauterwasser Creek and a tributary. Construction activities could result in the discharge of construction-related sediments and pollutants to the creeks or to the storm sewer system.

Highland Reservoir and Pipelines

Construction of the proposed Highland Reservoir and Pipelines would involve temporary land disturbance of approximately three acres. The proposed reservoir site is approximately 1,000 feet north of the Lafayette Reservoir. As summarized in Table 3.5-4, the proposed pipeline alignment

crosses Lafayette Creek adjacent to the Lafayette WTP. Construction activities could result in the discharge of construction-related sediments and pollutants to Lafayette Reservoir at Highland Reservoir, to Lafayette Creek at the pipeline crossing location, or to the storm sewer system where the pipeline crosses paved areas and Mt. Diablo Boulevard.

Lafayette Reclaimed Water Pipeline

Extending from the Lafayette WTP to the Lafayette Reservoir, the proposed Lafayette Reclaimed Water Pipeline will primarily be constructed concurrently and co-located with other pipeline projects (the Bryant and Leland Pipelines or the Orinda-Lafayette Aqueduct, as well as with the Highland Reservoir Inlet/Outlet and overflow pipelines). As summarized in Table 3.5-4, the proposed pipeline alignment crosses Lafayette Creek adjacent to the Lafayette WTP. Construction activities associated with the pipeline crossing would involve temporary land disturbance of less than one-acre and could result in the discharge of construction-related sediments and pollutants to Lafayette Creek. Impacts to Lafayette Reservoir at the overflow pipeline terminus or to the storm sewer system where the pipeline crosses paved areas and Mt. Diablo Boulevard are discussed under Impact 3.5-5.

Leland Isolation Pipeline and Bypass Valves

Construction of the proposed Leland Isolation Pipeline would involve temporary land disturbance of approximately 0.3 acre. Although the proposed pipeline location is approximately 1,000 feet from Walnut Creek, construction activities could potentially result in the discharge of construction-related sediments and pollutants to the storm sewer system.

Construction of the proposed Leland Bypass Valves would involve land disturbance of less than one acre near the Danville Pumping Plant. Construction activities would occur near San Ramon Creek and a small drainage along the eastern property boundary of the pumping plant. Construction activities could potentially result in the discharge of construction-related sediments and pollutants to the nearby drainage or to the storm sewer system.

Moraga Reservoir

Proposed replacement of the Moraga Reservoir would involve temporary land disturbance of approximately three acres. Although the reservoir is more than one-quarter mile from Laguna Creek, and the creek is culverted, construction activities could result in the discharge of construction-related sediments and pollutants to the onsite storm sewer system.

Moraga Road Pipeline

Construction of the proposed Moraga Road Pipeline would involve temporary land disturbance of over seven acres. As summarized in Table 3.5-4, the proposed pipeline crosses Laguna Creek near Woodford Drive and several seasonal drainages using open-trench construction. Construction across the creeks could result in the discharge of construction-related sediments and pollutants to the creeks. Along the entire pipeline alignment within Moraga Road, construction

activities could result in the discharge of construction-related sediments or pollutants to the storm sewer system or directly or indirectly to Laguna Creek and Lafayette Creek.

Sunnyside Pumping Plant

Construction of the proposed Sunnyside Pumping Plant would involve temporary land disturbance of approximately 0.5 acre. Although the proposed pumping plant site is approximately 600 feet from Happy Valley Creek, potential water quality effects could occur as a result of construction.

Tice Pumping Plant and Pipeline

Construction of the proposed Tice Pumping Plant and Pipeline would involve approximately 1.5 acres of temporary land disturbance. As summarized in Table 3.5-4, the pipeline crosses Las Trampas Creek near Calvin Court using open-trench construction. Construction across the creek could result in the discharge of construction-related sediments and pollutants to Las Trampas Creek. Construction at the pumping plant site and at other pipeline locations could result in the discharge of construction-related sediments or pollutants to the storm sewer system.

Withers Pumping Plant

Construction of the proposed Withers Pumping Plant would involve temporary land disturbance of approximately 0.6 acre. The proposed pumping plant is located within 200 feet of a tributary to Grayson Creek, and construction activities could result in the discharge of construction-related sediments or pollutants to the creek or to the storm sewer system.

Mitigation Measures

Measure 3.5-1a: EBMUD will incorporate into contract specifications the requirement for the grading of construction staging areas to contain surface runoff so that contaminants such as oil, grease, and fuel products do not drain towards receiving waters. If heavy-duty construction equipment is stored overnight at the construction staging areas, drip pans will be placed beneath the machinery engine block and hydraulic systems to prevent any leakage from entering runoff or receiving waters.

Measure 3.5-1b: For construction adjacent to or crossing any creeks or drainage channels, EBMUD or the contractor will obtain an encroachment permit from the Contra Costa County Flood Control and Water Conservation District. Construction activities by EBMUD and its contractor(s) will comply with CDFG and the U.S. Army Corps of Engineers requirements pertaining to wetlands or streambeds, including associated water quality protection requirements of the RWQCB.

Impact 3.5-2: Degradation of water quality from dewatering.

Excavation for some proposed WTTIP projects could require groundwater dewatering and discharge to adjacent surface waters; depending on the quality of the groundwater, such discharge to surface waterways could affect surface water quality. As summarized in Section 3.11, Hazards and Hazardous Materials, Impact 3.11-1, and in the Setting, the contractor would be required by Section 01125 of the EBMUD construction specifications to prepare a water control and disposal plan for the discharge, identifying the appropriate disposal method for groundwater produced during dewatering, in compliance with the regulations of the RWQCB, CDFG, county flood control districts, and any other regulatory agency having jurisdiction. With preparation of the water control and disposal plan for the discharge, including compliance with regulatory requirements, as required by EBMUD construction specifications, water quality impacts related to construction dewatering would be less than significant for all projects requiring dewatering, and no mitigation is required.

The potential for dewatering at each proposed WTTIP site is evaluated below.

Lafayette WTP

Alternative 1

Construction of the proposed clearwells, chlorine contact basin, backwash water recycling system, and Bryant Pumping Plant would require excavation to depths ranging from approximately 25 to 50 feet, and it is likely that construction dewatering would be required. Discharge of groundwater could adversely affect water quality in Lafayette Creek and other surface waters.

Alternative 2

There would be limited soil excavation required at the Lafayette WTP under Alternative 2, and construction dewatering would not likely be required. Therefore, there is no impact related to dewatering.

Orinda WTP

Alternative 1

Construction of the proposed backwash water recycling system would require excavation to a depth of up to 25 feet, and it is likely that dewatering would be required. Discharge of groundwater could adversely affect water quality in San Pablo Creek and other surface waters, including San Pablo Reservoir.

Alternative 2

Alternative 2 would include construction of a proposed new clearwell to a depth of 70 feet and the Los Altos Pumping Plant to a depth of 80 feet, as well as construction of the backwash water recycling system (described under Alternative 1), and it is likely that groundwater dewatering

could be required. Discharge of groundwater could adversely affect water quality in San Pablo Creek and other surface waters, including San Pablo Reservoir.

Walnut Creek WTP – Alternative 1 or 2

Construction of the proposed new filters under both alternatives would require excavation to a depth of approximately 25 feet, and it is likely that dewatering could be required. Discharge of groundwater could adversely affect surface water quality in the tributary to Grayson Creek.

Sobrante WTP – Alternative 1 or 2

Construction of the proposed chlorine contact basin would require excavation to a depth of approximately 30 feet, and it is likely that dewatering could be required. Discharge of groundwater could adversely affect water quality in San Pablo Creek and other surface waters.

Upper San Leandro WTP – Alternative 1 or 2

The only improvement that would require substantial excavation at this WTP is the proposed filter-to-waste equalization basin, requiring limited soil excavation to a maximum depth of approximately 3 feet. Therefore, there is no impact related to dewatering.

Orinda-Lafayette Aqueduct – Alternative 2

Construction of the proposed aqueduct would occur below the water table, and during construction, groundwater would seep into the aqueduct and shafts. Although a detailed hydrogeologic study would be performed to estimate groundwater flow rates, for planning purposes the average groundwater flow rate is estimated at 100 gallons per minute, and the maximum flow rate is estimated at 350 gallons per minute. Discharge of groundwater could adversely affect surface water quality in Lafayette Creek, San Pablo Creek, and Lauterwasser Creek.

Ardith Reservoir and Donald Pumping Plant

Construction of proposed Ardith Reservoir and Donald Pumping Plant would each require excavation to a depth of approximately 15 feet. This site is located on a hillside at an elevation of about 750 feet. Based on the topography of this site, it is unlikely that dewatering would be required. Therefore, there is no impact related to dewatering.

Fay Hill Pumping Plant and Pipeline Improvements

No excavation would be required for proposed improvements to the Fay Hill Pumping Plant. Construction of the proposed Fay Hill Pipeline Improvements would require excavation to a depth of 5 feet on a portion of Rheem Boulevard that is elevated from Moraga Boulevard. Based on the shallow depth of excavation and the topography, it is unlikely that dewatering would be required. Therefore, there is no impact related to dewatering.

Fay Hill Reservoir

The proposed Fay Hill Reservoir would be constructed in the footprint of the existing reservoir, and limited excavation would be required. Because this site is located on the top of a hill, it is unlikely that dewatering would be required. Therefore, there is no impact related to dewatering.

Glen Pipeline Improvements

Construction of the proposed Glen Pipeline Improvements would require excavation to a depth of 5 feet. It is possible that dewatering could be required in some portions of the pipeline alignment. Discharge of groundwater could adversely affect surface water quality.

Happy Valley Pumping Plant and Pipeline

Construction of the proposed Happy Valley Pumping Plant would require excavation to a depth of less than 10 feet. Because this site is located higher than the nearby creeks, it is unlikely that dewatering would be required. Construction of the Happy Valley Pipeline would require excavation to a depth of 5 feet. Because the pipeline alignment is close to Lauterwasser Creek and crosses it in one location, it is likely that dewatering would be required. Discharge of groundwater could adversely affect surface water quality.

Highland Reservoir and Pipelines

Construction of the proposed Highland Reservoir would require excavation to a maximum depth of approximately 30 feet. Because this site is located on a hill and the final depth of excavation would be over 70 feet higher than the nearby Lafayette Reservoir, it is unlikely that dewatering would be required. Construction of the pipeline would require excavation to a depth of 5 feet, and it is likely that dewatering would be required where the pipeline crosses Lafayette Creek near the Lafayette WTP. Discharge of groundwater could adversely affect water quality in Lafayette Creek and other surface waters.

Lafayette Reclaimed Water Pipeline

Similar to the inlet/outlet pipeline for the Highland Reservoir, construction of the proposed Lafayette Reclaimed Water Pipeline would require excavation to a depth of about 5 feet, and it is likely that dewatering would be required where the pipeline crosses Lafayette Creek near the Lafayette WTP. Discharge of groundwater could adversely affect water quality in Lafayette Creek and other surface waters.

Leland Isolation Pipeline and Bypass Valves

Construction of the proposed Leland Isolation Pipeline and Bypass Valves would require excavation to a maximum depth of 7 feet. Based on this depth of excavation, it is unlikely that dewatering would be required. Therefore, there is no impact related to dewatering.

Moraga Reservoir

The proposed Moraga Reservoir would be constructed within the footprint of the existing reservoir, and limited soil excavation would be required. Because the final depth of excavation is over 100 feet higher than Laguna Creek to the west, it is unlikely that dewatering would be required. Therefore, there is no impact related to dewatering.

Moraga Road Pipeline

Construction or the proposed Moraga Road Pipeline would require excavation to depths of 12+ feet, and the pipeline would be installed using jack and bore beneath Rheem Boulevard. Because the pipeline alignment is close to Laguna Creek, and crosses Laguna Creek near Madrone Drive as well as seasonal drainages and tributaries, it is likely that dewatering would be required. Discharge of groundwater could adversely affect water quality in Laguna Creek and other surface waters.

Sunnyside Pumping Plant

Construction of the proposed Sunnyside Pumping Plant would require excavation to a depth of less than 10 feet, and dewatering would not likely be required. Therefore, there is no impact related to dewatering.

Tice Pumping Plant and Pipeline

Construction of the proposed Tice Pumping Plant would require excavation to a maximum depth of approximately 25 feet, and construction of the pipeline would require excavation to a depth of approximately 7 feet. Based on the depth of excavation required for the pumping plant and because the pipeline crosses Las Trampas Creek, it is likely that dewatering would be required. Uncontrolled discharge of groundwater could adversely affect water quality in Las Trampas Creek and other surface waters. However, compliance with Section 01125 of the EBMUD construction specifications will avoid the impact.

Withers Pumping Plant

Construction of the proposed Withers Pumping Plant would require excavation to a depth of 15 feet. Although this pumping plant is located near an unnamed tributary to Grayson Creek that parallels Reliez Valley Road, dewatering would not likely be required because the final depth of excavation would be approximately 15 feet higher than the creek. Therefore, there is no impact related to dewatering.

Impact 3.5-3: Construction in 100-year flood zones.

This impact applies to the proposed Orinda-Lafayette Aqueduct, Happy Valley Pipeline, Leland Isolation Pipeline and Bypass Valves, Moraga Road Pipeline, and Tice Pipeline. Construction within existing 100-year flood zones could impede flood flows and discharge sediments and

pollutants to flood flows if a flood occurred during construction. Construction activities requiring the excavation and stockpiling of soil in a 100-year flood zone could impede and redirect storm flows and contribute sediment to flood flows if a flood occurred during construction. Hazardous materials and debris could also be released to flood flows if construction diesel tanks, hazardous materials, or other construction materials were stored in a flood zone. However, EBMUD would require in their construction contract specifications that the contractor(s) include a measure in the SWPPP prepared for the project prohibiting the stockpiling of soil, storage of hazardous materials, and stockpiling of construction materials in flood zones during the rainy season, as specified in Measure 3.5-3. With implementation of this measure, water quality impacts related to conducting construction in 100-year flood zones would be less than significant.

Although 100-year flood zones are mapped adjacent to the Orinda WTP and Sobrante WTP, and Lafayette Creek crosses the Lafayette WTP, construction at these sites would occur at elevations higher than the base flood elevation.

Mitigation Measure

> **Measure 3.5-3:** EBMUD will require in their construction contract specifications that the contractor(s) include a measure in their erosion control plan or SWPPP prepared for the project prohibiting the stockpiling of soil, storage of hazardous materials, and stockpiling of construction materials in flood zones during the rainy season, typically between October 1 and May 1.

Impact 3.5-4: Discharge of chloraminated water to surface water during construction.

Discharge of treated water and tank heel during reservoir replacement as well as treated water discharge in the event of an accidental pipeline break at a WTP could result in a release of chlorinated water and sediments to a nearby surface water. The Basin Plan prohibits the discharge of chlorine or other substances that are toxic to aquatic organisms into reservoirs, creeks, or other waters of the state.

Fay Hill Reservoir and Moraga Reservoir, which contain treated water, would need to be drained prior to demolition. In accordance with established EBMUD procedures, when a reservoir is drained, the water level drops about 1 to 3 feet above the bottom through consumption or pumping. In accordance with construction specification Section 01125, the contractor would be required to prepare a water control and disposal plan for the remaining water and potential sediments, known as tank heel. The liquid would not be discharged until it has been sampled in accordance with a sampling and analysis plan and the results submitted to EBMUD. Once sampled, the liquid and tank heel would be discharged in accordance with the water control and disposal plan, typically to the sanitary sewer, in compliance with a discharge permit from the local sanitary district; however, the liquid and tank heel could be dechlorinated and discharged to the storm drain or creek in accordance with RWQCB requirements, with settling or other treatment to remove the solids. Reservoir water might also be discharged. In accordance with

Section 01125 of the construction specifications, the contractor would be responsible for verifying that the discharge has a nondetectable total chlorine residual and a pH greater than 6.5 and less than 8.5.

In addition, construction at the WTPs could result in an accidental, or nonroutine, discharge of chlorinated water to an adjacent creek or storm drain. However, each of the water treatment plants is permitted for nonroutine discharges of water under the Regionwide General NPDES Permit for Discharges from Surface Water Treatment Facilities for Potable Supply, and the discharge would be conducted in accordance with the site-specific BMP plan that has been approved by the RWQCB. Therefore, water quality impacts related to an accidental release of treated water from the Lafayette WTP, Orinda WTP, Walnut Creek WTP, Sobrante WTP, and Upper San Leandro WTP, including work associated with the proposed Orinda-Lafayette Aqueduct at the Orinda and Lafayette WTPs, would be less than significant through permit compliance.

Operational Impacts

Impact 3.5-5: Operational discharges of chloraminated water to surface water.

As a result of implementation of the WTTIP, operational discharges of chloraminated water would occur from new reservoirs and clearwells and from the filter backwash water recycle system at the Lafayette WTP under the Lafayette Reclaimed Water Pipeline project. While chloramine is an effective disinfectant for potable water, discharge of chloraminated water into natural waters can be detrimental due to the toxicity of chlorine, ammonia, and chloramine to aquatic organisms. Chlorine residuals (both free and combined) are acutely toxic to aquatic organisms at low concentrations and are persistent due to their stability. The Basin Plan standard for residual chlorine is 0.0 milligrams per liter; thus, dechlorination of a discharge would be required in order to remove all residual chlorine prior to discharge to surface waters, and to assure compliance with RWQCB requirements. Chloramine is regulated in the Basin Plan as a form of chlorine. In the temperature and pH range of natural waters, ammonia exists predominately in its nontoxic form and, in general, ammonia in chloraminated discharges would be diluted or degraded to a nontoxic form fairly rapidly.

Continuous discharges, such as those that could occur under the proposed Lafayette Reclaimed Water Pipeline project, have the potential to cause temperature changes that can result in thermal shock to aquatic organisms during some times of the year if there is a sufficient difference between the temperature of the discharge and receiving water and without adequate mixing.

Nitrogen loading can also occur in a still water body (such as a lake) if chloramine is released into the water body and the ammonia becomes free and oxidized to form nitrate, which is an available nutrient form for plant uptake. An increase in nutrient availability can produce higher aquatic plant growth, such as an increase in algae. Although algal blooms usually pose no direct health effects to humans, some species of algae flourish in highly eutrophic[6] waters and can develop

6 Eutrophic water is water that is enriched with nutrients, including nitrogen and phosphorous.

noxious blooms that cause offensive tastes and odors. Excessive algal growth may also deplete dissolved oxygen and cause toxic conditions for fish. Depending on such factors as the location, design, timing, and volume, discharges could also result in erosional effects to surface water bodies.

However, as described below, all operational discharges to a surface water body would be dechlorinated prior to discharge to conform to Basin Plan standards for chlorine residual, and the proposed discharges from the Lafayette Reclaimed Water Pipeline would be managed in accordance with an NPDES permit to avoid adverse water quality effects. Therefore, impacts related to operational discharges of chloraminated water under the WTTIP would be less than significant.

New Reservoirs and Clearwells

The proposed Highland Reservoir would include an emergency overflow and drain pipeline from the tank to Lafayette Reservoir, and emergency overflows could also occur from the proposed new Ardith Reservoir, resulting in potential impacts on water quality and/or aquatic organisms due to chlorine toxicity. However, discharges would occur only on an occasional basis, such as if the tank is overfilled. Operationally, this is a rare event. The overflow from the Highland Reservoir would be dechlorinated in a vault manhole, and discharges from the Ardith Reservoir would also be dechlorinated. All discharges would occur in accordance with RWQCB requirements. Therefore, water quality impacts related to an emergency discharge from a new reservoir would be less than significant, and no mitigation is necessary.

Under Alternative 2, a new 9.8-million-gallon clearwell would be constructed at the Orinda WTP, and under Alternative 1, two new clearwells with a combined capacity of 6 million gallons would be constructed at the Lafayette WTP. An emergency overflow of chloraminated water could also occur from one of these clearwells during operation of the WTPs. However, these discharges would be dechlorinated and managed in accordance with the Regionwide General NPDES Permit for Discharges from Surface Water Treatment Facilities for Potable Supply. Therefore, water quality impacts related to an emergency discharge from a new clearwell would be less than significant and no mitigation is necessary.

Lafayette Reclaimed Water Pipeline

Under the proposed Lafayette Reclaimed Water Pipeline project, an average of about 0.3 mgd of dechlorinated water (maximum of 0.5 mgd) from the Lafayette WTP filter backwash water recycle system would be discharged to Lafayette Reservoir, resulting in potential impacts on water quality and/or aquatic organisms. The discharge would consist of supernatant from the backwash water recycle system that has undergone treatment by flocculation and sedimentation to remove solids.

EBMUD has submitted an amended notice of intent for the Lafayette WTP to the RWQCB to authorize the proposed discharge under the Regionwide General NPDES Permit for Discharges from Surface Water Treatment Facilities for Potable Supply (EBMUD, 2006b). This permit

specifies effluent and receiving water limitations to ensure that the existing beneficial uses and quality of surface waters are maintained and protected. Compliance with effluent and receiving water limitations as well as monitoring requirements specified in the permit would ensure that adverse water quality effects would not occur, and water quality impacts related to this discharge would be less than significant, as discussed below.

Effluent Limitations

Effluent limitations of the General NPDES Permit for Discharges from Surface Water Treatment Facilities for Potable Supply are summarized in Table 3.5-5.

TABLE 3.5-5
EFFLUENT LIMITATIONS AND WATER QUALITY DATA FOR PLANNED DISCHARGE

Constituent	Units	NPDES Effluent Limitations						Backwash Settling Basin Supernatant
		Maximum	Daily Maximum	Monthly Average	Weekly Average	Single Sample	3-Sample Median	
Total Suspended Solids	mg/L	–	–	30	45	–	–	9.0
Total Chlorine Residual	mg/L	0.0	–	–	–	–	–	0.2/0.0[a]
pH	pH Units	6.5 to 8.5 (if the receiving water has a pH greater than 8.5, then the pH of the effluent shall not be greater than 0.5 pH unit of the receiving water pH value)				–	–	7.6
Whole Effluent Toxicity	Percent Survival	–	–	–	–	≥70 percent	≥90 percent	no data

mg/L = milligrams per liter

[a] Chlorine residual was reported at 0.2 mg/L in the backwash water settling basin supernatant, but the project would include a dechlorination facility to remove residual chlorine from the discharge. With construction of this facility, the discharge would not contain detectable chlorine and would therefore comply with effluent limitations for residual chlorine.

SOURCE: RWQCB, 2003d; EBMUD, 2006b.

As summarized in this table, discharge of residual chlorine is prohibited, and effluent limitations are specified for total suspended solids, pH, and whole effluent toxicity. Backwash water settling basin supernatant water quality data provided to the RWQCB in the amended notice of intent are also included in Table 3.5-5. Based on these data, the discharge would comply with effluent limitations for total suspended solids and pH. With use of the dechlorination facility, planned as part of the project, the discharge would also comply with the residual chlorine limitation. The effluent would be expected to meet the effluent limitation for whole effluent toxicity because it would be dechlorinated and would not contain other toxic substances.

Receiving Water Limitations

In accordance with the General NPDES Permit for Discharges from Surface Water Treatment Facilities for Potable Supply, the discharge must not cause the following conditions to exist in the receiving water at any place or any time:

- Erosion to the stream bank and bed
- Floating materials, including solids, liquids, foams, scum, or suspended and/or deposited materials in concentrations that cause nuisance or adversely affect beneficial uses
- Bottom deposits or aquatic growths to the extent that such deposits or growths cause nuisance or adverse effects to beneficial uses
- Alteration of temperature or apparent color beyond natural background levels
- Visible, floating, suspended, or deposited oil or other products of petroleum origin
- Toxic or other deleterious substances to be present in concentrations or quantities which will cause deleterious effects on wildlife, waterfowl, or other aquatic biota, or which render any of these unfit for human consumption, either at levels created in the receiving waters or as a result of biological concentration

The discharge also may not cause pH variation from normal ambient pH by more than 0.5 pH units and may not increase turbidity above background levels by more than the following:

Receiving Water Background	Incremental Increase
<50 NTU*	5 NTU, maximum
50–100 NTU	10 NTU, maximum
>100 NTU	10 percent of background, maximum

* NTU = Nephelometric Turbidity Units

The proposed discharge would comply with these receiving water limitations and would actually be expected to improve water quality in the reservoir in some respects, because:

- The low discharge rate would not cause substantial erosional, temperature, color, or pH differences in Lafayette Reservoir. The proposed outfall structure would be constructed in the deepest part of the reservoir to maximize dilution of the discharge, and the structure would be designed to provide appropriate dispersion of the discharge, minimizing the potential for erosion and allowing for adequate mixing to prevent substantial changes in temperature or color. The pH of the discharge, as described above, would be within natural background levels.
- The proposed discharge would consist of clarified filter backwash water and would not contain floatable materials or petroleum products that would degrade water quality.
- Based on a water quality assessment conducted for the proposed discharge (EBMUD, 2006a), existing reservoir water can be anoxic between May and November, and the proposed discharge would not be expected to increase bottom deposits or aquatic growth (algal blooms)

in the reservoir because: (1) the ammonia concentration in the discharge would be less than 0.3 milligrams per liter (mg/L) to 1.4 mg/L, which is similar to the concentration in Lafayette Reservoir (0.2 to 1.4 mg/L); (2) the proposed discharge would contain approximately 8.0 mg/L of dissolved oxygen and would increase dissolved oxygen levels in the reservoir, which is estimated to contain no dissolved oxygen; and (3) the existing concentration of soluble reactive phosphorous in the reservoir is 0.5 to 0.6 mg/L, and the proposed discharge would decrease this nutrient level.

- The proposed discharge would be dechlorinated and would not contain other toxic or deleterious substances that would degrade water quality.

- The proposed discharge would not increase turbidity of the receiving waters because turbidity of the discharge water would be approximately 1.2 NTU, and the turbidity of Lafayette Reservoir is in the range of 0.9 to 6.8 NTU.

Monitoring Requirements

In accordance with the self-monitoring program for the General NPDES Permit for Discharges from Surface Water Treatment Facilities for Potable Supply, EBMUD would be required to monitor the discharge for flow rate, total suspended solids, pH, total chlorine residual, various metals, trihalomethanes, and toxicity. The receiving water would also need to be monitored for hardness, total solids, pH, salinity, metals, and trihalomethanes. Results of the monitoring, any exceedances of discharge limitations, and any corrective actions taken would be reported to the RWQCB annually in the required self-monitoring report. In the event of a discharge containing detectable levels of residual chlorine, EBMUD would be required to notify the RWQCB by telephone within 24 hours and in writing within five days of becoming aware of the discharge.

Compliance with Permit Requirements

The proposed discharge would likely be required to comply with conditions of the General NPDES Permit for Discharges from Surface Water Treatment Facilities for Potable Supply, although the RWQCB could require an individual or other NPDES permit. In any case, compliance with either the general or individual NPDES permit requirements would ensure that the discharge meets Basin Plan water quality objectives and that the existing beneficial uses and water quality in Lafayette Reservoir are maintained and protected. Therefore, water quality impacts related to discharge of the filter backwash water effluent would be less than significant, and no mitigation is necessary.

Impact 3.5-6: Changes in impervious surfaces and stormwater runoff.

Urban stormwater runoff can contain many types of pollutants, including polynuclear aromatic hydrocarbons from vehicle emissions; heavy metals such as copper from brake pad wear and zinc from tire wear; dioxins as products of combustion; and mercury resulting from atmospheric deposition. These materials and others can be deposited on paved surfaces and rooftops as fine airborne particles, thus causing stormwater runoff pollution that is unrelated to the particular activity or land use. As described in the Setting, a new provision was added to the Contra Costa

County municipal stormwater permit in 2003; provision C.3 requires developers to implement treatment control measures to reduce the entry of pollutants into stormwater from new and redevelopment projects. The requirements apply to projects constructed after August 15, 2006 that involve the creation or replacement of 10,000 square feet or more of impervious surfaces, regardless of whether there is a net reduction in the amount of impervious surfaces at a development site.[7]

Projects that involve the creation or replacement of less than 10,000 square feet of impervious surfaces and those that are constructed in a public right-of-way would not be subject to the C.3 requirements. In addition, the creation or replacement of impervious surfaces at the WTPs would not be subject to the C.3 provisions because stormwater management at these facilities is addressed under the Regionwide General NPDES Permit for Discharges from Surface Water Treatment Facilities for Potable Supply and the site-specific BMP plan prepared for each WTP. However, the BMP plan would be revised to address any changes in stormwater runoff and potential stormwater pollutant sources, and the changes in the plan would be subject to approval by the RWQCB. Therefore, water quality impacts related to an increase in impervious surfaces at each of the WTPs, the replacement of impervious surfaces in a public right-of-way, and the creation or replacement of less than 10,000 square feet of impervious surfaces would be less than significant, and no mitigation is required.

The proposed reservoir construction and replacement projects (Ardith Reservoir and Donald Pumping Plant, Fay Hill Reservoir, Highland Reservoir, and Moraga Reservoir) are the only WTTIP projects that would involve the creation or replacement of over 10,000 square feet of impervious surfaces and are not located in a public right-of-way or at a WTP. Therefore, the District would implement Measure 3.5-6 for these projects, requiring incorporation of site design and landscape features to maximize infiltration, provide retention or detention, slow runoff, and minimize impervious surfaces so that post-development pollutant loads from the site are reduced to the maximum extent possible. Types of site planning concepts that could be considered include providing a vegetated buffer zone between impervious surfaces and nearby waterways, reducing the paved area, using porous pavement, retaining natural surfaces, minimizing the use of gutters and curbs that concentrate and direct runoff, and using existing vegetation to create new vegetated areas to promote infiltration.

The text below discusses the creation and replacement of impervious surfaces for each proposed project.

San Pablo Watershed

The total increase in impervious surfaces in this watershed resulting from near-term, or project-level projects, would be approximately 84,500 square feet under Alternative 1 and 133,000 square feet under Alternative 2. This increase is negligible compared to the existing 8.7 square miles of existing impervious surfaces.

[7] Replacement of impervious surfaces occurs when existing surfaces, such as pavement and rooftops, are replaced with new surfaces. Creation of impervious surfaces occurs when new surface are constructed in an area that did not previously have impervious surfaces.

Orinda WTP – Alternative 1 or 2

The total increase in impervious surfaces at the Orinda WTP would be 41,500 square feet under Alternative 1 and 90,000 square feet under Alternative 2. However, the WTP would not be subject to the C.3 requirements, because stormwater management is addressed under the Regionwide General NPDES Permit for Discharges from Surface Water Treatment Facilities for Potable Supply.

Orinda-Lafayette Aqueduct – Alternative 2

There would be only a negligible increase in impervious surface at the Orinda end of the Aqueduct as this would be the tunnel portion of the facility.

Sobrante WTP

The total increase in impervious surfaces at the Sobrante WTP under both alternatives would be 37,500 square feet. However, the WTP would not be subject to the C.3 requirements, because stormwater management is addressed under the Regionwide General NPDES Permit for Discharges from Surface Water Treatment Facilities for Potable Supply.

Happy Valley Pumping Plant and Pipeline

The proposed Happy Valley Pipeline would be constructed in a public right-of-way. The total increase in impervious surfaces for the proposed Happy Valley Pumping Plant would be approximately 5,500 square feet, and the pumping plant would not include the storage of hazardous materials or other potential pollutants.

Las Trampas Creek Watershed

The total increase in impervious surfaces in this watershed would be approximately 97,500 square feet under Alternative 1 and 103,500 square feet under Alternative 2. This increase is negligible compared to the existing 6.7 square miles of existing impervious surfaces.

Lafayette WTP – Alternative 1 or 2

The total increase in impervious surfaces at the Lafayette WTP would be approximately 50,000 square feet under Alternative 1, and there would be no change in impervious surfaces under Alternative 2. However, the Lafayette WTP would not be subject to the C.3 requirements, because stormwater management is addressed under the Regionwide General NPDES Permit for Discharges from Surface Water Treatment Facilities for Potable Supply.

Orinda-Lafayette Aqueduct

The majority of the pipeline portion of the proposed Orinda-Lafayette Aqueduct would be constructed primarily within public rights-of-way or in unpaved areas. However, 600 feet of pipeline would be constructed across a paved parking lot at the Bentley School, resulting in the replacement of approximately 6,000 square feet of pavement (assuming a maximum trench width of 10 feet).

Glen Pipeline Improvements

The proposed Glen Pipeline Improvements would be constructed in a public right-of-way.

Highland Reservoir and Pipelines

The proposed Highland Pipelines would be constructed almost entirely in unpaved areas, and there would be no increase in impervious surfaces. The amount of impervious surfaces created for the proposed Highland Reservoir and access road would be approximately 33,500 square feet.

Lafayette Reclaimed Water Pipeline

Construction of the proposed Lafayette Reclaimed Water Pipeline would not increase impervious surfaces in this watershed, because portions of the proposed pipeline not constructed and analyzed as part of other pipeline projects (i.e. Lafayette Creek crossing) would be constructed in unpaved areas.

Moraga Road Pipeline

Construction of the portion of the proposed Moraga Pipeline in this watershed would not increase impervious surfaces because, with the exception of road crossings, the pipeline would be largely constructed in unpaved areas. The portion of the Moraga Road Pipeline built in unpaved areas would remain unpaved.

Sunnyside Pumping Plant

The total increase in impervious surfaces for the proposed Sunnyside Pumping Plant would be approximately 5,500 square feet, and the pumping plant would not include the storage of hazardous materials or other potential pollutants.

Tice Pumping Plant and Pipeline

The total increase in impervious surfaces for the proposed Tice Pumping Plant would be approximately 8,500 square feet, and the pumping plant would not include the storage of hazardous materials or other potential pollutants. The pipeline would be constructed in a public right-of-way.

San Ramon Creek Watershed

The total increase in impervious surfaces in this watershed would be approximately 2,000 square feet under both alternatives. This increase is negligible compared to the existing 10.8 square miles of existing impervious surfaces.

Leland Bypass Valves

The total increase in impervious surfaces for the proposed Leland Bypass Valves would be approximately 2,000 square feet, and use of the valve would not include the storage of hazardous materials or other potential pollutants.

Grayson Creek and Murderer's Creek Watershed

The total increase in impervious surfaces in this watershed would be approximately 19,350 square feet under both alternatives, which is negligible compared to the existing 10.8 square miles of existing impervious surfaces.

Walnut Creek WTP

The total increase in impervious surfaces at the Walnut Creek WTP would be 11,350 square feet under both alternatives. However, the WTP would not be subject to the C.3 requirements, because stormwater management is addressed under the Regionwide General NPDES Permit for Discharges from Surface Water Treatment Facilities for Potable Supply.

Leland Isolation Pipeline

The proposed Leland Isolation Pipeline would be constructed in a public right-of-way.

Withers Pumping Plant

The total increase in impervious surfaces for the proposed Withers Pumping Plant would be approximately 8,000 square feet, and the pumping plant would not include the storage of hazardous materials or other potential pollutants.

Upper San Leandro/Moraga Creek Watershed

Because the reservoir replacement projects at Fay Hill and Moraga Reservoirs would reduce the impervious surfaces at each site, there would be a net reduction of approximately 80,000 square feet of impervious surfaces in this watershed.

Ardith Reservoir and Donald Pumping Plant

The total increase in impervious surfaces for the proposed Ardith Reservoir and Donald Pumping Plant would be approximately 20,000 square feet.

Fay Hill Pumping Plant and Pipeline Improvements

The improvements to the proposed Fay Hill Pumping Plant would occur within the plant itself, and there would be no replacement or creation of impervious surfaces. The Fay Hill Pipeline Improvements would be constructed in a public right-of-way.

Fay Hill Reservoir

The existing impervious surfaces at the Fay Hill Reservoir are approximately 45,000 square feet; after construction, there would be approximately 24,000 square feet of impervious surfaces, a reduction of over 20,000 square feet. Therefore, this project would be subject to municipal stormwater permit requirements.

Moraga Reservoir

The existing impervious surfaces at the Moraga Reservoir are approximately 124,000 square feet; after construction, there would be approximately 45,000 square feet of impervious surfaces, a

reduction of almost 80,000 square feet. Therefore, this project would be subject to municipal stormwater permit requirements.

Moraga Road Pipeline

The portion of the proposed Moraga Road Pipeline in this watershed would be constructed in a public right-of-way and therefore would not increase the area of impervious surface in this watershed.

Arroyo Viejo Creek Watershed

The total increase in impervious surfaces in this watershed would be approximately 7,000 square feet, a negligible increase.

Upper San Leandro WTP

The total increase in impervious surfaces at the Upper San Leandro WTP would be 7,000 square feet. Regardless of the increase in impervious surfaces, the WTP would not be subject to the C.3 requirements, because stormwater management is addressed under the Regionwide General NPDES Permit for Discharges from Surface Water Treatment Facilities for Potable Supply.

Mitigation Measure

> **Measure 3.5-6:** For all projects that involve the creation or replacement of 10,000 square feet or more of impervious surfaces, and are not located in a public right-of-way or at a WTP, the District will incorporate site design and landscape features to maximize infiltration, promote retention or detention, slow runoff, and minimize impervious surfaces so that post-development pollutant loads from the site are reduced to the maximum extent possible. The affected projects are Ardith Reservoir and Donald Pumping Plant, Fay Hill Reservoir, Highland Reservoir, and Moraga Reservoir.

Program-Level Elements

The program-level projects would be expected to have similar impacts to the project-level projects, and the applicability of each hydrology and water quality impact to the program-level projects is summarized in Table 3.5-6. With compliance with applicable laws at the time of construction, and with implementation of measures similar to those specified for the project-level projects, hydrology and water quality impacts related to implementation of the program-level projects are expected to be less than significant.

Lafayette WTP

Construction of potential future improvements at the Lafayette WTP under Alternative 1, including the relocation of Walter Costa Trail, would likely involve temporary land disturbance of over one acre and could result in water quality impacts to Lafayette Creek. However, compliance with EBMUD contract specifications and implementation of a measure similar to

TABLE 3.5-6
SUMMARY OF POTENTIAL HYDROLOGY AND WATER QUALITY IMPACTS – PROGRAM-LEVEL PROJECTS

Facility	Impact 3.5-1 Degradation of Surface Water Quality during Construction	Impact 3.5-2 Groundwater Dewatering	Impact 3.5-3 Diversion of Flood Flows	Impact 3.5-4 Discharge of Chloraminated Water during Construction	Impact 3.5-5 Operational Discharge of Chloraminated Water	Impact 3.5-6 Change in Impervious Surfaces
Lafayette WTP *Alternative 1*	✓	✓	–	✓	–	✓
Orinda WTP *Alternative 1 or 2*	✓	✓	–	✓	✓	✓
Walnut Creek WTP *Alternative 1 or 2*	✓	✓	–	✓	–	✓
New Leland Pressure Zone Reservoir and Pipeline	✓	✓	–	–	✓	✓
Leland Reservoir Replacement	✓	✓	–	✓	–	✓
St. Mary's Road/ Rohrer Drive Pipeline	✓	✓	✓	–	–	–
San Pablo Pipeline	✓	✓	–	–	–	–

✓ = Applicable Impact
– = No Impact

Measure 3.5-1a would ensure that water quality impacts associated with degradation of surface water quality during construction are less than significant.

Impacts related to groundwater dewatering, if required, would be less than significant with compliance with EBMUD construction specifications and applicable regulatory requirements for the discharge of the groundwater (likely to Lafayette Creek).

Discharges of chloraminated water could occur during construction of the program-level improvements under Alternative 1. However, these discharges would be managed in accordance with the Regionwide General NPDES Permit for Discharges from Surface Water Treatment Facilities for Potable Supply, or the NPDES permit in effect at the time of construction. Therefore, impacts related to the discharge of chloraminated water during construction are expected to be less than significant.

Changes in impervious surfaces at the WTP as a result of program-level improvements under Alternative 1 would not be subject to separate treatment measure/source control requirements because stormwater management would be addressed under the Regionwide General NPDES Permit for Discharges from Surface Water Treatment Facilities for Potable Supply and the site-specific BMP plan (or the NPDES permit in effect at the time of construction). The BMP plan

would be revised to address any changes in stormwater runoff and potential stormwater pollutant sources, subject to approval by the RWQCB. Therefore, water quality impacts related to changes in impervious surfaces are expected to be less than significant.

Orinda WTP

Under both alternatives, construction of potential future improvements at the Orinda WTP would involve temporary land disturbance of over one acre and could result in water quality impacts to San Pablo Creek and two tributaries to San Pablo Creek between the Orinda WTP and the ballfields. However, compliance with EBMUD contract specifications and implementation of a measure similar to Measure 3.5-1a would ensure that water quality impacts associated with degradation of surface water quality during construction are less than significant.

Impacts related to groundwater dewatering, if required, would be less than significant with compliance with EBMUD construction specifications and applicable regulatory requirements for the discharge of the groundwater (likely to San Pablo Creek).

Discharges of chloraminated water could occur during construction of the program-level improvements at the Orinda WTP. However, these discharges would be managed in accordance with the Regionwide General NPDES Permit for Discharges from Surface Water Treatment Facilities for Potable Supply, or the NPDES permit in effect at the time of construction. Therefore, impacts related to the discharge of chloraminated water during construction are expected to be less than significant.

New clearwells constructed at the Orinda WTP under both alternatives could result in periodic discharges of chloraminated water for maintenance or in the event of an overflow. However, these discharges would be managed in accordance with the Regionwide General NPDES Permit for Discharges from Surface Water Treatment Facilities for Potable Supply, or the NPDES permit in effect at the time of construction. Therefore, impacts related to operational discharges of chloraminated water are expected to be less than significant.

Changes in impervious surfaces at the WTP as a result of program-level improvements under both alternatives would not be subject to separate treatment measure/source control requirements because stormwater management would be addressed under the Regionwide General NPDES Permit for Discharges from Surface Water Treatment Facilities for Potable Supply and the site-specific BMP plan (or the NPDES permit in effect at the time of construction). The BMP plan would be revised to address any changes in stormwater runoff and potential stormwater pollutant sources, subject to approval by the RWQCB. Therefore, water quality impacts related to changes in impervious surfaces are expected to be less than significant.

Walnut Creek WTP

Under both alternatives, construction of potential future improvements at the Walnut Creek WTP would involve temporary land disturbance of over one acre and could result in water quality impacts to the tributary to Grayson Creek. However, compliance with EBMUD contract specifications and implementation of a measure similar to Measure 3.5-1a would ensure that

water quality impacts associated with the degradation of surface water quality during construction are less than significant.

Impacts related to groundwater dewatering, if required, would be less than significant with compliance with EBMUD construction specifications and applicable regulatory requirements for the discharge of the groundwater (likely to the tributary to Grayson Creek).

Discharges of chloraminated water could occur during construction of the program-level improvements at the Walnut Creek WTP. However, for reasons similar to those described above for the Orinda WTP program improvements, these discharges would be managed in a manner that would not be expected to result in a significant impact. Similarly, changes in impervious surfaces at the WTP as a result of program-level improvements under both alternatives would not be expected to result in significant water quality impacts.

Leland Reservoir Replacement

Construction of the Leland Reservoir Replacement would involve temporary land disturbance of over one acre and could discharge stormwater-related materials to the storm sewer system. However, compliance with EBMUD contract specifications and implementation of a measure similar to Measure 3.5-1a would ensure that water quality impacts associated with the degradation of surface water quality during construction are less than significant.

Impacts related to groundwater dewatering, if required, would be less than significant with compliance with EBMUD construction specifications plan and applicable regulatory requirements for the discharge of the groundwater.

The proposed Leland Reservoir Replacement would require the discharge of treated water and tank heel during reservoir replacement. However, compliance with EBMUD construction specifications and regulatory requirements for the discharge would provide adequate protection of surface water quality, and water quality impacts related this discharge are expected to be less than significant.

The proposed replacement of the Leland Reservoir would likely involve the replacement of over 10,000 square feet of impervious surfaces. Furthermore, the threshold area for requiring compliance with municipal stormwater permits could decrease over time. Therefore, this project would likely be required to comply with municipal stormwater permitting requirements at the time of construction and require implementation of a measure similar to Measure 3.5-6, which would likely reduce water quality impacts related to stormwater runoff to a less-than-significant level.

New Leland Pressure Zone Reservoir and Pipeline

Construction of the New Leland Pressure Zone Reservoir and Pipeline would involve temporary land disturbance of over one acre and would occur near San Ramon Creek, which could result in the discharge of construction-related materials to the creek. However, compliance with EBMUD contract specifications and implementation of a measure similar to Measure 3.5-1a would ensure

that water quality impacts associated with the degradation of surface water quality during construction are less than significant. Local permits for the San Ramon Creek crossing (Measure 3.5-1b) may also be required.

Impacts related to groundwater dewatering, if required, would be less than significant with compliance with EBMUD construction specifications and applicable regulatory requirements for the discharge of the groundwater (likely to San Ramon Creek).

The proposed New Leland Pipeline would cross under the existing flood control channel and therefore would not be expected to impede flood flows or discharge sediments and pollutants to flood flows if a flood occurred during construction. Therefore, water quality impacts related to conducting construction in 100-year flood zones would be less than significant.

The proposed New Leland Pressure Zone Reservoir could result in periodic discharges of chloraminated water for maintenance or in the event of an overflow. However, this water would be discharged to the sanitary sewer in accordance with local sanitary district requirements, or dechlorinated and discharged to a surface water body or storm drain system in accordance with RWQCB requirements. Therefore, impacts related to operational discharges of chloraminated water from the New Leland Pressure Zone Reservoir are expected to be less than significant.

Construction of the proposed New Leland Pressure Zone Reservoir would likely involve the creation of over 10,000 square feet of impervious surfaces. Furthermore, the threshold area for requiring compliance with municipal stormwater permits could decrease over time as regulatory requirements intensify. Therefore, this project would likely be required to comply with municipal stormwater permitting requirements at the time of construction and implement a measure similar to Measure 3.5-6, which would likely reduce water quality impacts related to stormwater runoff to a less-than-significant level.

The proposed pipeline would be constructed in a public right-of-way or within unpaved areas. Therefore, this portion of the project would not be subject to municipal stormwater permitting requirements, and water quality impacts related to stormwater runoff are expected to be less than significant.

St. Mary's Road/Rohrer Drive Pipeline

Construction of the St. Mary's Road/Rohrer Drive Pipeline would involve temporary land disturbance that could exceed one acre and therefore could result in water quality impacts to the tributaries to Laguna Creek, Las Trampas Creek, and Grizzly Creek. However, compliance with EBMUD contract specifications and implementation of a measure similar to Measure 3.5-1a would ensure that water quality impacts associated with the degradation of surface water quality during construction are less than significant through incorporation of various erosion control measures. Local permits for creek crossings (Measure 3.5-1b) may also be required.

Impacts related to groundwater dewatering, if required, would be less than significant with compliance with EBMUD construction specifications and applicable regulatory requirements for the discharge of groundwater.

The proposed pipeline would cross a flood zone and could impede flood flows or discharge sediments and pollutants to flood flows if a flood occurred during construction. However, similar to the proposed project-level projects, EBMUD would implement a measure similar to Measure 3.5-3. With implementation of this measure, water quality impacts related to conducting construction in 100-year flood zones would be reduced to a less-than-significant level.

The proposed St. Mary's Road/Rohrer Drive Pipeline project would be constructed in a public right-of-way that is already paved. Therefore, the pipeline project would not be subject to municipal stormwater permitting requirements, and water quality impacts related to stormwater runoff would be less than significant.

San Pablo Pipeline

Construction of the San Pablo Pipeline would involve temporary land disturbance likely exceeding one acre and could therefore result in water quality impacts to San Pablo Creek and San Pablo Reservoir. However, compliance with EBMUD contract specifications and implementation of a measure similar to Measure 3.5-1a would likely reduce water quality impacts associated with degradation of surface water quality during construction to a less-than-significant level. Local permits for creek crossings (Measure 3.5-1b) would also be required.

Impacts related to groundwater dewatering, if required, would be less than significant with compliance with EBMUD construction specifications and applicable regulatory requirements for the discharge of groundwater (likely to San Pablo Creek and/or Reservoir).

The proposed San Pablo Pipeline project would not result in new impervious surface and would be constructed in a public right-of-way. Therefore, the project would not be subject to municipal stormwater permitting requirements, and water quality impacts related to stormwater runoff would be less than significant.

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