Volume 2 of 3

EBMUD WATER TREATMENT AND TRANSMISSION IMPROVEMENTS PROGRAM

Draft Environmental Impact Report
SCH # 2005092019

EBMUD East Bay Municipal Utility District

June 2006

ESA

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CHAPTER 3
Environmental Setting, Impacts, and Mitigation Measures

3.1 Introduction

3.1.1 Organization of Chapter 3

Chapter 3 is organized by environmental discipline, as follows:

3.2 Land Use, Planning, and Recreation
3.3 Visual Quality
3.4 Geology, Soils, and Seismicity
3.5 Hydrology and Water Quality
3.6 Biological Resources
3.7 Cultural Resources
3.8 Traffic and Circulation
3.9 Air Quality
3.10 Noise and Vibration
3.11 Hazards and Hazardous Materials
3.12 Public Services and Utilities

Each section of Chapter 3 describes the following:

- *Approach to Analysis*. This subsection describes the general approach to analyzing a given environmental topic and cross-references related issues addressed elsewhere in the EIR.

- *Setting*. This subsection presents a description of the existing physical environmental conditions in the vicinity of the project. California Environmental Quality Act (CEQA) Guidelines, Section 15125(d), requires that the environmental setting section evaluate consistency with local plans and policies. This evaluation is presented in Section 3.2, Land Use. Appendix D of this EIR presents a list of general plan goals and policies, as well as guidance polices from the EBMUD's *East Bay Watershed Master Plan*. Sections 3.3 through 3.12 describe resource-specific plans (e.g., the Bay Area Air Quality Management District's *Basin Management Plan*). Some policies, such as those from local noise and tree ordinances, are explicitly used as significance criteria in Sections 3.3 through 3.12.

- *Significance Criteria*. Refer to Section 3.1.2, below.

- *Impacts and Mitigation Measures*. Refer to Sections 3.1.2 and 3.1.3, below.

The evaluations presented in each Chapter 3 section distinguish between impacts associated with Alternative 1 facilities versus impacts associated with Alternative 2 facilities.

3.1.2 Significance Criteria and Impacts

In Chapter 3, the environmental impacts of the proposed WTTIP are identified and classified as significant or less than significant. Section 15382 of the CEQA Guidelines defines a significant impact as “a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project.” For each category of physical conditions evaluated in this EIR, significance criteria were developed using the CEQA Guidelines, city and county standards and policies, or the “significance thresholds” of federal, state, regional, or local agencies. Impacts classified as significant meet the criteria developed for each category of physical conditions. Impacts that are not significant (because they do not meet the significance criteria) are identified as less than significant. The impacts were determined by comparing the environmental effects of constructing and operating WTTIP projects with existing environmental conditions. Each impact is numbered; mitigation measures identified for that impact are assigned the same number. In many cases, impacts apply to all WTTIP projects. Impacts are further characterized for the project-level components as warranted in the text following each impact.

Following the discussion of impacts for project-level elements are more general discussions of impacts for program-level elements.

Chapter 4 addresses impacts associated with growth that could be induced by the project; Chapter 5 presents a discussion of the collective impacts of implementing the WTTIP projects and evaluates the WTTIP’s potential to contribute to cumulative impacts.

Some projects evaluated in this EIR at a project-level of detail would not be implemented for a number of years. To the extent that there are substantial changes in either the characteristics of a project or the circumstances under which a project is undertaken, or if new information that shows that new significant impacts could occur or impacts disclosed in this EIR could be substantially more adverse, then EBMUD will conduct additional evaluation of the project pursuant to the requirements of CEQA.

3.1.3 Mitigation Measures

CEQA Guidelines Section 15126.4(a)(1) states that an EIR “shall describe feasible measures which could minimize significant adverse impacts….” Section 15126.4(a)(3) also states that “mitigation measures are not required for effects which are not found to be significant.” In this EIR, mitigation measures are identified (where feasible) for all of the significant impacts and for some of the impacts labeled as less than significant. All mitigation measures are proposed as part of the project.

3.1.4 Project-Level Versus Program-Level Evaluation

This EIR serves as a project EIR and a program EIR. Table 2-1 in Chapter 2 indicates proposed actions evaluated at a project level of detail and those actions evaluated at a program level of detail. The program-level projects are potential future actions that may or may not be necessary depending on future circumstances; these projects are not proposed to occur until well into the future and/or have not yet been developed enough to permit a detailed evaluation. Consequently, the program-level elements are evaluated in a more general manner. In Chapter 3, impacts associated with these projects are discussed at the end of each technical section. The District will undertake further environmental review pursuant to CEQA as the need arises to design and implement these program-level components and as further details about the specific location and construction characteristics of those projects are known.

When the District undertakes subsequent environmental review for facilities evaluated at a program level of detail, the information contained in this EIR will be revisited to determine the accuracy and the adequacy of these evaluations. In accordance with criteria set forth in CEQA, this EIR can:

- Provide the basis in an Initial Study for determining whether a specific WTTIP project may have significant effects;
- Be incorporated by reference to deal with regional influences, secondary effects, cumulative impacts, alternatives, and other factors that apply to the WTTIP as a whole; and/or
- Focus subsequent environmental review to permit discussion solely of new effects or more adverse effects than those considered in this EIR.

3.2 Land Use, Planning, and Recreation

3.2.1 Approach to Analysis

This section addresses land use issues related to construction and operation of the proposed WTTIP projects, including evaluation of project consistency with general plans and other regional plans. Land use issues include the potential to divide an established community, agricultural resources effects, and recreation resources effects. This evaluation is based on discussions with local agency representatives, field reconnaissance, and a review of adopted general and regional plans, aerial photographs, and other environmental documents prepared for similar projects within the region.

3.2.2 Setting

The study area encompasses portions of the following jurisdictions:

- City of Orinda
- City of Lafayette
- City of Walnut Creek
- City of Oakland
- Town of Moraga
- Contra Costa County

The following sections present existing land uses in the vicinity of the proposed improvements.

Existing Land Use

The locations of WTTIP project sites throughout EBMUD’s service area are predominately suburban residential in character. Table 3.2-1 indicates the location, land use jurisdiction, general plan and zoning designations, and Important Farmland Map designation (as designated by the California Department of Conservation’s Important Farmland Mapping Program) for each WTTIP project site. Existing land uses in the vicinity of each site, including agricultural uses and recreation resources, are described briefly below.

Lafayette WTP

The Lafayette WTP is located on EBMUD property in the city of Lafayette, between Mt. Diablo Boulevard and Highway 24, east of El Nido Ranch Road (see Maps C-LWTP-1 and C-LWTP-2). Nearby land uses include Highway 24 to the north, the Lafayette Reservoir Recreation Area and a low-density residential development to the southeast, and a commercial development to the east, including a motel, office space, a synagogue, and a new Veterans Memorial building.

TABLE 3.2-1
WTTIP PROJECT SITE LOCATIONS AND LAND USE PLANNING DESIGNATIONS

Facility	Location	Project Location	General Plan Designation	Zoning Designation	Important Farmland Map Designation
Lafayette WTP	Existing EBMUD facility at 3848 Mt. Diablo Boulevard	Lafayette	Open Space; Low Density Single Family	Single Family Residential District-20; Single Family Residential District-40	Urban and Built-up Land
Orinda WTP	Existing EBMUD facility at 190 Camino Pablo	Orinda	Public/Semi-Public Utility	Parks and Recreation District	Urban and Built-up Land
Walnut Creek WTP	Existing EBMUD facility at 2201 Larkey Lane	Walnut Creek	Open Space/Recreational	Open Space/Recreational	Urban and Built-up Land
Sobrante WTP	Existing EBMUD facility at 5500 Amend Road	Unincorporated Contra Costa County	Public/Semi-Public	General Agriculture	Urban and Built-up Land
Upper San Leandro WTP	Existing EBMUD facility at 7700 Greenly Drive	Oakland	Detached Unit Residential	One Family Residential	Urban and Built-up Land
Orinda-Lafayette Aqueduct	Underground tunnel from Orinda WTP to intersection of East Altarinda Drive and St. Stephens Drive; open-cut pipeline on El Nido Ranch Road from St. Stephens Drive to Bentley School parking lot at 1000 Upper Happy Valley Road in Lafayette; then tunnels under Highway 24, continues as an open-cut pipeline along Mt. Diablo Boulevard to the Lafayette WTP	Orinda/Lafayette	Public/Semi-Public Utility; Residential: Single Family Low Density; Parks and Recreation; Open Space	Planned Development District; Parks and Recreation District; Residential Lot-40 District; Residential Lot-20 District; Residential Lot-10 District	Urban and Built-up Land
Ardith Reservoir and Donald Pumping Plant	At existing EBMUD Donald Pumping Plant property, Ardith Drive and Westover Court	Orinda	Residential: Single Family Low Density (1–2 units/acre)	Residential Lot-40 District; Residential Lot-12 District	Urban and Built-up Land
Fay Hill Pumping Plant and Pipeline Improvements	At southwest corner of Moraga Road and Rheem Boulevard; in Rheem Boulevard to Chalda Way	Moraga	Rheem Park Specific Plan Area; Right-of-way	Community Commercial District	Urban and Built-up Land
Fay Hill Reservoir	At existing Fay Hill Reservoir site east of Moraga Road off of Rheem Boulevard	Moraga	Moraga Open Space Ordinance Open Space	Moraga Open Space Ordinance Open Space	Grazing Land
Glen Pipeline Improvements	Nordstrom Lane from Hilltop Drive to Glen Road, Glen Road from Nordstrom Lane to just west of Monticello Drive	Lafayette	Right-of-way	NA	Urban and Built-up Land
Happy Valley Pumping Plant and Pipeline	On Lombardy Lane at Van Ripper Lane; Miner Road from Oak Arbor Road to Lombardy Lane, Lombardy Lane from Miner Road to just past the eastern intersection with Van Ripper Lane	Orinda	Residential: Single Family Low Density (1–2 units/acre); Right-of-way	Residential Lot-40 District; NA	Urban and Built-up Land
Highland Reservoir and Pipelines	Northern edge of Lafayette Reservoir Recreation Area; from Highland Reservoir site at northern edge of recreation area to Lafayette WTP	Lafayette	Open Space; Low Density Single Family	Lafayette Reservoir; Residential Lot-40 District	Grazing Land and Urban and Built-up Land
Leland Isolation Pipeline and Bypass Valves	Lacassie Drive from North California Street to North Main Street; valve work near Danville Pumping Plant	Walnut Creek/ Unincorporated Contra Costa County	Isolation Pipeline: Right-of-way; Isolation Bypass Valves: Public/ Semi-Public Parks and Recreation	Single Family Residential District-20	Urban and Built-up Land

TABLE 3.2-1 (Continued)
WTTIP PROJECT SITE LOCATIONS AND LAND USE PLANNING DESIGNATIONS

Facility	Location	Project Location	General Plan Designation	Zoning Designation	Important Farmland Map Designation
Lafayette Reclaimed Water Pipeline	From Highland Reservoir site at northern edge of Lafayette Reservoir Recreation Area to Lafayette WTP	Lafayette	Open Space; Low Density Single Family	Lafayette Reservoir; Residential Lot-40 District	Grazing Land and Urban and Built-up Land
Moraga Reservoir	At existing Moraga Reservoir at Draeger Drive and Fernwood Drive	Moraga	Residential – 2 dwelling units/acre	2 Dwelling Units per Acre Residential District	Urban and Built-up Land
Moraga Road Pipeline	Eastern edge of Lafayette Reservoir Recreation Area, Moraga Road from Nemea Court/Madrone Drive to Draeger Drive	Lafayette/Moraga	Open Space; Low Density Single Family; Right-of-way	Lafayette Reservoir; Single Family Residential District 20; NA	Grazing Land and Urban and Built-up Land
Sunnyside Pumping Plant	Happy Valley Road and Sundown Terrace	Orinda/Lafayette	Residential: Single Family Low Density (1–2 units/acre)	Residential Lot-40 District	Urban and Built-up Land
Tice Pumping Plant and Pipeline	Tice Valley Boulevard and Olympic Boulevard; Boulevard Way from Warren Road to Olympic Boulevard	Unincorporated Contra Costa County	Open Space; Right-of-way	Single Family Residential; NA	Urban and Built-up Land
Withers Pumping Plant	At Grayson Reservoir at Reliez Valley Road and Silver Hill Way	Unincorporated Contra Costa County	Public/Semi-Public; Single Family Residential Low Density	General Agriculture	Urban and Built-up Land
Other Projects (program level), excluding other improvements planned for Orinda, Lafayette, and Walnut Creek WTPs (locations described above)					
Leland Reservoir Replacement	Existing EBMUD Leland Reservoir site opposite 1050 Leland Drive	Lafayette	Site location to be refined	Site location to be refined	Urban and Built-up Land
New Leland Pressure Zone Reservoir	Adjacent to I-680 and Rudgear Road	Walnut Creek/ Unincorporated Contra Costa County	Site location to be refined	Site location to be refined	Grazing Land
San Pablo Pipeline	190 Camino Pablo northwest along Camino Pablo to San Pablo WTP or San Pablo Dam	Orinda/Unincorporated Contra Costa County/Richmond	Site location to be refined	Site location to be refined	Urban and Built-up Land and Grazing Land
St. Mary's Road/Rohrer Drive Pipeline	Moraga Road and Draeger Drive south to St. Mary's Road, turns northeast onto St. Mary's Road to Rohrer Drive, east on Rohrer Drive to Grizzly Creek, turns onto Oak Canyon Road to the vicinity of Grizzly Tank, then off road between Oak Canyon Road and the tank to Lafayette WTP	Moraga/Lafayette/ Walnut Creek	Site location to be refined	Site location to be refined	Urban and Built-up Land and Grazing Land

SOURCES: California Department of Conservation, 2005a, 2005b; Cass, 2005; City of Lafayette, 2002; City of Lafayette Municipal Code; City of Orinda, 1987; City of Orinda Municipal Code; City of Walnut Creek, 2006; City of Walnut Creek Municipal Code; Coburn, 2006; Contra Costa County, 2005; Contra Costa County Mapping Information Center, 2006; Contra Costa County Municipal Code; Dani, 2005; Town of Moraga, 2002, 2005; Warner, 2005.

Agricultural Resources

There are no agricultural resources within or adjacent to the Lafayette WTP; the site is designated as Urban and Built-up Land on the Important Farmland Maps.

Recreation Resources

A segment of the Walter Costa Trail, operated by the City of Lafayette[1], traverses the Lafayette WTP property along its south side. Walter Costa Trail is a paved multi-use trail extending from the Lafayette Reservoir Recreation Area north to El Nido Ranch Road (Bay Area Hiker, 2005). From there it follows hiking trails and paved roads north to Panorama Road and a southern entrance to Briones Regional Park, approximately 1.5 miles away (Mount Diablo Audubon Society, 2005; Olmsted & Brothers Map Company, 1991).

Orinda WTP

The Orinda WTP is located on EBMUD property in Orinda, on the northeast side of Camino Pablo; San Pablo Creek traverses the WTP site along the southeast property boundary (see Maps C-OWTP-1 and C-OWTP-2). Open space and single-family residential development lie northeast of the site. South and west of the WTP, across Camino Pablo, is single-family residential development.

Agricultural Resources

There are no agricultural resources within or adjacent to the Orinda WTP; the site is designated as Urban and Built-up Land on the Important Farmland Maps.

Recreation Resources

A paved trail extends along Camino Pablo past the EBMUD property. This approximately one-mile multi-use trail eventually connects to another major trail north toward San Pablo Reservoir (Olmsted & Brothers Map Company, 1991). The Orinda Country Club Golf Course lies to the southeast of the WTP, across San Pablo Creek (Orinda Chamber of Commerce, 2005). The Orinda Sports Field, located on EBMUD property, lies northwest of the WTP. These grass baseball and soccer fields are operated under a memorandum of understanding (MOU) between EBMUD and the City of Orinda ("Recreational and Watershed Land Use Policies and the Objectives in the City of Orinda"). The Orinda Sports Field operations will be moved to a new location prior to implementation of the proposed project, allowing for use of this area for project facilities. Playing fields and basketball courts belonging to Wagner Ranch Elementary School lie to the north of the Orinda Sports Field.

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1 The trail through EBMUD property is subject to the terms of a revocable license between EBMUD and the City of Lafayette.

Walnut Creek WTP

The Walnut Creek WTP is located on EBMUD property in Walnut Creek, at the western terminus of Larkey Lane (see Map C-WCWTP-1). Surrounding land uses include open space and residential development. There is residential development east of the plant as well as beyond the open space that abuts the WTP site.

Agricultural Resources

There are no agricultural resources within or adjacent to the Walnut Creek WTP; the site is designated as Urban and Built-up Land on the Important Farmland Maps.

Recreation Resources

The Acalanes Ridge Open Space, owned by the City of Walnut Creek, wraps around the south, west, and north sides of the site. The Briones–Mt. Diablo Trail is located adjacent to the WTP. The trail extends 11.8 miles from Briones Regional Park to Mt. Diablo State Park; it is a multi-use trail with paved and unpaved sections, connecting schools, city parks, and community facilities with open space areas (EBRPD, 2005). Other recreational trails are located within the Acalanes Ridge Open Space to the west of the WTP.

Sobrante WTP

The Sobrante WTP is located on EBMUD property south of the intersection of Valley View and Amend Roads in an unincorporated area of Contra Costa County (see Map C-SOBWTP-1). The EBMUD property is traversed by two public roads—Valley View Road and D'Avila Way—but fencing prevents public access to existing EBMUD facilities. The WTP is surrounded by patches of open space and residential development that is predominately single family, although there are also some multifamily developments in the vicinity. A Richmond fire station and Pacific Gas and Electric Company substation abut the EBMUD property.

Agricultural Resources

There are no agricultural resources within or adjacent to the Sobrante WTP; the site is designated as Urban and Built-up Land on the Important Farmland Maps.

Recreation Resources

There are no recreation resources within or adjacent to the Sobrante WTP.

Upper San Leandro WTP

The Upper San Leandro WTP is located on Greenly Drive in Oakland on the southwest side of Interstate 580 (I-580) (see Map C-USLWTP-1). The WTP site is surrounded predominately by single-family residential development, with I-580 to the northeast of the site. Across I-580 is Leona Quarry; the quarry was historically used for gravel mining, but is now being converted into a residential development.

Agricultural Resources

There are no agricultural resources within or adjacent to the Upper San Leandro WTP; the site is designated as Urban and Built-up Land on the Important Farmland Maps.

Recreation Resources

There are no recreational land uses in the immediate vicinity of the WTP.

Orinda-Lafayette Aqueduct

The tunnel portion of this project would be constructed entirely within Orinda, from the Orinda Sports Field west of the Orinda WTP to an exit shaft near the St. Stephens Drive/El Nido Ranch Road intersection (see Maps C-OLA-1 to C-OLA-5). The tunnel would predominantly run beneath low-density residential land uses. The pipeline from the tunnel exit shaft would be constructed along El Nido Ranch Road, which has single-family residential development on the north side and Highway 24 and the Bentley School on the south side. The pipeline alignment would cross under Highway 24 from the Bentley School parking lot, then parallel Mt. Diablo Boulevard to the Lafayette WTP in the vicinity of Walter Costa Trail and the Lafayette Reservoir Recreation Area.

Agricultural Resources

The Orinda-Lafayette Aqueduct project area and adjacent areas are designated as Urban and Built-up Land on the Important Farmland Maps.

Recreation Resources

As noted above, the proposed aqueduct would be located in the vicinity of the Orinda Sports Field, a paved multi-use trail adjacent to Camino Pablo, the Walter Costa Trail, and the Lafayette Reservoir Recreation Area. These recreation resources are described within the land use descriptions for the Lafayette WTP, the Orinda WTP, and the Highland Reservoir and Pipelines.

Ardith Reservoir and Donald Pumping Plant

The site for the new Ardith Reservoir and relocated Donald Pumping Plant is on EBMUD-owned property at Ardith Drive near Westover Court in Orinda (see Map C-ARRES-1). The facility is surrounded by low-density single-family residential development, with Orinda Intermediate School approximately 700 feet to the east.

Agricultural Resources

There are no agricultural resources within or adjacent to the Ardith Reservoir and Donald Pumping Plant site; the site is designated as Urban and Built-up Land on the Important Farmland Maps.

Recreation Resources

There are no recreation resources within or adjacent to the Ardith Reservoir and Donald Pumping Plant project location.

Fay Hill Pumping Plant and Pipeline Improvements

The proposed improvements would be at EBMUD's existing Fay Hill Pumping Plant, located at the corner of a shopping center in Moraga, in the southwest quadrant of the intersection of Moraga Road and Rheem Boulevard (see Map C-FHPP-1). The corner is primarily developed with commercial land uses, with open space and grazing land across the intersection (east of Moraga Road and north of Rheem Boulevard).

The pipeline route would extend along Rheem Boulevard west of Chalda Way. Land uses in the immediate vicinity include commercial development and open space, with residential development further east on the south side of Rheem Boulevard.

Agricultural Resources

There are no agricultural resources within or adjacent to the Fay Hill Pumping Plant and Pipeline Improvements; the site is designated as Urban and Built-up Land on the Important Farmland Maps. As noted above, there are grazing lands in the vicinity of the project area.

Recreation Resources

There are no recreation resources within or adjacent to the Fay Hill Pumping Plant and Pipeline Improvements project area.

Fay Hill Reservoir

The Fay Hill Reservoir is located on existing EBMUD-owned property north of Rheem Boulevard and east of Moraga Road in Moraga (see Map FHRES-1). The reservoir is situated on a hilltop surrounded by privately owned grazing land and open space. There is relatively new residential development on the south side of Rheem Boulevard, where an access road enters the EBMUD property. Two new housing developments have been proposed for construction in open space areas near the reservoir property—Rancho Laguna and Palos Colorados (to include a golf course).

Agricultural Resources

The Fay Hill Reservoir site is designated as Grazing Land on the Important Farmland Maps, and adjacent Rheem Valley areas include existing grazing use.

Recreation Resources

There are no recreation resources within or adjacent to the Fay Hill Reservoir site.

Glen Pipeline Improvements

The Glen Pipeline Improvements consists of a pipeline segment that would be constructed in public streets in Lafayette (see Map C-GLENPL-1). The segment would be constructed in Nordstrom Lane, from Hilltop Drive to Glen Road, then east in Glen Road to just west of Monticello Road. The segment is surrounded by single-family residential development.

Agricultural Resources

There are no agricultural resources within or adjacent to the Glen Pipeline Improvements project area; the site is designated as Urban and Built-up Land on the Important Farmland Maps.

Recreation Resources

There are no designated recreation resources within or adjacent to the proposed Glen Pipeline Improvements.

Happy Valley Pumping Plant and Pipeline

This proposed new pumping plant would be constructed on a privately owned parcel on Lombardy Lane near Van Ripper Lane in Orinda (see Maps C-HVPP to C-HVPP-3). The currently undeveloped site is surrounded by single-family residential development.

The proposed Happy Valley Pipeline alignment follows Miner Road and Lombardy Lane through a predominately single-family residential neighborhood. The southern portion of the proposed pipeline alignment, near Oak Arbor Road (its terminus), is adjacent to the Orinda Country Club Golf Course.

Agricultural Resources

There are no agricultural resources within or adjacent to the Happy Valley Pumping Plant and Pipeline site; the site is designated as Urban and Built-up Land on the Important Farmland Maps.

Recreation Resources

There are no recreation resources at or adjacent to the proposed Happy Valley Pumping Plant and Pipeline site. As noted above, a portion of the proposed pipeline would be adjacent to the Orinda County Club Golf Course.

Highland Reservoir and Pipelines

Highland Reservoir would be constructed on an undeveloped hill slope in oak woodland within the Lafayette Reservoir Recreation Area, in an area traversed by a dirt road and hiking trails (see Map C-HIGHRES-1). An inlet/outlet pipeline is proposed for construction to connect the new reservoir with the Lafayette WTP. It would be constructed through the recreation area, across Mt. Diablo Boulevard to the Lafayette WTP. A new overflow pipeline would be constructed from the Highland Reservoir tank to the Lafayette Reservoir, extending into the reservoir approximately 600 feet. The proposed construction access road for the project would extend from Mt. Diablo Boulevard south to the reservoir site through open space (both privately owned open space and a portion of the Lafayette Reservoir Recreation Area).

Agricultural Resources

There are no existing agricultural uses within or adjacent to the Highland Reservoir and Pipelines site. However, areas of the project site within the Lafayette Reservoir area are designated as

Grazing Land, while other portions of the pipeline route are designated as Urban and Built-up Land on the Important Farmland Maps.

Recreation Resources

As noted above, the Highland Reservoir would be constructed within the Lafayette Reservoir Recreation Area. This recreation area, owned and operated by EBMUD, lies directly across Mt. Diablo Boulevard to the south of the WTP. The 1.4-billion-gallon reservoir, completed in 1933, serves as an EBMUD standby drinking water supply. The 925-acre reservoir site was opened to public recreational use in 1966. Activities include hiking, nonmotorized boating, fishing, and picnicking. The reservoir has two main trails—a 2.7-mile paved lakeside loop trail and the 4.7-mile Rim Trail, as shown on Map A2 (Lafayette Chamber of Commerce, 2005). A series of shorter unpaved trails connect the Lakeside and Rim Trails. The reservoir would be located adjacent to the Rim Trail, northwest of where that trail meets the Lakeside Trail.

Leland Isolation Pipeline and Bypass Valves

Pipeline improvements would be constructed along Lacassie Avenue, in a commercial (retail and office) section of Walnut Creek (see Maps C-LELPL-1 and C-LELPL-2). Valve improvements would occur on and near the Danville Pumping Plant, and adjacent to Danville Boulevard and the County Transportation and Utility Corridor, commonly referred to as the Iron Horse Regional Trail, in a predominately residential area of unincorporated Contra Costa County.

Agricultural Resources

There are no agricultural resources within or adjacent to the Leland Isolation Pipeline and Bypass Valves; the site is designated as Urban and Built-up Land on the Important Farmland Maps.

Recreation Resources

The Iron Horse Regional Trail is a 12-foot-wide paved multi-use trail in a 20-foot-wide easement. It follows a former Southern Pacific Railroad right-of-way that was abandoned in 1977. The trail currently extends approximately 16 miles, from Monument Boulevard in Concord south to the Contra Costa County/Alameda County line. The trail connects residential and commercial areas, schools, public transportation, open space and parks, regional trails, and other community facilities. The Iron Horse Regional Trail is operated and maintained by the East Bay Regional Parks District (EBRPD) under a license agreement with Contra Costa County. It is also a utility corridor, with existing underground facilities and easements.

Lafayette Reclaimed Water Pipeline

The Lafayette Reclaimed Water Pipeline would be co-located with the Highland Reservoir Pipeline between the proposed Highland Reservoir and the Lafayette WTP. However, at Mt. Diablo Boulevard, the Lafayette Reclaimed Water Pipeline would extend westward to the WTP, while the Highland Inlet/Outlet Pipeline would extend eastward to the WTP. See the description for the Highland Reservoir and Pipelines, above.

Agricultural Resources

There are no existing agricultural uses within or adjacent to the Lafayette Reclaimed Water Pipeline site. However, areas of the project site within the Lafayette Reservoir area are designated as Grazing Land, while other portions of the pipeline route are designated as Urban and Built-up Land on the Important Farmland Maps.

Recreation Resources

The Lafayette Reclaimed Water Pipeline would be constructed within the Lafayette Reservoir Recreation Area, described above under Highland Reservoir and Pipelines. In addition, the pipeline would cross the Walter Costa Trail, as described under the Lafayette WTP, above.

Moraga Reservoir

The existing Moraga Reservoir is located on EBMUD-owned property at the intersection of Draeger Drive and Claudia Court in Moraga (see Map C-MORRES-1). The reservoir is surrounded by single-family residential development.

Agricultural Resources

There are no agricultural resources within or adjacent to the Moraga Reservoir; the site is designated as Urban and Built-up Land on the Important Farmland Maps.

Recreation Resources

There are no recreation resources within or adjacent to the Moraga Reservoir project area.

Moraga Road Pipeline

The proposed improvements would be constructed from the Lafayette WTP, then across Mt. Diablo Boulevard and through the Lafayette Reservoir Recreation Area where the pipeline would run overland toward the southeast to Nemea Court. The pipeline would then extend southward to Moraga Road and then along Moraga Road from the intersection of Draeger Drive and Moraga Road (the tie-in to the existing Moraga Reservoir) (see Maps C-MORPL-1 to C-MORPL-7). The pipeline would be constructed within Lafayette and Moraga public streets through areas of mixed residential and commercial development and on EBMUD-owned open space at the Lafayette Reservoir Recreation Area.

Agricultural Resources

The Moraga Road Pipeline route includes land designated as Grazing and Urban and Built-up Lands on the Important Farmland Maps.

Recreation Resources

As noted above, the Moraga Road Pipeline would cross the Lafayette Reservoir Recreation Area, including the Rim Trail. See the description of the recreation area included above for the Highland Reservoir and Pipelines project component.

Sunnyside Pumping Plant

This proposed new pumping plant would be constructed on privately owned, currently undeveloped property located in Lafayette, on the Orinda border near the intersection of Happy Valley Road and Sundown Terrace (see Map C-SUNPP-1). The project site is adjacent to an existing horse paddock. EBMUD would purchase the project site prior to project construction. The site is surrounded by low-density single-family residential development and open space.

Agricultural Resources

There are no agricultural resources within or adjacent to the Sunnyside Pumping Plant site; the site is designated as Urban and Built-up Land on the Important Farmland Maps. However, the proposed site is in the vicinity of land identified as Grazing Land on the Important Farmlands Map.

Recreation Resources

There are no recreation resources within or adjacent to the Sunnyside Pumping Plant site.

Tice Pumping Plant and Pipeline

The Tice Pumping Plant would be located on privately owned vacant land in unincorporated Contra Costa County, south of Olympic Boulevard (see Map C-TICEPP-1). The site is at the foot of a steep, grass-covered slope, adjacent to a segment of paved recreational trail that parallels Olympic Boulevard. Adjacent land uses include open space to the south, commercial uses to the east, and single-family residential development to the west (along Olympic Boulevard) and to the north (across Olympic Boulevard). The pipeline would extend east along Olympic Boulevard, then north in the right-of-way of Boulevard Way, past corner commercial development, and through a single-family residential neighborhood.

Agricultural Resources

There are no agricultural resources within or adjacent to the Tice Pumping Plant and Pipeline; the site is designated as Urban and Built-up Land on the Important Farmland Maps.

Recreation Resources

There are no recreation resources within the Tice Pumping Plant and Pipeline site. As noted above, the Tice Pumping Plant and Pipeline site is located adjacent to a segment of paved recreational trail that parallels Olympic Boulevard.

Withers Pumping Plant

The Withers Pumping Plant would be located on EBMUD property at the existing Grayson Reservoir, near the intersection of Reliez Valley Road and Silver Hill Way in an unincorporated area of Contra Costa County (see Map C-WITHPP-1). The site is surrounded by open space and single-family residential development.

Agricultural Resources

The Withers Pumping Plant location does not include agricultural uses, and the site is designated as Urban and Built-up Land on the Important Farmland Maps. However, the site is located less than one-half mile from Grazing Lands identified on the Important Farmlands Maps.

Recreation Resources

There are no recreation resources at or adjacent to the proposed Withers Pumping Plant site. The Grayson Woods Golf Course is located to the east of a residential neighborhood that is adjacent to the project site.

Project Consistency with Plans and Policies

Consistency between the proposed WTTIP and general plans and other plans is discussed in accordance with CEQA Guidelines Section 15125(d). Appendix D summarizes the content of general plans for the WTTIP area land use planning agencies and the EBMUD *East Bay Watershed Master Plan*. Resource-specific plans, such as air quality attainment plans, are discussed in the resource sections that follow Section 3.2. It is EBMUD's practice to work closely with host jurisdictions and the neighboring community during project planning and to conform to local land use plans and policies to the extent possible. However, actual determinations of project consistency with general plans would be made by the pertinent land use jurisdictions during project implementation.

Overall, implementation of the WTTIP appears to be consistent with general and regional plans. The proposed project would facilitate local jurisdictions' ability to achieve general plan goals and policies related to providing a high-quality water supply, addressing capacity deficiencies, and improving emergency response capabilities by improving water available for firefighting. As discussed in Section 2.2 of the Project Description, the communities that would benefit from the WTTIP vary depending on the need being addressed and the facility being improved. The improvements to reduce microbial pathogens and to control disinfection byproducts are proposed at all of the WTPs and therefore represent a health benefit to all EBMUD treated-water customers. Improvements to ozonation systems at the Sobrante and Upper San Leandro WTPs would provide the District's West of Hill's customers with better-tasting water. Improvements to address existing capacity deficiencies, to meet projected increases in demand, and to address existing hydraulic constraints would benefit customers in the Lamorinda/Walnut Creek area by ensuring that supplies continue to meet demand, increasing the amount of water available for firefighting during warm weather, and reducing problems associated with fluctuations in water pressure.

Implementation of the WTTIP would result in potential inconsistencies with the land use and zoning designations of applicable jurisdictions (see Table 3.2-1) and with the general plans of local jurisdictions related to tree removal and to the temporary closure of public roadways and emergency access routes. However, potential inconsistencies would be short term for the most part (i.e., would occur during construction only), with the exception of potential land use and zoning designation inconsistencies, conflicts with tree removal policies, and conflicts with some policies related to views and scenic resources. As noted above, actual determinations of project consistency with general plans would be made by the pertinent land use jurisdictions during project implementation.

Due to the extent and type/size of trees that could be removed for construction of the Highland Reservoir and Pipelines, the proposed project may be inconsistent with City of Lafayette Open Space Goal OS-4, Open Space Policy OS-1.3, Open Space Policy OS-3.1, Open Space Policy OS-4.3, and Open Space Policy OS-4.4, which address protection of important trees and woodland areas and specify replacement requirements. Due to the extent and type/size of trees that could be removed for construction of the Highland Reservoir and Pipelines and the Moraga Road Pipeline, the proposed project may be inconsistent with EBMUD's *East Bay Watershed Master Plan* Guideline Bio.5 regarding the protection of heritage native trees and trees with outstanding characteristics.

The Lafayette Reservoir Recreation Area, the Lafayette WTP, and some terrain between the two are within a City-designated Hillside Overlay District. The intent of the overlay district is to preserve hills and ridges within the City in as near a natural state as feasible by regulating development on hillsides and ridgelines. The City of Lafayette could consider some of the WTTIP projects in this area (changes to the Lafayette WTP, the Highland Reservoir and Pipelines, and other proposed pipelines connecting to the Lafayette WTP) to be inconsistent with the Hillside Overlay District. The Highland Reservoir and Moraga Pipeline would be inconsistent with City policies precluding development within a 250-foot setback of City-designated Class II ridgelines. The Highland Reservoir and Pipelines project is located within the 250-foot setback area of a Class II ridgeline. The Moraga Road Pipeline alignment traverses ridgelines designated by the City as Class III and Class II ridges. Both facilities would be exempt from application of this policy pursuant to Section 53091 of the California Water Code.

Temporary road closures associated with the Glen Pipeline Improvements may be inconsistent with City of Lafayette Fire Hazard Policy S-4.1, Police Services Goal S-7 and Policy S-7.3, and Emergency Preparedness Goal S-8 and Policies S-8.1 and S-8.5, which address emergency services and response times. In addition, this project component may be inconsistent with City of Lafayette Circulation Goal C-2 and Circulation Policy C-2.1 regarding the management of traffic flow. Temporary road closures associated with the Happy Valley Pumping Plant and Pipeline may be inconsistent with City of Orinda Safety Implementing Policy 4.2.2.N regarding adequate medical and other emergency services. Temporary access closures associated with the Tice Pipeline may be inconsistent with Contra Costa County Roadway and Transit Policy 5-16, Public Protection Goal 7-V, Public Protection Policy 7-59, Fire Protection Goal 7-7, and Fire Protection Policies 7-62 and 7-63 regarding emergency service and response times.

3.2.3 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:

- Physically divide an established community;
- Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance;
- Conflict with existing zoning for agricultural use or a Williamson Act contract;
- Involve other changes that could result in conversion of farmland to nonagricultural use;
- Increase the use of existing parks or recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated; or
- Include recreational facilities or require construction or expansion of recreational facilities that might have an adverse physical effect on the environment.

Impacts and Mitigation Measures

Table 3.2-2 indicates the level of significance for the identified land use impacts, listed by WTTIP project component. These land use impacts are described below.

Impact 3.2-1: Division of an established community.

Proposed improvements at the five water treatment plants and the Ardith Reservoir and Donald Pumping Plant, Fay Hill Pumping Plant and Pipeline Improvements, Fay Hill Reservoir, Leland Isolation Pipeline and Bypass Valves, Moraga Reservoir, and Withers Pumping Plant project sites would be located at existing EBMUD facilities, near or within the developed areas of those facility sites, and implementation of these WTTIP components would not result in a land use impact.

The Happy Valley Pumping Plant, Sunnyside Pumping Plant, and Tice Pumping Plant project components would be located at properties that are currently privately owned. These properties are located within predominantly single-family residential and open space areas. The Highland Reservoir would be located in a relatively undeveloped area of the Lafayette Reservoir Recreation Area. The proposed project components would be relatively small, compact facilities that would not disrupt or divide the existing communities they are located within; therefore, the Happy Valley Pumping Plant, Highland Reservoir, Sunnyside Pumping Plant, and Tice Pumping Plant project components would result in a less-than-significant land use impact.

Construction of the Orinda-Lafayette Aqueduct, Fay Hill Pipeline Improvements, Glen Pipeline Improvements, Happy Valley Pipeline, Highland Pipelines, Leland Isolation Pipeline, Lafayette Reclaimed Water Pipeline, Moraga Road Pipeline, and Tice Pipeline project components would include construction within and/or across public roads and would temporarily disrupt access

TABLE 3.2-2
SUMMARY OF POTENTIAL PROJECT-LEVEL LAND USE IMPACTS

Facility	Impact 3.2-1 Division of an Established Community	Impact 3.2-2 Agricultural Resources Impacts	Impact 3.2-3 Recreation Resources Impacts
Lafayette WTP			
Alternative 1	LTS	–	LTS
Alternative 2	–	–	LTS
Orinda WTP			
Alternative 1	–	–	LTS
Alternative 2	–	–	LTS
Walnut Creek WTP			
Alternative 1 or 2	–	–	LTS
Sobrante WTP			
Alternative 1 or 2	–	–	–
Upper San Leandro WTP			
Alternative 1 or 2	–	–	–
Orinda-Lafayette Aqueduct			
Alternative 2	LTS	–	LTS
Ardith Reservoir and Donald Pumping Plant	–	–	–
Fay Hill Pumping Plant and Pipeline Improvements	LTS	LTS	–
Fay Hill Reservoir	–	LTS	–
Glen Pipeline Improvements	LTS	–	–
Happy Valley Pumping Plant and Pipeline	LTS	–	LTS
Highland Reservoir and Pipelines	LTS	LTS	LTS
Lafayette Reclaimed Water Pipeline	LTS	LTS	LTS
Leland Isolation Pipeline and Bypass Valves	LTS	–	LTS
Moraga Reservoir	–	–	–
Moraga Road Pipeline	LTS	LTS	LTS
Sunnyside Pumping Plant	LTS	LTS	–
Tice Pumping Plant and Pipeline	LTS	–	LTS
Withers Pumping Plant	–	LTS	LTS

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

through pipeline routes. Pipeline construction would progress at a rate between 40 feet per day and 120 feet per day (depending on the pipeline, location constraints, and construction techniques), and it is assumed that construction activities generally would be located in front of any one residence for approximately one to two days. Construction-phase detours would allow continued access to adjacent communities throughout the construction period at most construction areas (see Section 3.8, Traffic and Circulation, Impact 3.8-5).

Following construction, access along roadways would be reestablished. The WTTIP pipeline project components would result in a temporary and less-than-significant land use impact.

Impact 3.2-2: Agricultural resources impacts.

The California Department of Conservation's Important Farmland Maps for Contra Costa County and Alameda County indicate that project components are predominately located within areas or are adjacent to areas designated as Urban and Built-up Lands (see the Setting section). Construction of these project components would not result in an agricultural resources impact. However, some components are located on designated Grazing Land or are adjacent to land with grazing uses or designations, including:

- Fay Hill Pumping Plant and Pipeline Improvements – adjacent areas include existing grazing use
- Fay Hill Reservoir – designated as Grazing Land, adjacent areas include grazing use
- Highland Reservoir and Pipelines – includes areas designated as Grazing Land
- Lafayette Reclaimed Water Pipeline – includes areas designated as Grazing Land
- Moraga Road Pipeline – includes areas designated as Grazing Land
- Sunnyside Pumping Plant – in the vicinity of land designated as Grazing Land
- Withers Pumping Plant – adjacent areas include land designated as Grazing Land

Construction of the proposed WTTIP could disrupt ongoing grazing uses (i.e., noise, use of construction equipment) located near project components or temporarily disturb lands designated for grazing use. However, the WTTIP would not convert Prime Farmland, Unique Farmland, or Farmland of State Importance and would not result in the permanent loss of agricultural use. Overall grazing productivity would not be substantially affected. Potential disruption of grazing activities would end upon the completion of construction activities. Therefore, the proposed project would result in a less-than-significant agricultural resources impact for the above-listed project elements.

Impact 3.2-3: Recreation resources impacts.

There are no recreation resources within or adjacent to the Sobrante WTP, Upper San Leandro WTP, Ardith Reservoir and Donald Pumping Plant, Fay Hill Pumping Plant and Pipeline Improvements, Fay Hill Reservoir, Glen Pipeline Improvements, Moraga Reservoir, and Sunnyside Pumping Plant project components, as described above in the Setting. Implementation of these WTTIP components would not result in a recreation impact.

Following completion of the proposed WTTIP under Alternative 1, a segment of the Walter Costa Trail adjacent to the Lafayette WTP would be relocated. The specific alignment of the relocated segment would be determined in consultation with the City of Lafayette. This project would include future CEQA evaluation, as required, during the project development process.

Construction of some WTTIP facilities would temporarily disrupt access to or enjoyment of existing recreation facilities. If such disruption resulted in the diversion of a large number of recreation users to other recreational facilities within the project region, overcrowding could occur at those facilities during peak-use periods, causing more rapid deterioration of facilities and greater impacts to the natural and cultural resources within those areas. For instance, overcrowding could lead to parking, trail use, and other activities at nondesignated areas, resulting in disturbance of sensitive resources found in these areas. Projects that could cause recreation resources impacts are described below.

Lafayette WTP. Under Alternative 1, construction staging would require the temporary closure (for the duration of the approximately four- to six-year construction period) of the short segment of Walter Costa Trail that passes through the south side of the WTP. Under Alternative 2, construction activities could result in noise, dust, construction traffic, and access disruption and could therefore disrupt recreational use of the Walter Costa Trail. The District would determine during the project design phase whether construction activities would require closure of the WTP segment of Walter Costa Trail under Alternative 2.

Orinda WTP. As described in the Setting, above, the Orinda Sports Field will be moved from the Orinda WTP property prior to proposed construction and would not be affected by the proposed project. Construction activities and staging would generate noise, dust, construction traffic, and access disturbance and could therefore disrupt recreational uses of the golf course to the east of the WTP, and the asphalt trail that runs along the south side of the property (on the north side of Camino Pablo) over the approximately four- to six-year construction period. In particular, a substantial amount of excavation would be associated with the potential future clearwell construction projects at the site of the current Orinda Sports Field under both alternatives.

Walnut Creek WTP. Construction activities at the Walnut Creek WTP would result in noise, dust, construction traffic, and access disruption and could therefore disrupt recreational use of the adjacent Acalanes Ridge Open Space and the adjacent segment of the Briones–Mt. Diablo Trail over the approximately one- to two-year construction period.

Orinda-Lafayette Aqueduct. The proposed aqueduct would be located in the vicinity of the Orinda Sports Field, a paved multi-use trail adjacent to Camino Pablo, the Walter Costa Trail, and the Lafayette Reservoir Recreation Area. As noted above, the Orinda Sports Field would move from the Orinda WTP site prior to implementation of the WTTIP. While most construction activities would be located below ground, construction of the Orinda-Lafayette Aqueduct would result in noise, dust, and construction traffic, particularly at tunnel portals/shafts and along the pipeline route, that could cause disruption of recreation uses during the course of the approximately three- to five-year construction period (see Appendix B, Table B-OLA-1 regarding the rate and duration of pipeline construction).

Happy Valley Pipeline. The southernmost segment of the pipeline connecting the new pumping plant to Happy Valley Reservoir would be constructed in Miner Road, passing along the western side of the northern tip of the Orinda Country Club Golf Course. Construction activities would result in noise, dust, construction traffic, and access disruption (see Appendix B, Table B-HVPP-2 regarding the rate and duration of pipeline construction), causing temporary disturbance to recreation use of the golf course during part of the approximately one- to two-year construction period.

Highland Reservoir and Pipelines. The Highland Reservoir and Pipelines would be located within the Lafayette Reservoir Recreation Area. Construction of the facility would result in noise, dust, construction traffic, and access disruption (see Appendix B, Table B-HIGHRES-2 regarding the rate and duration of pipeline construction). Therefore, general construction activities could result in recreation area disturbance (including picnicking, trail use, and fishing/boating use) during the approximately one- to two-year construction period. A short segment of the inlet/outlet pipeline route would cross the recreation area entrance access road; however, this segment would be constructed at night, and vehicle access to the recreation area would be maintained. Construction of the overflow pipeline would require closure of the west end of the Lakeside Trail for approximately one week and would disrupt fishing/boating use in the vicinity of the pipeline. Construction of the Highland Reservoir would require closure of an adjacent segment of the Rim Trail, from the Lakeside Trail intersection to just beyond the proposed reservoir location, for the duration of reservoir construction. However, Rim Trail users would be able to bypass the closed trail section through use of the Westview Trail or other trails that link the Lakeside and Rim Trails. Following completion of reservoir construction, a short segment of the Rim Trail would be relocated to the northeast of its existing alignment.

Lafayette Reclaimed Water Pipeline. The Lafayette Reclaimed Water Pipeline would be located within the Lafayette Reservoir Recreation Area and would cross the Walter Costa Trail in the vicinity of the Lafayette WTP. Construction of the facility would result in noise, dust, construction traffic, and access disruption. Therefore, general construction activities could result in recreation area disturbance during the approximately one- to two-year construction period. A short segment of the pipeline route would cross the recreation area entrance road; however, this segment (and the co-located Highland Pipeline segment described above) would be constructed at night; therefore, vehicle access to the recreation area would be maintained. Construction would also require closure of a short segment of the Walter Costa Trail. Construction of this pipeline would occur prior to Lafayette WTP improvements.

Leland Bypass Valves. Valve improvements would be located adjacent to the Iron Horse Regional Trail. Construction activities would result in noise, dust, construction traffic, and access disruption, causing temporary disruption of trail use during part of the approximately one-year construction period.

Moraga Road Pipeline. The Moraga Road Pipeline would cross the Lafayette Reservoir Recreation Area. A short segment of the pipeline would cross the Rim Trail and a neighborhood connector trail, requiring closure of affected trail segments during pipeline construction (see Appendix B, Table B-MORPL-1 regarding the rate and duration of pipeline construction). However, Rim Trail users would be able to bypass the closed trail section through use of the Big Oak Trail or other trails that link the Lakeside and Rim Trails. Construction of the facility would result in noise, dust, and construction traffic and could disrupt access to the recreation area during part of the approximately one- to two-year construction period.

Tice Pumping Plant and Pipeline. Construction activities at the Tice Pumping Plant and Pipeline site would result in noise, dust, construction traffic, and access disruption (see Appendix

B, Table B-TICEPP-2 regarding the duration of pipeline construction) and could therefore disrupt use of the adjacent segment of paved recreational trail that parallels Olympic Boulevard over the approximately one- to two-year construction period.

Withers Pumping Plant. Construction of the Withers Pumping Plant would result in noise, dust, construction traffic, and access disruption. The Grayson Woods Golf Course, situated to the east of a residential neighborhood that is adjacent to the project site, is located some distance from the project site. However, construction activities associated with the proposed Withers Pumping Plant could disrupt recreational use of the golf course over the approximately one- to two-year construction period.

Operation of WTTIP components would require periodic maintenance activities that would further disrupt recreation uses. For instance, maintenance access to Lafayette WTP facilities could disrupt use of the Walter Costa Trail, and access to the Highland Reservoir would likely be via the Lafayette Reservoir Recreation Area Rim Trail. As a result of the construction and operation effects described above, some recreation users might use other regional facilities. While the proposed WTTIP could result in closure or disruption of several recreation opportunities, construction of project components would be phased, operation activities would be periodic, a variety of recreation types would be affected (i.e., paved trails in urban areas, rural recreation opportunities, golf courses), and effects would be distributed over a relatively large area within the EBMUD service area. Further, given the availability and diversity of recreation opportunities in the vicinity of the project components listed above, diversion of recreation users would not likely result in overcrowding and associated potential deterioration of facilities and natural and cultural resources. Therefore, construction and operation of the above-described project elements would result in a less-than-significant recreation resources impact.

Program-Level Elements

Lafayette WTP

Impacts associated with proposed program-level changes to the Lafayette WTP under Alternative 1, including disruption of an established community, agricultural resources impacts, and recreation resources impacts, would be similar to those described above for project-level elements (Impacts 3.2-1 through 3.2-3).

Orinda WTP

Impacts associated with proposed program-level changes to the Orinda WTP, including disruption of an established community, agricultural resources impacts, and recreation resources impacts, would be similar to those described above for project-level elements (Impacts 3.2-1 through 3.2-3). Program-level developments under Alternative 1 and Alternative 2 are shown in blue on Maps D-OWTP-1 and D-OWTP-2 following Chapter 2. As shown, the elements common to both alternatives include new clearwell capacity (two program-level clearwells are shown under Alternative 1; one program-level clearwell is shown under Alternative 2), chlorine contact basin, UV disinfection facility, low-lift pumping plant, high-rate sedimentation unit and San Pablo Pumping Plant to pump water through the San Pablo Pipeline (discussed below). These facilities would be constructed in the existing backwash water settling basins (to be decommissioned under either alternative), the Orinda Sports Field, and intervening property. As described in the Setting, above, the Orinda Sports Field will be moved from the Orinda WTP property prior to proposed construction. Construction activities could disrupt use of the paved trail adjacent to Camino Pablo; the duration of construction would depend on the program-level elements constructed. Existing vegetation at properties adjacent to the WTP property would continue to separate activities in this part of the WTP property from adjacent communities.

Walnut Creek WTP

Potential program-level elements at the Walnut Creek WTP include high-rate sedimentation units and a UV disinfection facility. Impacts associated with proposed program-level changes to the Walnut Creek WTP, including disruption of an established community, agricultural resources impacts, and recreation resources impacts, would be similar to those described above for project-level elements (Impacts 3.2-1 through 3.2-3).

Leland Reservoir Replacement

The Leland Reservoir Replacement project would be located at an existing EBMUD facility within a residential area. The site and adjacent areas are designated as Urban and Built-up Lands on the Important Farmlands Maps, and there are no existing recreation or agricultural resources within or adjacent to the site. The Leland Reservoir Replacement project would result in less-than-significant, program-level land use, agricultural resources, and recreation resources impacts.

New Leland Pressure Zone Reservoir

The New Leland Pressure Zone Reservoir site would be located at Caltrans and privately owned properties in Walnut Creek; a potential construction access route is in unincorporated Contra Costa County. This site has low-density residential development to the north and east, open space to the south, and I-680 to the west. A pipeline would be constructed to connect the new tank with existing EBMUD facilities at Rudgear Road and Danville Boulevard in a residential area just west of I-680.

The proposed project would likely be a relatively small, compact facility and would not likely disrupt or divide the existing community it would be located within. The New Leland Pressure Zone Reservoir would result in a less-than-significant, program-level land use impact.

The New Leland Pressure Zone Reservoir site and adjacent areas are designated as Urban and Built-up Lands. There are no agricultural resources within the New Leland Pressure Zone Reservoir site; however, there are Important Farmland Maps Grazing lands in the project vicinity, adjacent to the Sugarloaf Open Space. The New Leland Pressure Zone Reservoir project component would not significantly affect those lands as any construction-related impacts would be temporary.

The reservoir site is adjacent to the Sugarloaf Open Space. Potential construction access routes being considered could be located within portions of the open space, including potential use of the Bottom Spring Trail. Access through the open space could disrupt use of or require closure of segments of the trail or other areas of the open space during periods of construction. In addition, reservoir construction would result in noise, dust, construction traffic, and access disruption that could further disrupt use of the Sugarloaf Open Space. Some recreation users might divert to other regional facilities. However, the availability and diversity of recreation opportunities in the vicinity of the New Leland Pressure Zone Reservoir site, it is unlikely that the diversion of recreation users would result in overcrowding and associated potential deterioration of facilities and natural and cultural resources. Therefore, construction of this project component would result in a less-than-significant, program-level recreation resources impact.

St. Mary's Road/Rohrer Drive Pipeline

This pipeline route would follow Moraga Road south from Draeger Drive to St. Mary's Road, then travel east and north along St. Mary's Road to Rohrer Drive, ending at the eastern terminus of Oak Canyon Road. This pipeline route would pass through residential areas and two public recreation areas—the park adjacent to Moraga's Town Offices off Donald Drive (Hacienda de las Flores) and Moraga Commons, and the Lafayette-Moraga Regional Trail. The route would also pass the Campolindo High School and St. Mary's College campuses.

Construction of the St. Mary's Road/Rohrer Drive Pipeline would include construction within public roads and would likely disrupt access through the pipeline route temporarily, particularly along Rohrer Drive where the roadway is narrow and winding. Construction-phase detours would likely be implemented to allow continued access to adjacent communities throughout the construction period. Following construction, access along roadways would likely be reestablished. The St. Mary's Road/Rohrer Drive Pipeline project would result in a temporary but significant program-level land use impact.

The California Department of Conservation's Important Farmland Maps for Contra Costa County designates the potential pipeline route as Urban and Built-up Lands. However, adjacent areas include designated Prime Farmland, including a small area located just west of the Moraga Road/ St. Mary's Road intersection. Implementation of this proposed project would not directly affect those areas, however, and therefore convert Prime Farmland, Unique Farmland, or Farmland of State Importance nor likely result in the permanent loss of agricultural use. Any disruption of agricultural activities would end upon the completion of construction activities. Therefore, the proposed St. Mary's Road/Rohrer Drive Pipeline would result in a less-than-significant, program level agricultural resources impact.

Portions of the pipeline alignment would cross the Lafayette-Moraga Regional Trail and would be adjacent to a park next to Moraga's Town Offices and Moraga Commons, disrupting use of these recreation resources during periods of the approximately one- to two-year construction phase. Some recreation users might divert to other regional facilities. However, given the availability and diversity of recreation opportunities in the vicinity of the St. Mary's Road/Rohrer Drive Pipeline project, diversion of recreation users would not likely result in overcrowding and associated potential deterioration of facilities and natural and cultural resources. Therefore, construction of this pipeline project would result in a less-than-significant, program-level recreation resources impact.

San Pablo Pipeline

The San Pablo Pipeline would be constructed within the EBMUD Old San Pablo Trail. The Trail runs 4.7 miles along San Pablo Reservoir, is unpaved, and provides access to several picnic areas as well as two ranger stations and the marina. Constructing within the trail would result in temporary impacts but not permanently disrupt or divide adjacent communities.

The EBMUD San Pablo Recreation Area provides recreation opportunities, including fishing and boating, picnicking, nature study, and hiking. Fishing and boating operations are managed by Urban Park Concessionaires. The EBMUD San Pablo Recreation Area is open from mid-February to mid-November and is closed during the migratory bird season as part of EBMUD's wildlife enhancement program. The San Pablo Recreation Area includes group picnic areas, a large play apparatus for children, as well as picnicking, hiking, and biking (on paved paths). Designated trails adjacent to the reservoir include the Old San Pablo Trail and the Oursan Loop Trail. These trails interconnect with multiple casual trails within EBMUD protected watershed lands. A segment of the Bay Area Ridge Trail is co-designated along a portion of the Old San Pablo Trail, from the EBMUD/EBRPD property boundary to the San Pablo Recreation Area entrance at San Pablo Dam Road. Some recreational trails on EBMUD watershed lands are accessible by permit only.

The California Department of Conservation's Important Farmland Maps for Contra Costa County designates segments of the potential pipeline route as Grazing Lands. However, the proposed project component would not convert Prime Farmland, Unique Farmland, or Farmland of State Importance and would not likely result in the permanent loss of agricultural use. Overall grazing productivity would not be substantially affected, and any disruption of grazing activities would end upon the completion of construction activities. Therefore, this proposed project would result in a less-than-significant, program-level agricultural resources impact.

Portions of the San Pablo Pipeline would be located within Old San Pablo Trail, disrupting use of or requiring closure of trail segments during periods of the approximately one- to two-year construction phase. In addition, pipeline construction would result in noise, dust, construction traffic, and access disruption that could further disrupt use of the San Pablo Recreation Area. Some recreation users might divert to other regional facilities. However, given the availability and diversity of recreation opportunities in the vicinity of the San Pablo Pipeline project, diversion of recreation users would not likely result in overcrowding and associated potential deterioration of facilities and natural and cultural resources. Therefore, construction of this project component would result in a less-than-significant, program-level recreation resources impact.

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3.3 Visual Quality

3.3.1 Approach to Analysis

This section addresses the aesthetic and visual quality impacts associated with the proposed construction and operation of the WTTIP. It includes a description of existing visual conditions and an evaluation of potential effects on visual resources and public view corridors. Presumed views from private viewpoints are also discussed. Over 100 photographs document existing visual conditions at the project sites. Photographs of existing visual conditions and associated viewpoint maps are summarized in Table 3.3-1, and are presented in the Visual Quality Figures section following this chapter.

TABLE 3.3-1
PHOTOGRAPHS OF EXISTING VISUAL CONDITIONS – WTTIP PROJECT FACILITY SITES

Facility Site	Viewpoint Map	Figure Number for Site Photos	Photo Numbers
Lafayette WTP	3.3-LWTP-1	3.3-LWTP-2, 3.3-LWTP-3	L1 – L8
Orinda WTP	3.3-OWTP-1	3.3-OWTP-2, 3.3-OWTP-3	O1 – O8
Orinda-Lafayette Aqueduct	3.3-OWTP-1	3.3-OWTP-4	O9 – O11
Walnut Creek WTP	3.3-WCWTP-1	3.3-WCWTP-2, 3.3-WCWTP-3	WC1 – WC8
Sobrante WTP	3.3-SOBWTP-1	3.3-SOBWTP-2, 3.3-SOBWTP-3, 3.3-SOBWTP-4	S1 – S11
Upper San Leandro WTP	3.3-USLWTP-1	3.3-USLWTP-2, 3.3-USLWTP-3	U1 – U8
Donald Pumping Plant and Ardith Reservoir	3.3-ARRES-1	3.3-ARRES-2, 3.3-ARRES-3, 3.3-ARRES-4	A1 – A12
Fay Hill Reservoir	3.3-FHRES-1	3.3-FHRES-2	F1 – F4
Fay Hill Pumping Plant	3.3-FHPP/MORPL-1	3.3-FHPP/MORPL-2	F5 – F6
Glen Pipeline Improvements	3.3-GLENPL-1	3.3-GLENPL-2	G1 – G4
Happy Valley Pumping Plant	3.3-HVPP-1	3.3-HVPP-2	HV1 – HV4
Highland Reservoir	3.3-HIGHRES-1	3.3-HIGHRES-2	H1 – H4
Highland Pipelines	3.3-HIGHRES-1	3.3-HIGHRES-3	HP1 – HP4
Moraga Reservoir	3.3-MORRES-1	3.3-MORRES-2	M1 – M3
Moraga Road Pipeline	3.3-FHPP/MORPL-1, 3.3-HIGHRES-1	3.3-FHPP/MORPL-2, 3.3-HIGHRES-2	MR1 – MR2, HP3 – HP4
Sunnyside Pumping Plant	3.3-SUNPP-1	3.3-SUNPP-2	SS1 – SS4
Tice Pumping Plant	3.3-TICEPP-1	3.3-TICEPP-2	T1 – T4
Withers Pumping Plant	3.3-WITHPP-1	3.3-WITHPP-2	W1 – W4

For the purpose of this analysis, visual or aesthetic resources are generally defined as the natural and built landscape features that can be seen. The overall visual character of a given area results from the unique combination of natural landscape features, including landform, water, and vegetation patterns as well as built features such as buildings, roads, and other structures.

The EIR visual impact analysis considers view obstruction, negative aesthetic effects, conflict with adopted environmental plans or goals, and light and glare effects. As part of the analysis, a set of computer-generated visual simulations has been produced to illustrate “before” and “after” visual conditions at key project sites. The visual simulations provide a clear depiction of the location, scale, and general appearance of proposed project facilities. Digitized photographs and computer modeling and rendering techniques were used to prepare the simulation images. The simulations are based on conceptual project drawings and technical data provided by District engineers, and are presented in the Visual Quality Figures section following this chapter.

The visual assessment is based on field observations of the project facility sites and surroundings in addition to review of topographic maps, project drawings, and technical data supplied by EBMUD, aerial and ground-level photographs of the project area, computer-generated visual simulations from representative viewing locations, and public planning documents.

3.3.2 Setting

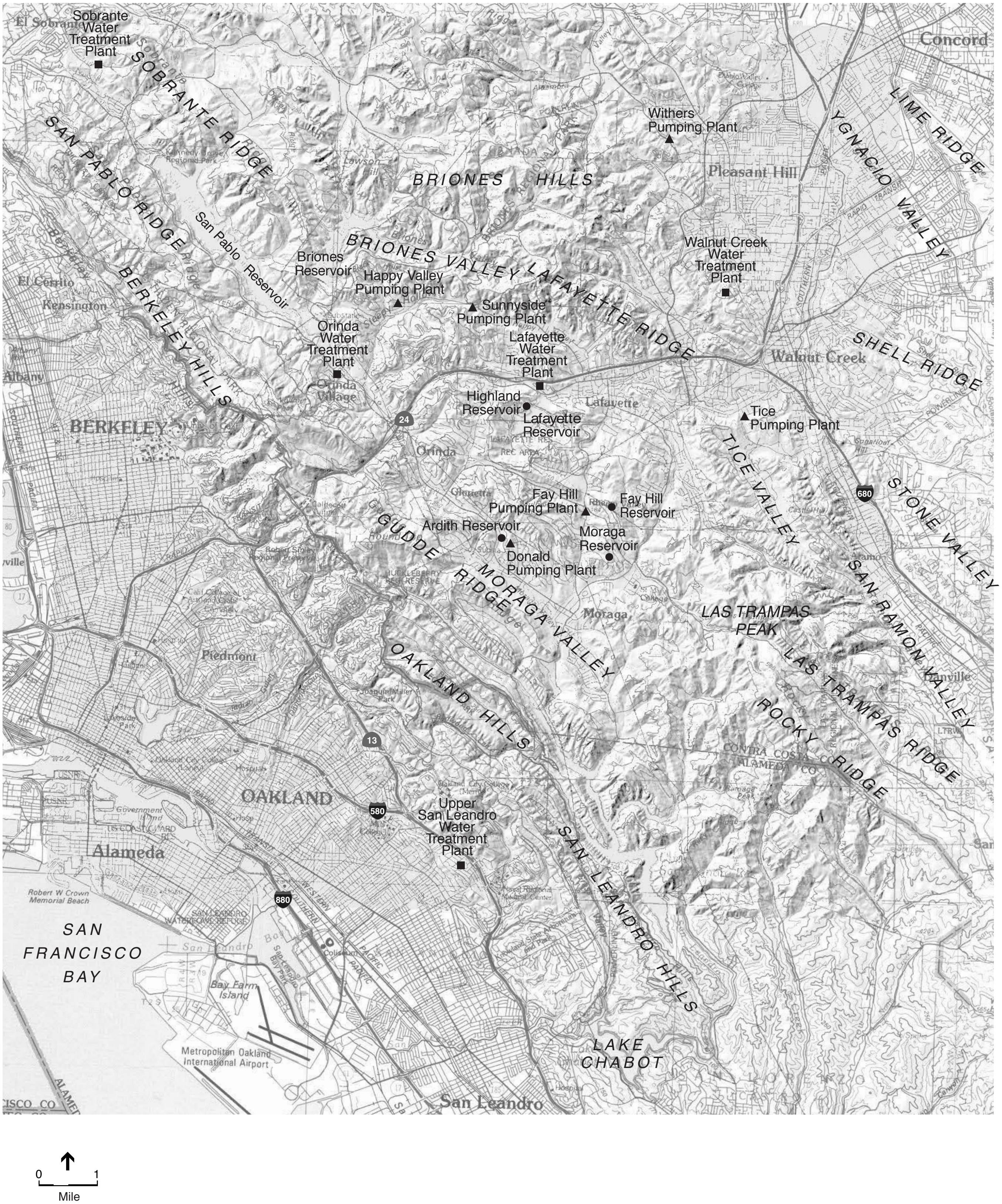
Regional Setting

The WTTIP project sites are located in the Oakland and El Sobrante Hills and in the western Contra Costa County communities of Orinda, Moraga, Lafayette, and Walnut Creek. Figure 3.3-1 shows the regional landscape context for the WTTIP project.

The area’s visual setting contains visual resources representative of California’s northern Coast Range mountains and inland valley landscapes. Natural features include rolling, grass-covered hillsides; steep, rugged hills and narrow ravines; broad valleys and prominent ridges; meandering, tree-lined creeks and drainages; and oak woodlands. Within this landscape setting, peaks, open ridgelines, and wooded hillsides are prominent landscape features that provide a visual backdrop for the region’s urban and suburban development pattern.

Topographic features in the northern project area include the San Pablo and Sobrante Ridges and the Briones Hills, which rise to elevations of over 1,000 feet above sea level. To the west/southwest, the Berkeley-Oakland Hills roughly parallel the San Francisco Bay shoreline, rising to elevations of over 1,500 feet. Prominent landforms situated southeast of the Berkeley Hills, including the Gudde, Rocky, and Shell Ridges as well as Las Trampas Peak, reach up to 2,000 feet in elevation. To the east, the urban and suburban development in the broad Ygnacio Valley spreads to the base of the Mt. Diablo massif, which rises to over 3,800 feet in elevation.

The hills and ridges found in the project area are prominent visual features that provide a sense of orientation and identity within individual community landscapes as well as within the larger regional context. The undeveloped hills and ridgelines serve in part as visual and recreational open space. As such, the hills and designated open-space preserves provide a visual backdrop and contrast to urbanized portions of the suburban communities in the project area.



SOURCE: USGS and Environmental Vision

Figure 3.3-1
Regional Landscape Context

Several major roadway corridors traverse the project area. Interstate 580 (I-580), an east-west scenic corridor, parallels the Oakland Hills, passing near the Upper San Leandro WTP before continuing eastward through the Livermore Valley south of Mt. Diablo. Highway 24, a scenic corridor, passes through a tunnel in the Berkeley Hills, then continues east past the Lafayette WTP to connect to I-680 in the urbanized valley. I-680 extends in a general north-south direction, passing in close proximity to the New Leland Pressure Zone Reservoir site, and provides panoramic views of Mt. Diablo and other ridgelines. Portions of Mt. Diablo Boulevard and Camino Pablo, two locally designated scenic routes, lie adjacent to the Lafayette and Orinda WTPs, respectively. Highway 24, I-580, and I-680 are officially designated state scenic highways, requiring special measures by local governments to protect views along the travel corridor.

Project Facilities

Lafayette WTP

Visual Character and Quality

The Lafayette WTP occupies a 15.7-acre, partially wooded site bordered by Highway 24 on the north and Mt. Diablo Boulevard on the south. Figure 3.3-LWTP-1 is an aerial photograph showing the Lafayette WTP and surrounding area. (All aerial and site photographs, landscape plans, and visual simulations are included in the Visual Quality Figures section following this chapter.)

As shown in the figure, a variety of mature trees and shrubs are clustered around key buildings and site facilities. Relatively dense vegetation is located along much of the site’s perimeter, providing substantial visual screening from offsite locations. The Lafayette Reservoir Recreation Area is directly across Mt. Diablo Boulevard to the south. Some commercial development, including a motel, a synagogue, and a new veterans memorial building, lie to the east. To the west, low-density residential development is situated more than a quarter mile away.

The elevation of the Lafayette WTP site is approximately 350 to 460 feet above sea level. The site’s terrain slopes down gradually from north to south, rising steeply at its northeast corner. Lafayette Creek traverses the southern portion of the site, running roughly parallel to Mt. Diablo Boulevard. Relatively flat open areas are found along Mt. Diablo Boulevard southwest of the creek and near the western end of the site, between the creek and Highway 24. As shown in Figure 3.3-LWTP-1, the Walter Costa Trail runs through the WTP site. The trail connects with the Lafayette Reservoir Recreation Area to the south.

Originally developed in 1953, the Lafayette WTP was improved in 1960 and again in the 1980s. Existing WTP facilities include the Bryant #1 and #2 Pumping Plants, filters, an operations building, a chemical building, clearwell and storage tanks, as well as a variety of ancillary structures such as an electric substation and generator. Two large-diameter, underground aqueducts pass directly through the plant site. Paved parking areas and road access from Mt. Diablo Boulevard are also included on the WTP site.

Public View Corridors

Due to its topography and the presence of mature tree cover, the Lafayette WTP is not very visible to the public. Views of the site are not generally available from distant locations because of intervening terrain and vegetation. Portions of the site and existing facilities are visible, however, from nearby viewing locations in the surrounding vicinity. Figures 3.3-LWTP-2 and 3.3-LWTP-3 present photographic views of the site as seen from representative public vantage points. Figure 3.3-LWTP-1 depicts the viewpoint locations.

The Lafayette WTP lies due south of Highway 24, a designated state scenic highway (Caltrans, 1999, 2005). Mature vegetation situated along the edge of the roadway largely screens motorists' views of the site and facilities, but an unobstructed view of the westernmost portion of the site (shown in Photo L1) is available from a limited segment of Highway 24 (Figure 3.3-LWTP-1 shows viewpoint locations). The roadway, built on a bridge structure at this location, provides a somewhat elevated and typically very brief view of the site.

The Walter Costa Trail (a public recreation trail on EBMUD property via a license agreement with the City of Lafayette) traverses the southern side of the site. Western portions of the site are visible at close range from places along the trail. Photo L2 (Figure 3.3-LWTP-2) is a view looking southwest toward the WTP from the trail near the Highway 24 undercrossing. Photos L3 and L4, also taken from the trail, are views looking northwest toward the site.

Site visibility from Mt. Diablo Boulevard to the south is limited due to the dense tree cover along the roadway and on the site. Photo L5 (Figure 3.3-LWTP-3); is a view from Mt. Diablo Boulevard near the WTP entry road looking northeast. Part of the Bryant Pumping Plant can be seen near the center of the view, beyond the dense mature trees in the foreground. A view looking toward the WTP from Mt. Diablo Boulevard at the Lafayette Reservoir entrance road is presented in Photo L7. Photo L8 shows a view looking west on Mt Diablo Boulevard near the southeastern edge of the WTP near the exit road. Both photos show substantial screening provided by roadside vegetation. Photo L6, taken from the concrete bridge at the WTP entrance, shows a perspective similar to that of Photo L5, but from closer range. In this view, the Bryant Pumping Plant facade can be seen beyond the trees, with the concrete bridge, gate, and gatehouse in the foreground.

Orinda WTP

Visual Character and Quality

The Orinda WTP occupies a 39-acre site along the east side of Camino Pablo. The City of Orinda has designated Camino Pablo a scenic corridor. Manzanita Drive, a narrow two-lane local road, bisects the WTP. Figure 3.3-OWTP-1 is an aerial photograph showing the Orinda WTP and surrounding area.

As shown in the aerial photo, the main portion of the WTP lies south of Manzanita Drive. This area includes the historic Orinda Filter Plant as well as chemical and operations buildings, maintenance buildings, an entry road, and parking area. Backwash water settling basins and a secondary paved area are located on the opposite side of Manzanita Drive. Currently, there is a fence around the existing settling basins at this location. A ravine and undulating wooded terrain lie to the northwest of the backwash water settling basins. San Pablo Creek lies north of the Orinda WTP facilities (within EBMUD property). To the northwest, the Orinda Sports Field is adjacent to the WTP on District land.

The site is about 320 to 420 feet in elevation. The topography is relatively level in the developed portions of the site. The highest elevations are found where the site rises east of the creek in the northeast corner. To the south, near the edge of the Orinda Sports Field, a wooded embankment rises steeply up to Camino Pablo. Site vegetation includes dense trees along the southern and eastern edges, including along San Pablo Creek. Dense woodland is also found near the ravine between the Orinda Sports Field and backwash water settling basins.

Single-family residences are situated to the west, across Camino Pablo, and to the east, above San Pablo Creek. The Orinda Country Club lies beyond San Pablo Creek to the south of the Orinda WTP.

Public Views and View Corridors

Dense tree and shrub cover screens views of the Orinda WTP from many locations within the surrounding vicinity; however, portions of the site and facilities are visible from some places along nearby public roadways. Views of the site are not generally available from distant locations due to intervening topography and vegetation. Figures 3.3-OWTP-2, 3.3-OWTP-3, and 3.3-OWTP-4 present photographic views of the site as seen from representative public vantage points. Figure 3.3-OWTP-1 depicts the viewpoint locations.

Photos O1 through O4 are views taken from Camino Pablo looking toward the Orinda WTP (refer to Figure 3.3-OWTP-2). As demonstrated in these photos, the mature vegetation situated along the roadway's edge generally screens views of WTP facilities from Camino Pablo. Filtered views into the site are available from a limited area where roadside vegetation is less dense (refer to Photos O3 and O4). A portion of the chemical building is visible from this location. This building, which is set back 50 to 100 feet from the fenceline, appears against a wooded hillside backdrop.

Manzanita Drive bisects the Orinda WTP. Although existing vegetation provides considerable screening, close-range views from the roadway encompass portions of the WTP facilities. Photo O5, looking southeast from Manzanita Drive near the Orinda WTP entrance, is a close-range view showing part of the Orinda Filter Plant beyond the entry gates, perimeter landscaping, and parking area (refer to Figure 3.3-OWTP-3). Photo O6, taken from a similar close-range viewpoint, shows a portion of the chemical building, which is visible beyond landscaped berms in the foreground. As demonstrated by Photo O8, views of the Orinda WTP from the residential area situated to the north are generally screened by intervening dense vegetation.

Photos O9 through O11 are views at the Orinda Sports Field on District land (refer to Figure 3.3-OWTP-4). The roadside vegetation and bank up to Camino Pablo are seen in Photo O9 looking west. The San Pablo Creek corridor and wooded slopes to the east are visible across the open Orinda Sports Field in Photos O10 and O11.

Walnut Creek WTP

Visual Character and Quality

The Walnut Creek WTP site is adjacent to the Acalanes Ridge Open Space. The facility site is situated on a shoulder of the ridge at an elevation of about 300 to 400 feet. As shown on Figure 3.3-WCWTP-1 (an aerial photograph), the Briones–Mt. Diablo Trail traverses the open space area and the Walnut Creek WTP (EBRPD, 2005). The Acalanes Ridge rises to about 700 feet. The grass-covered, oak-studded hills of the Acalanes Ridge landscape, a City-owned open space area and distinctive ridgeline with a high degree of scenic value, are characteristic of undeveloped areas of Contra Costa County. Portions of the Acalanes Ridge allow for panoramic views, as mapped in the Walnut Creek General Plan (2006). Two District distribution reservoir tanks, Larkey and Bacon, are located atop and midway between the Walnut Creek WTP and the ridgeline. In all other directions, the surrounding topography is lower than the operations building and clearwell.

Figure 3.3-WCWTP-2 and 3.3-WCWTP-3 present photos at and around the Walnut Creek WTP. At present, an expansion of the existing WTP is close to completion.[1] Photo WC7 is a view looking northwest across the new clearwell toward Acalanes Ridge. Photo WC4 shows the temporary backwash water holding tank, which has been removed. All of the existing and expanded WTP facilities as well as the proposed WTTIP facilities are located within property owned by the District. There are residential areas surrounding the WTP site, primarily to the east and the northwest.

Public Views and View Corridors

As seen from much of the surrounding area, the Walnut Creek WTP is not visually prominent due to intervening topography, landscaping, and berming. Photos WC1 and WC4 are views from the Briones–Mt. Diablo Trail toward the northern side of the site where WTTIP improvements are proposed (see Figure 3.3-WCWTP-2). New landscaping installed on the eastern slopes of the site (Photo WC8) as part of the current WTP expansion will further screen views from the residential area to the east, as seen in Photo WC6 (refer to Figure 3.3-WCWTP-3). Large trees in the northern portion of the site screen views from the north, as shown in Photo WC5, from Ramsay Circle.

Views from the site looking northwest and east are shown in Photos WC7 and WC8. To the northeast, east, and southeast, the surrounding topography is lower than the facility site. Although the site offers panoramic views to the north, east, and southeast, including Mount Diablo State Park (about six miles east of the site), its elevation and screening (landscaping and berms) limit views from these directions.

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[1] An evaluation of visual effects associated with this expansion of the Walnut Creek WTP is documented in the *Walnut Creek–San Ramon Valley Improvement Project Environmental Impact Report* (EBMUD, 2000).

Sobrante WTP

Visual Character and Quality

The Sobrante WTP is located along Valley View Road. Figure 3.3-SOBWTP-1 is an aerial photograph showing the Sobrante WTP and vicinity. Valley View Road bisects the 38-acre WTP, with the main portion of the plant situated on a hillside, east of this roadway. Facilities located in the main, larger WTP parcel include an operations building, a chemical building, clearwell, sedimentation basin, access road, and parking area. The facilities are built on a graded, level area situated at an elevation of approximately 250 feet. With the exception of the clearwell, and operations and ozone buildings, most facilities are low profile or are built near grade. Topography on the main part of the plant slopes up to the east. A grass- and tree-covered embankment drops down from the site's southern edge to Valley View Road. Mature trees border the perimeter fence along the north, east and west sides of the WTP.

D'Avila Way further bisects the smaller two-acre western part of the WTP. Facilities located south of D'Avila Way include two concrete settling basins along Valley View Road. The topography at this site slopes down to the west, toward San Pablo Creek, and lies at about 160 feet above sea level. Dense vegetation occurs along the site perimeter, with a planted berm situated outside the WTP fenceline along Valley View Road.

Hillside residential development lies above the WTP to the southeast as well as across Amend Road to the north. A Richmond Fire Station and a PG&E substation are located adjacent to the site to the northwest and northeast, respectively. Single-family and multifamily residential development is the predominant land use in the surrounding area.

Public Views and View Corridors

Portions of the Sobrante WTP site are visible from a variety of locations in the vicinity. Figures 3.3-SOBWTP-2, 3.3-SOBWTP-3, and 3.3-SOBWTP-4 present photographic views of the site as seen from representative public vantage points. Figure 3.3-SOBWTP-1 depicts the location of the viewpoints.

Photos S1 and S2, taken from Valley View Road at D'Avila Way, are views of the smaller part of the WTP site located west of Valley View Road (Figure 3.3-SOBWTP-2). From the roadway, perimeter fencing and landscaping appear in the foreground, with the wooden roofs of the concrete settling basins partially visible beyond. Photos S3 and S4, looking north and northeast toward the main part of the WTP site, show views of the grass- and tree-covered embankment situated along the east side of Valley View Road. This embankment largely screens views of the existing WTP facilities located on the main portion of the WTP site. In the view from D'Avila Way, the uppermost part of the basin structure is just barely visible along the top of the embankment (Photo S3). Photos S5 and S6, taken from Valley View Road looking southeast toward the WTP site, demonstrate the screening provided by the perimeter trees and roadside embankment. Photo S6 encompasses part of the Richmond Fire Station as well.

Photos S7 through S11 are views looking toward the Sobrante WTP from places along Amend Road (Figures 3.3-SOBWTP-3 and 3.3-SOBWTP-4). The photos demonstrate that, to varying degrees, intervening trees and vegetation screen views of existing WTP facilities. Photo S7, taken from Amend Road near Valley View Road, shows a relatively unobstructed view toward the project site's northern edge. From here, the upper portion of a WTP building, seen near the right side of the photo, is visible through the vegetation. Looking south from Heavenly Ridge Lane, views of the WTP are partially obstructed by vegetation in the foreground (Photo S8).

Photo S9, taken from Amend Road near Simoni Court and the PG&E substation, encompasses roadside landscaping/berms and houses in the foreground, with distant hillsides in the backdrop. Additional views taken from farther east along Amend Road encompass roadside vegetation in the foreground that screens the WTP facilities (Photos S10 and S11).

Views from the residential area situated above and east of the WTP site are generally screened by intervening vegetation and structures; however, existing facilities may be partially visible from a limited number of residences in this area.

Upper San Leandro WTP

Visual Character and Quality

The Upper San Leandro WTP occupies a 22-acre hillside site immediately south of I-580 and west of Keller Avenue in Oakland. Figure 3.3-USLWTP-1, an aerial photo showing the site vicinity, shows the WTP facility complex with its pattern of relatively dense vegetation along much of the site's perimeter. The WTP site entrance, located at Greenly Drive and Field Street, includes stucco gate posts and a gate house. Tan-colored stucco buildings with red terracotta roofs are arranged along the southern side of the site. Tanks, basins, and a clearwell occupy the northern and western sides of the site. Mature landscaping, including shrubs and tree groupings near key buildings and stands of large redwood trees, are found within the site's interior.

With the exception of the I-580 corridor immediately to the northeast, the area surrounding the WTP site is primarily single-family hillside residences. This area is characterized by narrow hillside residential streets and mature landscape vegetation.

Public Views and View Corridors

Figures 3.3-USLWTP-2 and 3.3-USLWTP-3 present photos of the site as seen from representative public vantage points (refer to Figure 3.3-USLWTP-1 for viewpoint locations). As shown in these photos, the site is generally well screened by mature vegetation.

Photos U1 through U4 are views toward the WTP from places along Greenly Drive. The view from Greenly Drive near Field Street encompasses the entry gate and the operations building (Photo U1). When looking northeast from this area, the site is largely screened by landscaped berms; however, the upper portion of the clearwell is partially visible (Photo U2). As shown in Photo U3, dense trees line most of the site's Greenly frontage, except in a limited area where portions of the stucco building facades and tile roofs can be seen against a hillside backdrop (Photo U4). Views of the WTP from the residential streets located to the north, including Circle Hill Drive and Valentine Street, are largely screened by berms and mature vegetation (Photos U5 and U6). Similarly, dense vegetation screens views of the WTP from Keller Drive to the south (Photo U7).

Due to a steep embankment along the roadside as well as dense trees at the top of the embankment along the site perimeter, the Upper San Leandro WTP is not visible from the I-580 freeway corridor. Photo U8, taken from Mountain Boulevard near the I-580 on-ramp, displays screening provided by the embankment and vegetation.

Ardith Reservoir and Donald Pumping Plant

Visual Character and Quality

The Ardith Reservoir and Donald Pumping Plant site lies west of Ardith Drive in a predominantly single-family hillside residential area. Figure 3.3-ARRES-1 is an aerial photograph showing the site and surrounding area. Figure 3.3-ARRES-2 presents four photos taken at the site.

The existing Donald Pumping Plant, which is approximately 15 by 25 feet and 10 feet tall, lies on the east side of the site near the end of a paved access drive (Photo A2). To its west, a roughly 180- by 180-foot flat, graded area occupies the central portion of the site. In 1960, when the pumping plant was built, EBMUD created the graded pad in anticipation of a future reservoir at the site.

The site's topography consists of a steep bank that slopes down from Ardith Drive to reach the graded area. From this level pad, the site slopes down to the west and north toward the site's boundary. Site elevations drop from approximately 760 feet above sea level near Ardith Drive to about 720 feet at the graded pad to approximately 680 feet near the site's western edge. As shown in the aerial photo (Figure 3.3-ARRES-1), relatively dense vegetation covers much of the site's perimeter. Photos A9 through A12 are views from the site looking north and northwest toward existing residential areas. The photos illustrate the considerable screening provided by this perimeter vegetation.

In addition to surrounding single-family residential use, the Orinda Intermediate School lies uphill, approximately 700 feet to the east (see Figure 3.3-ARRES-1).

Public Views and View Corridors

Public views of the Ardith Reservoir and Donald Pumping Plant site are extremely limited due to the intervening landform and extensive screening provided by vegetation. Filtered views of portions of the site are available from some close-range viewpoints. Figures 3.3-ARRES-3 and 3.3-ARRES-4 present photographic views of the site as seen from representative public vantage points. Figure 3.3-ARRES-1 depicts the viewpoint locations.

Photos A1 through A5 are views taken from points along Ardith Drive looking toward the site (Figures 3.3-ARRES-2 and 3.3-ARRES-3). As demonstrated in these photos, the mature trees and dense shrubs situated along the site's perimeter and along the roadway edge generally screen views to the site's interior from Ardith Drive. In addition, Photos A3 and A4 indicate that this vegetation also screens views of the site from the adjacent residences located to the north and south. However, as seen from a limited area immediately adjacent to the perimeter fence, a break in this vegetation pattern enables partial filtered views into the site (Photo A7). A similar but slightly elevated view may be available from the rear yards of several residences located to the east on Westover Court. Photo A6, taken from the top of the slope embankment along the east side of Ardith Drive, represents a comparable perspective of these residential rear yards. However, as shown in Photo A5, rear yard fences generally obstruct residential views toward the Ardith Reservoir/Donald Pumping Plant site. As shown in Photo A8, views of the site from farther east are generally screened by vegetation and intervening structures.

The site is not generally visible from the residential area located downhill to the north and west due to intervening vegetation and topography.

Fay Hill Pumping Plant and Pipeline Improvements

Visual Character and Quality

The Fay Hill Pumping Plant site, located in Moraga at the intersection of Moraga Road and Rheem Boulevard, occupies a small (less than 0.25-acre) area at the corner of a commercial shopping center. The relatively flat site is landscaped and lies adjacent to public sidewalks. Figure 3.3-FHPP/MORPL-1 is an aerial photograph showing the site and its landscape context.

Public View Corridors

Views of this site are available from nearby locations along Moraga Road and Rheem Boulevard. In addition, the site is visible from a portion of the adjacent shopping center parking lot. Photos F5 and F6 show close-range views of the site as seen from Moraga Road (refer to Figure 3.3-FHPP/MORPL-2).

Fay Hill Reservoir

Visual Character and Quality

The Fay Hill Reservoir is located in Moraga, north of Rheem Boulevard and east of Moraga Road. The reservoir is situated on a three-acre hilltop site, surrounded by perimeter trees and undeveloped open grassland, at an elevation of approximately 950 feet above sea level. A transmission line with lattice towers crosses the open hillside from northwest to southeast. A graded access road runs up the hillside from the southeast at Rheem Boulevard. As shown in Figure 3.3-FHRES-1 (aerial photo), suburban development lies below the hill to the south, west, and north.

Public Views and View Corridors

Public views of the Fay Hill Reservoir site are available from some surrounding residential areas and roadways. Figure 3.3-FHRES-2 presents photographic views of the site as seen from representative public vantage points. Figure 3.3-FHRES-1 depicts the viewpoint locations.

Photo F1 shows a view looking toward the site from Natalie Drive in the residential area to the north (Figure 3.3-FHRES-2). Where not screened by foreground landscaping, views of the site are available from this area. From this viewpoint, the site is seen on the hilltop skyline approximately one-half mile away and 300 feet higher in elevation. An existing transmission tower is also seen on the hilltop in this view. As demonstrated in this and the other site photos, the mature trees along the site perimeter screen views to the site's interior from the surrounding areas. From Moraga Road near Campolindo High School, as shown in Photo F2, the site is visible on the hilltop through mature roadside trees. Views toward the site from many other locations in this vicinity are screened by landscaping.

Photo F3 shows a view looking up toward the site from Moraga Road almost one-half mile away to the southeast. Other similar open views of the site are available from the adjacent shopping center parking lots. Onsite perimeter landscaping effectively screens the facility from these viewpoints. Transmission line towers are also seen along the skyline in this view. The view from Rheem Boulevard looking north is shown in Photo F4. From this point, before Rheem Boulevard descends the hill and curves to the northwest, the site is seen along the skyline in the center of the view. Views toward the site from residences immediately west of this point are generally screened by the roadside trees seen on the left side of the photo.

Glen Pipeline Improvements

Visual Character and Public Views

Figure 3.3-GLENPL-1 is an aerial photograph showing the landscape context for the proposed Glen Pipeline alignment along Glen Road and Nordstrom Lane. Segments of the proposed alignment are bordered by single-family residences. Photos G1 and G2 are views along Nordstrom Lane in areas of single-family homes (refer to Figure 3.3-GLENPL-2). Photos G3 and G4 were taken along the Glen Road portion of the project.

Happy Valley Pumping Plant and Pipeline

Visual Character and Quality

The 1.93-acre Happy Valley Pumping Plant site and pipeline alignment are situated within an established single-family residential area. Figure 3.3-HVPP-1 is an aerial photograph showing the site and vicinity.

This site is relatively level and currently undeveloped. Near its northern edge along Lombardy Lane, the site's topography rises and falls slightly in elevation, creating a berm-like landform. Vegetation includes a number of mature trees and shrubs. There is a clearing within the site's central area. The site includes approximately 75 feet of street frontage on Lombardy Lane and extends back toward a riparian area and creek located to the south.

Public Views and View Corridors

Dense roadside vegetation, mature residential landscaping, and houses screen views of the site from much of the surrounding area. Figure 3.3-HVPP-2 presents four photos taken in the immediate site vicinity. As shown in the photos, close-range views of the northern portion of the site are available from nearby points along Lombardy Lane.

Views from Lombardy Lane near the site are shown in Photos HV1 and HV2 (Figure 3.3-HVPP-2). From these locations, the street frontage of the site is visible; however, onsite and adjacent trees and shrubs screen views of the site's interior. A large and visually prominent deciduous oak on the northern side of the site provides a substantial amount of screening from Lombardy Lane. In addition, the slightly elevated landform along the site's northern edge provides a degree of visual screening. As shown in photos taken from the site, relatively dense surrounding vegetation substantially screens views from neighboring residential properties (refer to Photos HV3 and HV4, looking southwest and northwest, respectively, across the site). In Photo HV4, an adjacent residence can be partially seen in a view filtered by vegetation.

Highland Reservoir and Pipelines

Visual Character and Quality

The Highland Reservoir site occupies 2.5 acres of hillside within the Lafayette Reservoir Recreation Area, a public recreation area owned and operated by EBMUD. Figure 3.3-HIGHRES-1 is an aerial photograph of the site and surrounding area. The site lies about 1,000 feet northwest of the Lafayette Reservoir Dam and adjacent parking area. Oak woodland covers much of the surrounding hillsides, including the project site. Open panoramic views of the surrounding hillside and reservoir landscape are available from places along the shoreline and trails as well as from the 53-acre Lafayette Reservoir.

Several trails traverse the open space, including the Rim Trail, which passes adjacent to the proposed reservoir site. Terrain within the Lafayette Reservoir Recreation Area is relatively steep. Topography and vegetation intermittently enclose and screen views from points along the recreational trail system.

Public Views and View Corridors

Figure 3.3-HIGHRES-2 presents photographic views of the Highland Reservoir site as seen from four locations within the recreation area. Figure 3.3-HIGHRES-3 presents photographic views of the Inlet/Outlet (I/O) Pipeline alignment. Viewpoints include the trail adjacent to the site and more distant locations, as shown in Figure 3.3-HIGHRES-1.

Photos H1 through H4 are views of the Highland Reservoir site. Photo H1 shows the view from the Rim Trail looking to the northwest across the site. From this viewpoint just south of the site, the trail can be seen curving around a group of mature trees on the site in the center of the view. With the exception of the trees and shrubs in the background, the site includes most of the area seen in this photo. On the Rim Trail to the west of the site, views toward the site are generally screened by trees and shrubs.

The open view from the dam and nearby parking area is shown in Photo H2. From here and from the perimeter trail (Photo H3), the site is located on the far hillside, screened by the oak woodland. Panoramic views from these locations encompass the reservoir water surface, shoreline, and surrounding ridges. At other points along the perimeter trail, views toward the site are screened by foreground vegetation.

The Big Oak Trail, shown in Photo H4, climbs from the perimeter trail up a spur ridge to the Rim Trail. From this elevated perspective, views include the reservoir, surrounding ridges, and more distant ridges outside of the Lafayette Reservoir Recreation Area. The reservoir site and trees are visible on the slope above the far shore in the center of the photo at a distance of almost three-quarters of a mile.

Photos HP1 through HP4 are views of the Highland Reservoir I/O Pipeline (see Figure 3.3-HIGHRES-3). Except for the crossing of Mt. Diablo Boulevard, the pipeline alignments would be located within the Lafayette Reservoir Recreation Area. Photo HP1 is a view northeast from just east of the proposed Highland Reservoir site along the Rim Trail. In this area the I/O Pipeline line cuts east across the rim trail and joins the Lafayette Reclaimed Water Pipeline alignment. The vegetation in this area along the ridgeline is large-diameter Oak Woodland and an understory of shrubs and non-native grasses. Photo HP2 was taken near the rim trail where the I/O Pipeline heads northeast towards Mt. Diablo Boulevard. Oak Woodland is dominant on this north-facing slope. Photo HP3 is looking towards the alignment of the Highland Reservoir I/O line near where it leaves the Lafayette Reservoir Recreation Area and runs north across Mt. Diablo Boulevard to Lafayette WTP. Photo HP4 looks southeast along Mt. Diablo Boulevard at the turn-in the Lafayette Reservoir Recreation Area. This is the area where the joint pipeline alignment of the Highland Reservoir I/O Pipeline and the Lafayette Reclaimed Water Pipeline would cross the roadway. The pipelines would diverge on the north shoulder of the road.

Moraga Reservoir

Visual Character and Quality

Moraga Reservoir is a five-acre landscaped site located in a hillside suburban neighborhood. Figure 3.3-MORRES-1 is an aerial photo showing the site and surroundings. There are residential streets adjacent to the site on the north and west, and single-family residences or residential driveways abutting the reservoir site to the south and east.

Public View Corridors

Public views of the Moraga Reservoir site are available from some vantage points within the surrounding residential areas in the immediate vicinity. Intervening topography and vegetation generally screen views of the reservoir from distant locations. Figure 3.3-MORRES-2 presents photographic views of the site as seen from representative public vantage points. Figure 3.3-MORRES-1 depicts the viewpoint locations.

Claudia Court and Draeger Drive, adjacent to the site on the north and west, respectively, have close-range views of the perimeter site area. Photo M1, a view from Draeger Drive near Fernwood Drive, encompasses the western slope along the perimeter of the reservoir site. With the exception of a small amount of fencing seen at the top of the embankment, the existing reservoir facilities are not visible from this roadway location. Taken from Draeger Drive at Claudia Court, Photo M2 shows the mature landscaping at the site’s western corner. As seen from this location, an embankment with mature landscaping also screens views of the reservoir facilities. Portions of the reservoir structure and perimeter gate and fencing are visible in the foreground from Claudia Court, near the site access drive (Photo M3). To some degree, reservoir facilities may be partially visible from adjacent residences to the south and east; however, views are generally screened by mature landscaping and intervening topography.

Moraga Road Pipeline

Visual Character and Public Views

Photos MR1 and MR2, taken from Moraga Road at Madrone Drive and Nemea Court, respectively, show the visual character along this segment of the Moraga Road Pipeline route, which passes through undulating wooded terrain and grassland (Figure 3.3-FHPP/MORPL-2). Figure 3.3-FHPP/MORPL-1 depicts the viewpoint locations. Contra Costa County has designated Moraga Road as a scenic route. The northwestern portion of the pipeline alignment (between Nemea Court and Mt. Diablo Boulevard) traverses the Lafayette Reservoir Recreation Area. In addition, Figure 3.3-HIGHRES-1, as well as Maps C-MORPL-1 through C-MORPL-3 (presented at the end of Chapter 2), are aerial photographs showing the recreation area. As shown in the photos, the alignment passes through an orchard near the toe of the Lafayette Reservoir Dam, through woodlands, and open fields. The alignment ascends a ridge near its crossing of the Rim Trail (see C-MORPL-2).

Sunnyside Pumping Plant

Visual Character and Quality

The 0.49-acre (portion of a 10.7 acre parcel) Sunnyside Pumping Plant site is located along Happy Valley Road in a single-family hillside residential area. Figure 3.3-SUNPP-1 is an aerial photograph showing the site and landscape surroundings.

This currently undeveloped, grass-covered property lies at the base of a steep wooded embankment, immediately south of Happy Valley Road. The terrain rises steeply on the north side of this narrow, winding road, and single-family residential development occupies the partially wooded hillside. The adjacent property to the south and west is used for horse grazing; several small outbuilding structures lie within 200 feet to the southwest of the site. In addition, there is residential development downhill, farther to the west. The site's topography includes sloping terrain, and the site lies below the elevation of Happy Valley Road.

Public View Corridors

Topography and vegetation generally screen public views of the Sunnyside Pumping Plant site. Glimpses of the site are available from a limited area along Happy Valley Road; however, the hillside and vegetation along the road tend to obstruct motorists' line of sight toward the project site. With the exception of the closest residence (which lies several hundred feet to the east), residential views of the site are generally screened by intervening vegetation and topography. Limited portions of the site may be visible from a few other nearby residences. Photos SS1 through SS4 in Figure 3.3-SUNPP-2 are close-range views of the site from viewpoints along the Happy Valley Road and from the adjacent entry road. Photo SS3, a view looking southwest toward the site from Happy Valley Road, includes Mt. Diablo in the background.

Tice Pumping Plant and Pipeline

Visual Character and Quality

The approximately one-acre Tice Pumping Plant and Pipeline site is located in unincorporated Contra Costa County along Olympic Boulevard, approximately 400 feet west of the Tice Valley Boulevard intersection. Figure 3.3-TICEPP-1 is an aerial photograph showing the site and surrounding area. As shown in the photo, the site is adjacent to a segment of paved recreational trail that parallels Olympic Boulevard. This undeveloped site is situated at the foot of a steep, grass-covered slope. Clusters of trees and shrubs interspersed with grassland cover the site. Adjacent land uses include open space to the south, commercial uses (including an adjacent corner gas station) to the east, and single-family residential development to the west and north (across Olympic Boulevard). The pipeline alignment extends up Boulevard Way, through an established residential area with mature trees, crossing Las Trampas Creek (see Map C-TICEPP-1 at the end of Chapter 2).

Public View Corridors

Public views of the site are available from nearby locations, including Olympic Boulevard. Photos T1 through T3 include views looking southwest toward the site from Olympic and Tice Valley Boulevards (Photo T1) and looking southwest and east, respectively, from the adjacent recreation trail (Photos T2 and T3). Photo T4 shows a view near the site looking southwest toward the adjacent homes (refer to Figure 3.3-TICEPP-2). Views of the site are available from a limited number of these residences.

Withers Pumping Plant

Visual Character and Quality

The Withers Pumping Plant site is situated near the intersection of Reliez Valley Road and Silver Hill Way in an unincorporated area of Contra Costa County. The site occupies a portion of the District's hillside property at the location of the existing Grayson Reservoir. Reliez Valley Road is a County-designated scenic route.

Figure 3.3-WITHPP-1 is an aerial photograph showing the site and vicinity. The site is surrounded by open space and single-family residential development, including homes that border the west side of Grayson Woods Golf Course. The site's topography slopes steeply up to the southwest (toward the reservoir) from the base of the hillside near Reliez Valley Road. As shown in the Figure 3.3-WITHPP-1 aerial photo, the site includes dense vegetation along much of the hillside and around its overall perimeter.

Public Views and View Corridors

Topography and vegetation generally screen views of the Withers Pumping Plant site from much of the surrounding area. Views of the site are available from limited areas along Reliez Valley Road. Photos W1, W2, and W4 are views looking toward the site from various points along the roadway, including a view near the existing site access drive (Photo W2) (refer to Figure 3.3-WITHPP-2). Views of portions of the site may also be available from a limited number of residences situated near the top of the embankment along the northeast side of Reliez Valley Road. Photo W3 is a view from the top of the roadway embankment near the rear yard of one of these residences. However, the rear yards are generally fenced and include mature vegetation that provides foreground screening.

Regulatory Framework

Appendix D presents general plan and EBMUD *Watershed Master Plan* goals, policies, and implementation measures related to visual resources (EBMUD, 1996). Potential inconsistencies between the proposed WTTIP project and local plans, policies, and zoning regulations are discussed in Section 3.3.3, below, under Impact 3.3-3 (City of Lafayette, 2002; City of Lafayette Municipal Code; City of Oakland, 2005; City of Orinda, 1989; City of Orinda Municipal Code; City of Walnut Creek, 2006; City of Walnut Creek Municipal Code; Town of Moraga, 2002; Contra Costa County, 2005; Contra Costa County Code). It is District practice to work closely with host jurisdictions and the neighboring community during project planning and to conform to local land use plans and policies to the extent possible. However, actual determinations of project consistency with general plans would be made by the pertinent land use jurisdictions during project implementation.

3.2.3 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:

- Substantially degrade the existing visual character or quality of the site and its surroundings;
- Substantially damage scenic resources, including but not limited to trees, rock outcroppings, and historic buildings within a state scenic highway;
- Have a substantial, adverse effect on a scenic vista; or
- Create a new source of substantial light or glare that would adversely affect day or nighttime views in the area.

The significance determination is based on several evaluation criteria, including the extent of project visibility from sensitive viewing areas such as designated scenic routes, public open space, or residential areas; the degree to which the various project elements would contrast with or be integrated into the existing landscape; the extent of change in the landscape's composition and character; and the number and sensitivity of viewers (Smarden et al., 1986). Project conformance with public policies regarding visual quality was also taken into account.

As part of the aesthetic impact evaluation of the WTTIP, visual simulations were produced using computer modeling and rendering techniques. These simulations (presented by individual project in the figures section following this chapter) illustrate the appearance of the proposed project changes at 11 of the project sites as seen from representative public viewing locations. Visual simulations are presented in color, with two images per page: the top image is a photographic view showing the existing visual condition, and the bottom image is a visual simulation depicting the proposed project. The evaluation of potential visual impacts associated with the WTTIP is based in part on a comparison of the “before” and “after” visual conditions as portrayed in the simulation images and assessing the degree of visual change that the project would bring about. Table 3.3-2 provides a summary of the viewpoint locations and facility sites represented in the visual simulations.

TABLE 3.3-2
WTTIP PROJECT VISUAL SIMULATIONS

Facility Site	Viewing Location	Visual Simulation Figure	Associated Viewpoint Map
Lafayette WTP	Highway 24	3.3-LWTP-5, 3.3-LWTP-6	3.3-LWTP-1
Lafayette WTP	Walter Costa Trail	3.3-LWTP-7, 3.3-LWTP-8	3.3-LWTP-1
Orinda WTP	Camino Pablo	3.3-OWTP-6, 3.3-OWTP-7	3.3-OWTP-1
Orinda WTP	Manzanita Drive	3.3-OWTP-8, 3.3-OWTP-9	3.3-OWTP-1
Walnut Creek WTP	Briones–Mt. Diablo Trail	3.3-WCWTP-5, 3.3-WCWTP-6	3.3-WCWTP-1
Walnut Creek WTP	Alfred Avenue	3.3-WCWTP-7, 3.3-WCWTP-8	3.3-WCWTP-1
Sobrante WTP	Valley View Road	3.3-SOBWTP-6, 3.3-SOBWTP-7	3.3-SOBWTP-1
Ardith Reservoir and Donald Pumping Plant	Ardith Drive	3.3-ARRES-6, 3.3-ARRES-7	3.3-ARRES-1
Fay Hill Reservoir	Natalie Drive	3.3-FHRES-3	3.3-FHRES-1
Happy Valley Pumping Plant	Lombardy Lane	3.3-HVPP-4, 3.3-HVPP-5	3.3-HVPP-1
Highland Reservoir	Lafayette Reservoir Recreation Area, Rim Recreation Trail	3.3-HIGHRES-5, 3.3-HIGHRES-6	3.3-HIGHRES-1
Highland Reservoir	Lafayette Reservoir Recreation Area, Big Oak Recreation Trail	3.3-HIGHRES-7, 3.3-HIGHRES-8	3.3-HIGHRES-1
Sunnyside Pumping Plant	Happy Valley Road	3.3-SUNPP-4, 3.3-SUNPP-5	3.3-SUNPP-1
Tice Pumping Plant	Recreation Trail along Olympic Boulevard	3.3-TICEPP-4, 3.3-TICEPP-5	3.3-TICEPP-1
Withers Pumping Plant	Reliez Valley Road	3.3-WITHPP-4, 3.3-WITHPP-5	3.3-WITHPP-1

Computer modeling and rendering techniques were employed to produce the visual simulation images. The computer-generated visual simulations are the result of an objective analytical and computer modeling process. The visual simulations are based on conceptual engineering design data provided by EBMUD engineers.

As described in Chapter 2, Project Description, the project includes pipelines and other facilities (e.g., many of the basins proposed at the WTPs) that would be located at or below grade. These facilities would not be visible to the public. The potential visual effects associated with the construction of proposed underground facilities, including tree removal, are described in the discussion under Impacts 3.3-2 and 3.3-3. Section 3.6, Biological Resources, describes tree removal impacts associated with project construction; in particular, Table 3.6-4 quantifies the estimated tree removal impacts for each of the WTTIP sites.

Conceptual landscape plans, designed to provide screening of new facilities, are proposed as part of the WTTIP. The planting concepts (presented in the 3.3 Visual Quality Figures section) are also intended to enhance the appearance of the new facilities and to integrate them with their visual setting. In addition, proposed landscaping is designed to provide a measure of erosion control at the project sites. The WTTIP conceptual landscape plans include a recommended plant palette of drought-tolerant trees and shrubs (EBMUD, 2004). Table 3.3-3 provides a suggested list of the trees and shrubs, with estimates of plant heights at both 5- and 20-year maturity levels. The landscape design schemes will be refined during the final design phase, but will remain generally consistent with the conceptual landscape plans presented in the EIR.

Table 3.3-4 summarizes impact significance by project component. Table 3.3-5 provides a summary of the applicable mitigation measures.

Map C-HIGHRES-1 shows the Highland Reservoir and Pipelines project and the Lafayette Reclaimed Water Pipeline project. With the exception of the Lafayette Creek crossing, the Lafayette Reclaimed Water Pipeline would be constructed concurrently with and would be 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). Therefore, the Lafayette Reclaimed Water Pipeline impacts included in the discussion are for the Lafayette Creek crossing only and, because the impacts relate directly to opening up views of the Lafayette WTP, are presented as part of the discussions of the Lafayette WTP. Impacts resulting from installation of the remaining portions of the Lafayette Reclaimed Water Pipeline are included within the pipeline discussions.

Impacts and Mitigation Measures

Impact 3.3-1: Short-term visual effects experienced from nearby areas during project construction.

Construction activities associated with the WTTIP projects would involve earthwork and the use of heavy equipment to install new structures, equipment, and paving as well as to remove and/or relocate existing facilities. Earthwork could periodically create dust.

The degree to which construction activities would be noticeable varies among the sites based on existing conditions. The proposed Highland Reservoir and Pipelines and the Tice, Sunnyside, and Happy Valley Pumping Plants would involve project activities at undeveloped sites, as would the section of the Moraga Pipeline passing through the Lafayette Reservoir Recreation Area.

TABLE 3.3-3
SUGGESTED PLANT PALETTE TREES AND SHRUBS[a]

Common Name	Botanical Name	Container	5-year size[b] Height	5-year size[b] Width	20-year size[b] Height	20-year size[b] Width
Trees						
California Buckeye	*Aesculus californica*	15 gallon	15 feet	12 feet	15 feet	25 feet
Silk Tree	*Albizzia julibrissin*	15 gallon	30 feet	40 feet	40 feet	50 feet
Marina Arbutus	*Arbutus 'Marina'*	15 gallon	12 feet	15 feet	25 feet	25 feet
Incense Cedar	*Calocedrus decurrens*	15 gallon	12 feet	5 feet	75 feet	15 feet
Western Redbud	*Cercis occidentalis*	24-inch box	12 feet	12 feet	18 feet	18 feet
Goldenrain Tree	*Koelreuteria paniculata*					
Sour Gum	*Nyssa sylvatica*	15 gallon	14 feet	8 feet	50 feet	30 feet
Chinese Pistache	*Pistache chinensis*	15 gallon	15 feet	10 feet	50 feet	50 feet
Coast Live Oak	*Quercus agrifolia*	24-inch box	18 feet	6 feet	50 feet	50 feet
Valley Oak	*Quercus lobata*	15 gallon	10	8 feet	70 feet	70 feet
California Pepper Tree	*Schinus molle*	24-inch box	12 feet	12 feet	30 feet	25 feet
Shrubs						
Strawberry Tree	*Arbutus unedo*	5 gallon	5 feet	5 feet	15 feet	15 feet
Manzanita	*Arctostaphylos* sp.	5 gallon	Varies by specific selection			
Japanese Barberry	*Berberis thunbergii*	5 gallon	4 feet	4 feet	5 feet	5 feet
Wild Lilac	*Ceanothus* sp.	5 gallon	Varies by specific selection			
Smoke Bush	*Cotinus coggygria*	5 gallon	8 feet	6 feet	12 feet	12 feet
Pride of Madiera	*Echium candicans*	5 gallon	4 feet	6 feet	6 feet	8 feet
Silktassel	*Garrya elliptica*	5 gallon	8 feet	8 feet	15 feet	15 feet
Red-Hot Poker	*Kniphofia uvaria*	5 gallon	3 feet	3 feet	3 feet	3 feet
Tree Mallow	*Lavatera assurgentiflora*	5 gallon	8 feet	8 feet	12 feet	12 feet
Sticky Monkeyflower	*Mimulus aurantiacus*	1 gallon	4 feet	4 feet		
	Osmanthus	5 gallon	Varies by specific selection			
Coffeeberry	*Rhamnus californica*	5 gallon	6–8 feet	3 feet	15 feet	8 feet
Sage	*Salvia* sp.	5 gallon	Varies by specific selection			
Bush Germander	*Teucrium fruticans*	5 gallon	4 feet	4 feet	5 feet	5 feet

[a] Refer to **Visual Quality Figures section for** conceptual landscape plans.
[b] Sizes are estimated, with the assumption of regular plant watering and maintenance during an initial 2 to 3 year period; data is partially derived from "SelectTree: A Tree Selection Guide" (Reimer and Mark, 2006).

TABLE 3.3-4
SUMMARY OF POTENTIAL PROJECT-LEVEL VISUAL IMPACTS

Facility	Impact 3.3-1 Short-Term Visual Effects during Construction	Impact 3.3-2 Alteration of Appearance of WTTIP Sites	Impact 3.3-3 Effects on Views	Impact 3.3-4 Effects on Scenic Vista	Impact 3.3-5 New Sources of Light and Glare
Lafayette WTP					
Alternative 1	LTS	SM	SM	LTS	SM
Alternative 2	LTS	SM	SM	LTS	LTS
Orinda WTP					
Alternative 1 or 2	LTS	SM	SM	LTS	SM
Walnut Creek WTP					
Alternative 1 or 2	LTS	SM	SM	LTS	SM
Sobrante WTP					
Alternative 1 or 2	LTS	SM	SM	LTS	SM
Upper San Leandro WTP					
Alternative 1 or 2	LTS	LTS	LTS	LTS	SM
Orinda-Lafayette Aqueduct					
Alternative 2 only	LTS	LTS	LTS	LTS	SM
Ardith Reservoir/Donald Pumping Plant	LTS	SM	SM	LTS	SM
Fay Hill Pumping Plant and Pipeline Improvements	LTS	LTS	LTS	LTS	SM
Fay Hill Reservoir	LTS	LTS	LTS	LTS	SM
Glen Pipeline Improvements	LTS	LTS	LTS	LTS	LTS
Happy Valley Pumping Plant and Pipeline	LTS	SM	SM	LTS	SM
Highland Reservoir and Pipelines	LTS	SU	SU	SU	SM
Lafayette Reclaimed Water Pipeline	LTS	SM	SM	LTS	SM
Leland Isolation Pipeline and Bypass Valves	LTS	SM	SM	LTS	LTS
Moraga Reservoir	LTS	LTS	LTS	LTS	LTS
Moraga Road Pipeline	LTS	SM	SM	LTS	LTS
Sunnyside Pumping Plant	LTS	SM	SM	LTS	SM
Tice Pumping Plant and Pipeline	LTS	SM	SM	LTS	SM
Withers Pumping Plant	LTS	SM	SM	LTS	SM

NOTE: With the exception of the Lafayette Creek crossing shown in Map C-HIGHRES-1, the Lafayette Reclaimed Water Pipeline would be constructed concurrently with and would be co-located with the Bryant and Leland Pipelines or the Orinda-Lafayette Aqueduct (depending on whether Alternative 1 or Alternative 2 is selected), as well as with the Highland Reservoir pipeline. Therefore, the Lafayette Reclaimed Water Pipeline impacts included in this table and throughout this section are for the Lafayette Creek crossing only. Impacts resulting from installation of the remaining portions of the Lafayette Reclaimed Water Pipeline are included within the discussions of the other above-referenced projects.

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

TABLE 3.3-5
SUMMARY OF APPLICABLE MITIGATION MEASURES – IMPACT 3.3-1 THROUGH 3.3-4

Facility	Measure 3.3-1 Clean Construction Activity	Measure 3.3-2a Landscape Plans	Measure 3.3-2b Restore Disturbed Areas	Measure 3.3-2c Enhance Aesthetic Appearance
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	✓ [a]	–	✓	–
Moraga Reservoir	✓	–	–	–
Moraga Road Pipeline	–	–	✓	–
Sunnyside Pumping Plant	✓	✓	✓	✓
Tice Pumping Plant and Pipeline	✓	✓	✓	✓
Withers Pumping Plant	✓	✓	✓	✓

✓ = Applicable Impact
– = No Impact
[a] = Applicable to Bypass Valves

At the other WTTIP sites (the Lafayette, Orinda, Walnut Creek, Upper San Leandro, and Sobrante WTPs; Ardith Reservoir/Donald Pumping Plant; Fay Hill Pumping Plant; Fay Hill Reservoir; Moraga Reservoir; and Withers Pumping Plant sites), most project construction would be seen within the context of an existing water facility, where construction activity could be less noticeable. Pipeline construction projects through urbanized areas (Happy Valley Pipeline, Fay Hill Pipeline, Moraga Pipeline, Tice Pipeline, Glen Pipeline, Lafayette-Orinda Aqueduct, and pipelines in Mt. Diablo Boulevard) would be highly noticeable for short periods of time (generally about two weeks) to land uses adjacent to the alignment, traffic, and others passing the work site. With the exception of the Highland Reservoir site, which is situated on an undeveloped hillside within a publicly accessible area, and pipeline alignments traversing open space areas in the Lafayette Reservoir Recreation Area (Highland I/O and Overflow pipelines, Lafayette Reclaimed Water Pipeline, Moraga Road Pipeline), construction at proposed WTTIP sites would occur within generally developed urban/suburban areas where temporary construction activity might be expected. Project construction would be visible from places along public roadways and recreation trails and from within public open space and residential areas; construction would likely be most noticeable when seen at close range by neighboring residents at those sites that are not screened by buildings and landscaping.

The expected duration of construction activities varies among the project sites (refer to Tables 2-6 and 2-9, in Chapter 2). For example, construction of project-level improvements at the Lafayette WTP (Alternative 1) would occur over a four- to six-year period, whereas pipeline construction at any particular location would typically last a total of two weeks. Due to the limited duration of construction activities, potential visual impacts due to construction activities are considered less than significant. Although Impact 3.3-1 is considered less than significant for all projects, EBMUD is proposing to implement Measure 3.3-1, below, to help ensure that publicly visible construction sites would be maintained and screened where practical.

Mitigation Measure

> **Measure 3.3-1:** For stationary (non-pipeline) projects expected to be constructed over a period of one year or more, the District will require the contractor to ensure that construction-related activity is as clean and inconspicuous as practical by storing building materials and equipment within the proposed construction staging areas or in areas that are generally away from public view and by removing construction debris promptly at regular intervals.

Impact 3.3-2: Alteration of the appearance of WTTIP sites.

To varying degrees, the above-ground changes proposed as part of the WTTIP projects would alter the existing appearance of the facility sites. The specific modifications proposed and the resulting changes in site appearance are described below, with references to proposed site layout drawings.

Lafayette WTP

Alternative 1

Alternative 1 would involve substantial modification to the existing Lafayette WTP site. Map D-LWTP-1 following Chapter 2 shows the layout of proposed improvements. Map D-LWTP-3 is a profile at Lafayette WTP under Alternative 1. As shown on these figures and described below, under Alternative 1 several new facilities would be constructed on the western portion of the site, which is currently graded but undeveloped. Additional modifications would occur within the central, developed portion of the site. Alternative 1 also includes the installation of several new underground pipelines that would not be visible.

New facilities proposed on the western part of the site would include the 140-foot-diameter Clearwell #1, the 100-foot-diameter Clearwell #2, and a building that would house the new Leland and Bryant Pumping Plants. The pumping plant structure would be about 70 square feet and about 25 feet tall. The clearwells would be constructed largely below grade, extending only a few feet above grade. Additional site modifications proposed in this area would include low-profile valves and a 14-foot-wide paved access road extending to the new pumping plant structure from the central WTP area. The new paved road would widen to about 70 feet at the edge of the pumping plant; a 25-foot-wide paved access road is also proposed between the new clearwells. Figures 3.3-LWTP-5 and Figures 3.3-LWTP-6 show “before” and “after” views of the pumping plant structure from Highway 24. Figures 3.3-LWTP-7 and 3.3-LWTP-8 show a close-range “before” and “after” view of the new pumping plant structure as seen from the Walter Costa Trail. As shown in the visual simulations, the new building, fencing, and pavement would contrast with the existing landscape setting in terms of their form and scale. This visual change would alter the landscape character in this area. The introduction of two new clearwells would also contribute to the change in the visual character of the western portion of the site. Although the clearwells would not be as visually prominent as the new pumping plant structure, their built form would contrast with the undeveloped landscape setting. In addition, this alternative would require realignment of approximately 200 feet of the Walter Costa Trail to accommodate the new pumping plant building (the trail would be closed during project construction). EBMUD intends to reestablish the trail segment on District property, consistent with EBMUD security requirements. The specific realignment would be determined in coordination with the City of Lafayette.

The conceptual landscape plan proposed under Alternative 1 is presented as Figure 3.3-LWTP-4. The figure shows the proposed native tree and shrub planting. As it matures, the project landscaping would partially screen the new structures, contributing to their aesthetic integration with the surrounding landscape setting (refer to Figure 3.3-LWTP-8). The new facilities proposed at the undeveloped western portion of the site, in particular the new 25-foot-tall pumping plant structure, would noticeably alter the visual character in this area.

The Alternative 1 modifications proposed at the central portion of the site would not appear dissimilar to the existing Lafayette WTP facilities in terms of their scale and general appearance; consequently, these new facilities would represent an incremental change that would not substantially alter the site’s overall visual character and appearance. Modifications proposed in the central, developed portion of the site would include a new electrical substation (approximately 100 by 40 feet, 16 feet tall) and a new sodium hypochlorite storage and feed building (70 by 50 feet, 20 feet tall). The substation would be enclosed by 8-foot-tall fencing and would include a transformer, switchgear, capacitors, and meters. Also proposed in the central part of the site are a 70-foot-diameter chlorine contact basin and basins associated with the backwash water recycling system. The basins would be low profile, extending barely 5 feet above grade. Two existing pumping plant structures would be demolished under this alternative.

Construction-related vegetation clearing would include the removal of shrubs, grasses, and about 40-45 mature trees, including oaks (refer to Map C-LWTP-1 and Table 3.6-4 in Section 3.6). Much of the vegetation clearing would occur within the site's interior, particularly in the central portion (refer to Map C-LWTP-1). In addition, construction of the Lafayette Reclaimed Water Pipeline would require oak and riparian tree removal (approximately 15 trees) within a roughly 20-foot-wide, 100-foot-long area at the creek crossing. The site's appearance would be noticeably altered by proposed tree disturbance and removal, particularly in the area between the creek and Mt. Diablo Boulevard, which is within the public roadway view corridor. In light of the City's tree protection policies, the change in site appearance associated with tree removal is considered a significant visual effect. Implementation of Measures 3.3-2a through 3.3-2c, in addition to tree-related mitigation measures (3.6-1a through 3.6-1d), would reduce the visual impact to a less-than-significant level.

Alternative 2

Under Alternative 2, the Lafayette WTP would be decommissioned (see Map D-LWTP-2). Proposed modifications would be relatively minor and would not involve the introduction of prominent new above-ground features in undeveloped portions of the site. As with Alternative 1, construction of the Lafayette Reclaimed Water Pipeline would require oak and riparian tree removal (approximately 15 trees) within a roughly 20-foot-wide, 100-foot-long area at the creek crossing. Construction of the pipeline adjacent to the Lafayette WTP (the Orinda/Lafayette Aqueduct) would result in the removal of two oak trees along Mt. Diablo Boulevard at the eastern edge of the site, near the plant exit drive. The site's appearance would be noticeably altered by proposed tree disturbance and removal, particularly in the area between the creek and Mt. Diablo Boulevard, which is within the public roadway view corridor. In light of the city's tree protection policies, the change in site appearance associated with tree removal is considered a significant visual effect. Implementation of Measures 3.3-2a and 3.3-2b, in addition to tree-related mitigation measures (3.6-1a through 3.6-1d), would reduce the visual impact to a less-than-significant level.

Orinda WTP

Alternative 1

Map D-OWTP-1 shows the layout of proposed facilities at the Orinda WTP. Map D-OWTP-3 provides two cross-sections at Orinda WTP. Section B is through the backwash water recycle system proposed under Alternative 1 or 2. The new (project-level) facilities would occupy an approximately 120- by 220-foot area. The backwash water recycle system would be mostly below grade and therefore minimally visible. The above-grade portion of this facility would include a building housing the chemical and electrical room and the UV disinfection building. This part of the structure would be about 100 by 75 feet and about 15 feet tall. In addition, three smaller structures would be installed just east of the new building, near the northern corner of the existing chemical building. Each of these structures would be about 16 feet tall and would include a 35-foot-diameter sludge storage tank, a new solids pumping plant approximately 35 square feet in size, and a slightly smaller emergency generator building. Paved access from the entry drive would encircle the north side of the new basins and the new buildings. The above-ground portion of the facility would be located north/northwest of the existing Orinda WTP near Camino Pablo and Manzanita Drive and at the site's interior near the entry drive. Project construction would not result in the removal of mature trees or shrubs. The conceptual landscape plan for Alternative 1 is presented as Figure 3.3-OWTP-5. The landscape concept calls for clusters of drought-tolerant trees and shrubs to be installed near portions of the new above-ground facility. The new planting would complement the existing mature landscaping found along Camino Pablo and Manzanita Drive. As part of Alternative 1, the District would also replace the chain-link gate to the washwater settling basins.

Overall, the proposed Alternative 1 modifications would not appear dissimilar to existing facilities found at the Orinda WTP site in terms of their scale and general appearance. In this respect, the new facilities would represent an incremental aesthetic change that would not substantially alter the site's appearance. Implementation of Measures 3.3-2a through 3.3-2c would reduce the visual impact to a less-than-significant level.

Alternative 2

Under Alternative 2, proposed facilities south of Manzanita Drive would be essentially the same as under Alternative 1. Under Alternative 2, proposed modifications north of Manzanita Drive include the installation of a new 220-foot-diameter clearwell, a new partially buried pumping plant, and an electrical substation with transformers, switchgears, and other equipment; the substation would occupy an area of about 50 by 100 feet and would be enclosed by a 7-foot-tall wall or fence. The substation components would range in height from approximately 5 to 9 feet. Map D-OWTP-2 depicts the proposed layout of Alternative 2. Map D-OWTP-3 provides two cross-sections applicable to Alternative 2. Section A is through the clearwell and Los Altos Pumping Plant No. 2. Section B is through the backwash water recycle system. A 20-foot-wide paved drive would separate the clearwell from the new above-ground structures. The new upgraded facilities would not be dissimilar to existing facilities in terms of their physical and aesthetic characteristics and would not result in substantial visual changes to the site's appearance. As under Alternative 1, Figure 3.3-OWTP-5 would serve as a conceptual landscape plan under this alternative. However, substantial alteration of the site's visual character would occur at the new clearwell/substation/pumping plant area due to the vegetation removal required. Vegetation clearing in this area would include removal of 45 to 55 trees (refer to Table 3.6-4 in Section 3.6, and Map C-OWTP-2 for tree and shrub locations). As shown on Map C-OWTP-2, vegetation would be preserved along the site's Camino Pablo and Manzanita Drive frontage. This perimeter vegetation would generally screen views toward the site interior, including the new above-ground facilities. The District would also replace the gate north of Manzanita with a gate similar in appearance to the main entry gate to the WTP. Implementation of Measures 3.3-2a through 3.3-2c, in addition to tree-related mitigation measures (3.6-1a through 3.6-1d), would reduce the visual impact to a less-than-significant level.

Walnut Creek WTP – Alternative 1 or 2

Modifications are proposed at two locations at the Walnut Creek WTP site (see Map D-WCWTP-1). The new filters, approximately 50 by 100 feet, would be installed on the east side of the site, adjacent to the existing filters near the existing operations building. The new filters would be low profile and comparable in appearance to the existing filters; as such, their addition would represent a minor change to the site's appearance.

The new Leland Pumping Plant No. 2 would be built adjacent to the recently constructed backwash water treatment system near the site's northern edge. The new pumping facilities would be housed in a concrete structure that would be 35 by 85 feet and about 19 feet tall. Two connecting underground pipes would also be installed at the pumping plant. The new pumping plant would be situated on a developed portion of the site, adjacent to two existing structures. The conceptual landscape plan for the Walnut Creek WTP, presented as Figure 3.3-WCWTP-4, would extend the landscaping pattern (clusters of drought-tolerant trees and shrubs) established as part of the recently completed backwash water treatment system. Given its comparable scale and proximity to existing facilities, the presence of the new pumping plant would not substantially alter the general appearance of the northern side of the Walnut Creek WTP site. Construction of the new facilities would not require the removal of any trees or shrubs. Implementation of Measures 3.3-2a through 3.3-2c would reduce the visual impact to a less-than-significant level.

Sobrante WTP – Alternative 1 or 2

As shown on Map D-SOBWTP-1, the improvements proposed at the Sobrante WTP site would be essentially the same under Alternative 1 or 2. Map D-SOBWTP-2 provides a cross-section of the backwash water recycle system facilities on the western side of the WTP.

Several modifications (e.g., improvements to the ozonation system) are proposed within existing buildings located within developed portions of the main part of the WTP; these changes would not be visible to the public and would not affect the site appearance. West of the access drive from Amend Road, the proposed chlorine contact basin (a buried, 92-foot-diameter concrete tank) would be installed about 100 feet outside and northeast of the existing WTP fenceline. The proposed underground tank site is relatively flat and undeveloped. Tank construction would not require the removal of any trees; however, pipeline installation would require removal of several ornamental trees, and some established ornamental grasses would be removed. Because this visual change would be relatively minor and would not be highly noticeable, it would not substantially alter the visual character found in this part of the Sobrante WTP site.

As noted on Map D-SOBWTP-1, the two existing backwash water settling basins, located at the western side of the plant, would be converted to backwash water equalization basins, and a new filter-to-waste equalization basin would be constructed adjacent to these basins. Paved access would be added along the west side of the basins. In addition, two high-rate sedimentation units would be installed adjacent to the basins near the southern edge of the parcel. These structures would be prefabricated, epoxy-painted steel structures approximately 50 feet long, 20 feet wide, and approximately 15 feet high. Construction of these facilities would require removal of some mature vegetation, including approximately 10 trees and ornamental shrubs situated along a portion of the site's Valley View Road frontage (refer to Map C-SOBWTP-1 for the location of tree/shrub removal). The removal of this mature vegetation would be a noticeable change that would alter the visual character of the western part of the plant. The new/converted structures would be noticeable within the context of their visual setting.

Figure 3.3-SOBWTP-5 shows the conceptual landscape plan for the Sobrante WTP. Proposed landscaping would include clusters of drought-tolerant shrubs as well as screening and specimen trees along the site's Valley View Road frontage. Low shrubs and groundcover would also provide aesthetic enhancement of the site and the adjacent streetscape. As the landscaping becomes established and matures, the new plant material would create visual interest and provide considerable screening of the new structures. Over time, the proposed landscaping would integrate the new structures' appearance with the overall site landscape. Implementation of Measures 3.3-2a through 3.3-2c, in addition to tree-related mitigation measures (3.6-1a through 3.6-1d), would reduce this impact to a less-than-significant level.

Upper San Leandro WTP – Alternative 1 or 2

Map D-USLWTP-1 shows the layout of proposed improvements at the Upper San Leandro WTP under Alternative 1 or 2. The proposed modifications would include physical changes within two existing structures. These changes would not be visible and would therefore not alter the site's appearance. The locations of the proposed filter-to-waste basin and pumping plant are shown on Map D-USLWTP-1. The pumping station and equalization basin would be above-ground structures. Two liquid oxygen tanks, approximately 12 feet in diameter by 50 feet long, on 2 foot high supports, would be installed in a paved area, immediately adjacent to the existing ozone generator building and chemical building. The addition of these tanks would represent a minor, incremental physical and visual change within this developed portion of the site.

A 75-foot-diameter steel equalization basin is proposed near the northwest corner of the site. The above-ground basin would be 18 feet tall. The dimensions of the new pumping plant would be approximately 25 by 35 and 15 feet tall. As shown on the Figure 3.3-USLWTP-1 aerial photo, the new basin and pumping plant would be situated adjacent to two existing detention basins. These structures would also lie within close proximity to two existing tanks as well as other nearby equipment. The general appearance and scale of the new facilities would not be dissimilar to the appearance of these existing facilities and would therefore not substantially alter the site's existing visual character. Project construction would require the removal of 15 to 25 mature trees, many of which are redwoods. A number of mature trees would be preserved at this site area. Proposed tree removal would alter the existing visual character found at the northwest corner of the Upper San Leandro WTP; however, this effect would not substantially alter the site's overall appearance. Therefore, this impact is considered less than significant.

Orinda-Lafayette Aqueduct

Construction of the tunnel entry shaft for the Orinda-Lafayette Aqueduct, situated within the southeast portion of the Orinda Sports Field, and the exit shaft near St. Stephens Drive would require ground disturbance and minor vegetation (grass) clearing. The Orinda-Lafayette Aqueduct would be installed below grade and would not be visible to the public. The alignment for this project can be found on Maps C-OLA-1 through C-OLA-3. When completed, the tunnel shaft would be a low-profile concrete structure, about 16 by 16 feet and 1 foot tall.

A minor visual effect would occur with the construction of the Orinda-Lafayette Aqueduct adjacent to the Lafayette WTP, resulting in the removal of two oak trees located along Mt. Diablo Boulevard at the eastern edge of the site, near the WTP exit drive. The visual changes resulting from construction of this project are minimal and are addressed by implementation of tree-related mitigation measures (3.6-1a through 3.6-1d). Therefore, this visual impact is considered less than significant.

Ardith Reservoir and Donald Pumping Plant

The improvements proposed at the Ardith Reservoir and Donald Pumping Plant site, portrayed on Map D-ARRES-1, include relocating the Donald Pumping Plant to a lower elevation and constructing a partially buried concrete reservoir on the adjacent cleared, graded pad. The relocated pumping plant would be approximately 65 by 30 feet and 13 feet tall (above-ground height ranges from 2 to 7 feet) (Map D-ARRES-2 shows a profile drawing). The 110-foot-diameter concrete Ardith Reservoir would be partially buried, with a bottom elevation of 720 feet above sea level. The tank would extend about 22 to 25 feet above grade. A 10-foot-wide paved access road would encircle the tank, connecting to the existing access road. The new tank would be partially buried so as to reduce its visibility. In addition, the structure would be located at a disturbed site area that consists of a cleared and graded pad. The District constructed this pad in 1960 in conjunction with the Donald Pumping Plant, anticipating future construction of a relatively large-scale tank. Construction of the tank and the relocated pumping plant would require vegetation clearing, including the removal of 30 to 35 trees (mostly mature eucalyptus; refer to Table 3.6-4 in Section 3.6). The majority of trees on the site, including numerous mature trees situated along the site perimeter, would be preserved.

The introduction of a new, partially buried tank on the site would noticeably alter the existing visual conditions. However, in light of current site development, including the presence of the Donald Pumping Plant, and because the majority of tree cover would be preserved, these visual changes would not substantially alter the site's intrinsic visual character.

Figure 3.3-ARRES-5 presents a conceptual landscape plan for the Ardith Reservoir/Donald Pumping Plant site. Proposed landscaping would include several clusters of trees at the top of the slope just west of the new pumping plant building. Large shrubs would be placed along the western edge of this building to provide additional screening. A mix of trees and shrubs would be added to the area of existing vegetation adjacent to Ardith Drive upslope from the new Ardith Reservoir. The new vegetation would fill in holes in the existing vegetation improving the screening for views from Ardith Drive. As the landscaping becomes established and matures, the

new plant material would create visual interest and provide considerable screening of the new structures. Over time, the proposed landscaping would integrate the new structures' appearance with the overall site landscape. Implementation of Measures 3.3-2a through 3.3-2c, in addition to tree-related mitigation measures (3.6-1a through 3.6-1d), would reduce the visual impact to a less-than-significant level.

Fay Hill Pumping Plant and Pipeline Improvements

The WTTIP proposes to upgrade the existing underground Fay Hill Pumping Plant and an associated pipeline segment as shown on Map D-FHPP-1. More powerful pumping units would be installed at the pumping plant and about 500 feet of pipe would be installed in Rheem Boulevard. The above-ground physical changes that would result from pump and equipment installation and pipeline construction are very minor. Construction at the pumping plant would require the removal of one or two pine trees, which would not substantially affect the site's visual character because other nearby mature trees would remain. These changes in the site's appearance would not be highly noticeable from onsite or offsite locations. Therefore, the visual impact is considered less than significant.

Fay Hill Reservoir

The proposed modifications at Fay Hill Reservoir, depicted on Map D-FHRES-1, involve the replacement of an existing rectangular-shaped reservoir structure with two approximately 80-foot-diameter, cylindrical tanks that would be installed within the footprint of the existing reservoir. The new tanks would have low-profile dome roofs. Map D-FHRES-2 is a cross-section of the new reservoir. Installing the replacement tanks and constructing the paved perimeter access road would require the removal of one or two pine trees. Given the presence of an existing reservoir and the substantially unchanged stand of pine trees around the site's perimeter, the proposed modifications would represent a minor, incremental change in the site's appearance. Consequently, the visual impact is considered less than significant.

Glen Pipeline Improvements

The proposed Glen Pipeline Improvements would be installed underground and therefore would not be visible. Project construction would not result in the removal of any trees. While installation of the pipeline segment that crosses a tributary to Happy Valley Creek could result in minimal disturbance to the root zone of trees and riparian vegetation (see Map C-GLENPL-3), any potential damage would be addressed by implementation of Measures 3.6-1a through 3.6-1d. Therefore, visual changes resulting from construction of this pipeline project would be minimal. This visual impact is considered less than significant.

Happy Valley Pumping Plant and Pipeline

Proposed modifications at the Happy Valley Pumping Plant site would involve the installation of a new pumping plant facility on an undeveloped site. Mixed oak woodland and grasses occupy the pumping plant site, which is located in an established residential neighborhood. Map D-HVPP-1 depicts the proposed site plan for the Happy Valley Pumping Plant. Map D-HVPP-2 shows a profile of the proposed pumping plant. Modifications would include new underground pipelines, perimeter fencing, and paved access from Lombardy Lane. The paved access drive would be approximately 12 feet wide, with a fenced gate set back approximately 18 feet from the roadway. The pumping plant structure would be approximately 30 by 50 feet and approximately 15 feet tall. The new structure would be set back more than 50 feet from the edge of Lombardy Lane.

An existing, visually prominent oak tree situated at the site's north side would be preserved. However, project construction would require the removal of two oak trees (refer to Map C-HVPP-1). Figure 3.3-HVPP-3 presents the conceptual landscape plan proposed for the Happy Valley Pumping Plant site. As shown in the conceptual landscape plan, the large oak tree is located between the public roadway and the new pumping plant. The proposed project landscape concept calls for drought-tolerant shrubs and groundcover to be clustered outside of the oak tree's dripline, near the edge of the site. The new landscaping would provide additional screening, particularly along the site's street frontage. The new planting would complement the existing tree cover onsite. As the landscaping becomes established, it would create visual interest and provide additional screening of the new structures. Over time, the proposed project landscaping would integrate the appearance of the new facility into the overall landscape setting. Implementation of Measures 3.3-2a through 3.3-2c, in addition to tree-related mitigation measures (3.6-1a through 3.6-1d), would reduce this impact to a less-than-significant level.

Highland Reservoir and Pipelines

Map D-HIGHRES-1 depicts the proposed site plan for the Highland Reservoir. Map D-HIGHRES-2 shows a cross-section of the proposed reservoir. Proposed modifications at this site involve the installation of a new reservoir adjacent to the Lafayette Reservoir Recreation Area Rim Trail on an undeveloped hillside occupied by numerous mature oaks. The approximately 135-foot-diameter concrete Highland Reservoir would be partially buried, with a bottom elevation of 532 feet above sea level. The tank would extend approximately 3 to 30 feet above finished grade. A 10-foot-wide paved access road and 8-foot-tall security fencing would encircle the tank. A gate and approximately 40- by 60-foot-wide paved area would be situated at the east side of the tank.

As shown on Map C-HIGHRES-1, the Highland Reservoir inlet/outlet pipeline (and the Lafayette Reclaimed Water Pipeline) would follow an alignment traversing open space from Mt. Diablo Boulevard through the watershed before terminating at the outlet tower in Lafayette Reservoir. In addition, an overflow pipeline would extend underground approximately 800 feet from the new Highland Reservoir to the Lafayette Reservoir. The new pipelines would not be visible to the public.

Construction of the tank would require vegetation clearing, including the removal of 30 to 35 oak trees (with dbh 18 inches or greater) at the reservoir site (refer to C-HIGHRES-1). Figure 3.3-HIGHRES-4, the proposed conceptual landscape plan, shows native tree and shrub planting in the area between the trail and the new reservoir. As it matures, the project landscaping would partially screen the new structure, providing a measure of aesthetic integration with the surrounding landscape setting.

The introduction of a new, partially buried tank on the site and the removal of up to 35 mature trees would change the visual conditions considerably. Figures 3.3-HIGHRES-5 and 3.3-HIGHRES-6 show a close-range “before” and “after” view of the new tank structure as seen from the adjacent recreation trail. As shown in the simulation, the proposed project would add prominent new built structures that would appear in strong visual contrast to the natural landform and vegetation pattern. These changes would substantially alter the site’s undeveloped oak woodland hillside appearance. Even with implementation of Measures 3.3-2a through 3.3-2c and Measures 3.6-1a through 3.6-1e, this visual impact would remain significant.

Construction of the proposed Highland Reservoir Inlet/Outlet Pipeline would require vegetation clearing, including the removal of 25 to 30 pine trees. Construction of the proposed overflow pipeline would require a minor amount of vegetation clearing near the reservoir shoreline. As seen from nearby trail locations, the tree removal could, to varying degrees, be a noticeable visual change. However, because a substantial number of mature trees would remain along the pipeline corridor, it is expected that the tree removal associated with proposed pipeline and aqueduct construction would represent an incremental change that would not substantially alter the area’s general appearance. Implementation of Measures 3.3-2a through 3.3-2c, in addition to tree-related mitigation measures (3.6-1a through 3.6-1d), would reduce the visual impact for the Inlet/Outlet Pipeline to less than significant.

Lafayette Reclaimed Water Pipeline

Potential impacts resulting from installation of the Lafayette Reclaimed Water Pipeline are covered within Lafayette WTP, Orinda-Lafayette Aqueduct, and the Highland Reservoir and Pipeline impact discussions.

Leland Isolation Pipeline and Bypass Valves

The proposed Leland Isolation Pipeline and Bypass Valves would be located primarily underground; above-ground physical changes that would result from installation of the pipeline and bypass valves are very minor. The location of these facilities is shown on Maps C-LELPL-1 and C-LELPL-2. Construction could require removal of two trees at the Danville Pumping Plant, which would remove some of the screening of the pumping plant site from the Iron Horse Trail. Implementation of Measure 3.3-2b, in addition to tree-related measures (3.6-1a through 3.6-1d), would reduce the visual impact at the Leland Bypass Valves to a less-than-significant level.

Moraga Reservoir

As shown on Map D-MORRES-1, the proposed Moraga Reservoir project calls for replacing the existing rectangular-shaped, open-cut reservoir with a concrete tank that would be installed within the footprint of the existing reservoir. As shown on profile drawing Map D-MORRES-2, the new tank would have a low-profile dome roof and paved perimeter access. In addition, new piping would be installed from the reservoir to a new valve pit and drop inlet situated at the southwest corner of the site, near the Claudia Court and Draeger Drive intersection.

Installing the replacement tank and constructing paved perimeter access would require the removal of 4 to 6 trees on the eastern side of the site. Construction of the new valve pit at the southwest corner of the site would require only minor disturbance and no tree removal. Given the presence of an existing reservoir facility on the site and the mature trees and shrubs that would remain around the site's perimeter, the proposed modifications would represent a relatively minor, incremental visual change that would not substantially alter the site's appearance. Therefore, this impact would be considered less than significant.

Moraga Road Pipeline

The proposed Moraga Road Pipeline would be installed underground and therefore would not be visible. Project construction would result in vegetation clearing in the Lafayette Reservoir Recreation Area, including the removal of approximately 150 to 190 trees (refer to Table 3.6-4 in Section 3.6 and Maps C-MORPL-1 through C-MORPL-3). As seen from nearby trail locations, the tree removal could be a noticeable visual change. However, because a substantial number of mature trees would remain along the pipeline corridor, it is expected that the tree removal associated with proposed pipeline construction would be an incremental change that would not substantially alter the area's general appearance. The tree removal would not generally be visible from the residential area to the northeast due to intervening vegetation. Implementation of Measure 3.3-2b, in addition to tree-related mitigation measures (3.6-1a through 3.6-1d), would reduce the visual impact to a less-than-significant level.

Sunnyside Pumping Plant

As shown on Map D-SUNPP-1, the proposed Sunnyside Pumping Plant project calls for installing a new pumping plant and pipelines on a sloping, undeveloped site adjacent to Happy Valley Road. Modifications would include a new transformer, switchgear, and paved access. The pumping plant structure would be about 50 by 30 feet and approximately 20 feet tall and would be built near the base of an embankment. Map D-SUNPP-2 shows a cross-section of the proposed pumping plant. The new transformer and switchgear would lie immediately west of the pumping plant, on a paved apron connected to the access drive. The structures would be approximately 5 and 9 feet tall, respectively.

Project construction would require vegetation clearing, including the removal of 13 pine and redwood trees along the site's northern edge. A number of mature conifer trees would be preserved in this general area. The conceptual landscape plan for the Sunnyside Pumping Plant site, presented as Figure 3.3-SUNPP-3, shows several new conifer trees clustered on the north side of the pumping plant structure. In addition, an informal grouping of broad-leaf evergreen trees is proposed for screening purposes along the south and east edges of the new facility. Clusters of evergreen shrubs and groundcover and two deciduous specimen trees would accent this landscape planting.

The new facility would lie near the base of a roadside embankment in a location that is not generally visible to the public. Over time, the landscaping proposed as part of the project would provide considerable screening, particularly along the facility's south and east sides. As it matures, the landscaping would also enhance the visual integration of the proposed facility with the surrounding landscape setting. Implementation of Measures 3.3-2a through 3.3-2c, in addition to tree-related mitigation measures (3.6-1a through 3.6-1d), would reduce the visual impact to a less-than-significant level.

Tice Pumping Plant and Pipeline

As shown on Map D-TICEPP-1, the proposed Tice Pumping Plant and Pipeline project calls for installing a new pumping plant and pipelines on an undeveloped, partially wooded site adjacent to a recreation trail and Olympic Boulevard. Map D-TICEPP-2 is a cross-section of the proposed pumping plant. Modifications would include a new transformer, switchgear, control valve vault, and paved access. The pumping plant structure would be about 30 by 70 feet and 24 feet above-ground and would be built into the base of a slope. The toe of this hillside would be excavated and a 19-foot-tall retaining wall constructed along part of the site's southern boundary to provide a level pad for the new transformer and switchgear. The transformer would be approximately 10 by 12 feet and 10 feet tall and the switchgear would be 10 by 10 feet and 10 feet tall. A paved area, approximately 100 feet long and 25 to 40 feet wide, would extend from the north side of the new pumping plant structure. For security purposes, 8-foot-tall fencing would be installed along the north and east edges of this paved area.

Project-related earthwork and grading would require vegetation clearing, including the removal of about 10 trees. The conceptual landscape plan for the Tice Pumping Plant is presented as Figure 3.3-TICEPP-3. The proposed landscape concept calls for clusters of drought-tolerant, native trees and shrubs, and cobbles to be installed near portions of the new facility. The new planting would complement the existing vegetation pattern. Pipeline installation is not expected to require the removal of any trees and would be buried.

Figures 3.3-TICEPP-4 and 3.3-TICEPP-5 show close-range "before" and "after" views of the new Tice Pumping Plant as seen from the adjacent recreation trail. As illustrated in the simulation, the proposed project would introduce built features, including a 24-foot-tall building, a 19-foot-tall retaining wall, and fencing, on a currently undeveloped, partially wooded hillside. These changes would substantially alter the site's visual character. However, as it matures, the proposed landscaping would provide considerable screening and visual integration with the surrounding landscape setting (refer to the Figure 3.3-TICEPP-5 simulation). Implementation of Measures 3.3-2a through 3.3-2c, in addition to tree-related mitigation measures (3.6-1a through 3.6-1d), would reduce the visual impact to less than significant.

Withers Pumping Plant

Proposed modifications at the Withers Pumping Plant site would consist of a pump plant building, transformer, and switchgear (refer to Map D-WITHPP-1). A cross-section drawing of the proposed pumping plant is shown on Map D-WITHPP-1. The new pumping plant would be installed near the bottom of a partially wooded slope, approximately 100 feet downhill and northeast of the existing Grayson Reservoir. The pumping plant building would be 30 by 50 feet and approximately 15 feet tall, with paved access on all sides. The structure would be built into the slope, and a retaining wall would be constructed around most of its perimeter. The new transformer and main switchgear would be installed immediately southeast of the pumping plant building on a level paved pad. These project components would be approximately 8 by 8 feet and 10 feet tall and 2 by 8 feet and 9 feet tall, respectively.

Project construction would require vegetation clearing, including the removal of 35 to 40 trees (refer to Map C-WITHPP-1 for tree and shrub removal locations). Figure 3.3-WITHPP-3 shows the conceptual landscape plan proposed for the Withers Pumping Plant site. Proposed landscaping would include the installation of drought-tolerant trees and shrubs on the hillside near the new facility. The new planting would complement the existing site landscaping and, over time, would provide visual screening. Implementation of Measures 3.3-2a through 3.3-2c, in addition to tree-related mitigation measures (3.6-1a through 3.6-1d), would reduce the visual impact to less than significant.

Mitigation Measures

Measure 3.3-2a:

- The District will implement landscaping plans prepared for the following WTTIP projects: Lafayette WTP (Alternative 1), Orinda WTP (Alternative 1 or 2), Walnut Creek WTP (Alternative 1 or 2), Sobrante WTP (Alternative 1 or 2), Ardith Reservoir and Donald Pumping Plant, Happy Valley Pumping Plant, Highland Reservoir, Sunnyside Pumping Plant, Tice Pumping Plant, and Withers Pumping Plant.

- For each project (with the exception of the Fay Hill Pumping Plant), the District will plant native vegetation and/or construct earth berms around all proposed above-ground facilities to provide screening, consistent with the requirements set forth in Measure 3.6-1. Landscaping will include revegetation of disturbed areas to minimize textural contrasts with the surrounding vegetation.

- The District will replace any landscaping at the WTTIP project sites that is removed or destroyed during construction consistent with landscape plans. New plants would include grasses, shrubs, and trees typical of the surrounding area. The District will consult with the appropriate jurisdiction when developing final landscaping plans. For disturbance of natural, non-landscaped areas, see Measure 3.6-3c in Section 3.6, Biological Resources.

- The District will also install additional landscaping: (1) north of Manzanita Drive at the Orinda WTP to provide additional screening of existing ponds or new above-ground facilities, and (2) along Mt. Diablo Boulevard at the southeastern edge of the Lafayette WTP under Alternative 2 near the exit drive.

- Implement Measure 3.6-1b in Section 3.6 regarding pruning.

- For each project listed in the first bullet (with the exception of Highland Reservoir), the District will coordinate with and involve neighborhood representatives during the development of final landscaping plans.

- The contractor will be required to warrant landscape plantings for one year after project completion.

Measure 3.3-2b: For each project (with the exception of the Fay Hill Pumping Plant and pipelines in roadways), the District will ensure that its contractors restore disturbed, graded areas to a natural-appearing landform.

Measure 3.3-2c: The District will use design elements to enhance the aesthetic appearance of proposed facilities and to integrate them with the existing visual environment. Proposed facilities will be painted or include appropriate concrete admixtures to achieve low-glare, earth-tone colors that blend with the surrounding terrain and visual setting. For each project, colors will be selected based on site-specific conditions with the goal of (1) reducing the visual contrast between new facilities and the surrounding natural landscape setting and/or (2) integrating the facility appearance with the neighboring built environment. Concrete structures need not be painted; however, integral coloring should be employed, as noted above, where structures are seen from sensitive community viewpoints.

- At the Lafayette WTP, landscaped berms may be incorporated into the final site and landscape plans at proposed clearwell sites in order to screen views from the Walter Costa Trail.
- At the Orinda WTP backwash water facility use textures, colors and materials that will blend with existing filter plant buildings.
- For the Tice, Withers, Happy Valley, and Sunnyside Pumping Plants, new pump structures and buildings will include architectural treatment and design elements (such as pitched roofs, roof overhangs, or ornamental window or trim detail) to enhance the appearance of new facilities.
- For the Lafayette WTP, Orinda WTP, Happy Valley and Tice Pumping Plants, the design of new walls, gates, and fencing will include aesthetic architectural treatment where facilities are located near public trails, residences, or scenic roadways.

Impact 3.3-3: Effects on views from the surrounding area, including public roadways, public trails, and open space and residential areas.

Lafayette WTP

The Lafayette WTP is located in the City of Lafayette Hillside Overlay District (City of Lafayette Municipal Code). The intent of the overlay district is to preserve hills and ridges within the City in as near a natural state as feasible by regulating development on hillsides and ridgelines. The Lafayette WTP is not on a hillside or ridge. The discussion below characterizes the effects on views of the Lafayette WTP property from the surrounding area. Implementation of Measures 3.3-2a through 3.3-2c would help minimize impacts to views at this facility.

Alternative 1

Under Alternative 1, views of the Lafayette WTP from some locations in the surrounding area would be changed. Views from a limited segment of Highway 24, a designated state scenic highway, would include a fleeting glimpse of the proposed project. Figures 3.3-LWTP-5 and 3.3-LWTP-6 show “before” and “after” views of the project (without landscaping and with landscaping at five years of maturity) as seen from Highway 24. The visual simulations indicate that motorists' views could encompass a portion of the new pumping plant building, paved access, and perimeter fencing. The visible project elements would be seen adjacent to dense roadside vegetation, against a landscape backdrop. In addition, a small area cleared of vegetation might be visible along the south (right) side of the recreation trail. This view of the project would be fleeting and would last for several seconds or less. As demonstrated in the visual simulation, within five years the landscaping proposed as part of the project would largely screen views of the new pumping plant facilities (refer to Figure 3.3-LWTP-4 for the Lafayette WTP conceptual landscape plan). With implementation of Measures 3.3-2a through 3.3-2c, this project would not substantially alter the visual character of the scenic Highway 24 corridor.

People using the Walter Costa Trail would have close-range, foreground views of the project. Figures 3.3-LWTP-7 and 3.3-LWTP-8 present visual simulations of the proposed project as seen from the Walter Costa Trail. From this close-range location, the new pumping plant building would appear prominently in the foreground. As shown in the simulation images, the new building would be seen beyond existing and new security fencing within the context of foreground and background landscape vegetation. The lines, form, and texture of these new built features would contrast noticeably with the surrounding landscape setting. As a result, the presence of these new project components would alter the visual character experienced from this segment of the trail. In addition, portions of the new clearwells, new chlorine contact basin, and backwash water recycle system might also be partially visible in the foreground from a limited area along the trail. However, because the structures would be several feet or less in height, the clearwell structures would not appear visually prominent when seen from the trail. Proposed shrub plantings between the trail and the new facilities would provide substantial screening. The project would not substantially affect views from the trail toward the creek and general area. To varying degrees, the project would affect the visual character along approximately 500 to 600 feet of the Walter Costa Trail, including a shorter segment that would need to be realigned near the proposed pumping plant building. (For additional existing trail views, refer to Photos L2 and L3 in Figure 3.3-LWTP-2.)

New project structures proposed at the Lafayette WTP, including those located in the western and central portions of the site, would generally not be visible from Mt. Diablo Boulevard because of screening provided by intervening vegetation. Mature trees would be removed in limited areas along Mt. Diablo Boulevard, as shown on Map C-LWTP-1. Map C-LWTP-1 includes tree removal that would occur for the Lafayette Reclaimed Water Pipeline Project. As seen from Mt. Diablo Boulevard, the substantial number of remaining trees along the site perimeter would continue to screen views of WTP facilities. However, in the immediate project vicinity, the loss of these trees would noticeably affect motorists' views from Mt. Diablo Boulevard. In light of the City of Lafayette's policies that recognize this roadway's scenic quality, the City's tree protection policies, and the Hillside Overlay District designations, the effects associated with tree removal along Mt. Diablo Boulevard are considered significant. Measures 3.3-2a through 3.3-2c would reduce the visual impact to a less-than-significant level.

Alternative 2

Proposed modifications at the Lafayette WTP under Alternative 2 would not involve the introduction of prominent above-ground features on undeveloped portions of the site. As shown on Map C-LWTP-2, construction of the Lafayette Reclaimed Water Pipeline and the Orinda-Lafayette Aqueduct would require the removal of mature trees in limited areas. The loss of these trees could noticeably affect motorists' views from Mt. Diablo Boulevard. In light of the City of Lafayette's policies cited above, the effects associated with tree removal along Mt. Diablo Boulevard are considered significant. Measure 3.3-2a through 3.3-2b would reduce the visual impact to a less-than-significant level.

Orinda WTP

Alternative 1

Under Alternative 1, views of the Orinda WTP from some locations in the surrounding area would be altered. Views from Camino Pablo (a designated scenic route) would encompass portions of the backwash water recycle system. Due to the presence of dense roadside vegetation, the project would only be visible from a relatively short segment of designated scenic route. Figures 3.3-OWTP-6 and 3.3-OWTP-7 show close-range "before" and "after" views of the project (without landscaping and with landscaping at five years of maturity) as seen from Camino Pablo. From this location, portions of the new building would appear prominently during the initial period following construction. However, existing vegetation would partially screen the new structure. As shown in the Figure 3.3-OWTP-6 simulation, the new building would appear along the roadside within the context of foreground built elements, including traffic signals and meter boxes. In terms of the visual character experienced from Camino Pablo, the new building would not appear dissimilar to the existing chemical building (refer to Photo O4, Figure 3.3-OWTP-2). As indicated in the Figure 3.3-OWTP-**7** simulation, within five years the proposed landscaping would substantially screen the building and storage tank as seen from Camino Pablo. With implementation of Measures 3.3-2a through 3.3-2c, the visual impact to the character of views experienced from Camino Pablo would be reduced to less than significant.

Views from Manzanita Drive would be affected by the proposed project. Figures 3.3-OWTP-8 and 3.3-OWTP-9 are visual simulations showing a view of the new UV disinfection building as seen looking south from Manzanita Drive near the Orinda WTP entry road. The simulations indicate that a portion of the new building would be visible from this roadway location. The new structure would appear against a wooded hillside backdrop, and existing landscaping in the foreground would partially screen it from view. EBMUD would plant some additional vegetation to increase the screening after project completion. The new building would not be dissimilar in scale to the existing filter gallery building that is also visible from Manzanita Drive (refer to Photo O5, Figure 3.3-OWTP-3). As illustrated in the Figure 3.3-OWTP-9 simulation, within five years the combination of existing vegetation and proposed landscaping would substantially screen the new building. With implementation of Measures 3.3-2a through 3.3-2c, the visual impact to the character of views experienced from Manzanita Drive would be reduced to less than significant.

Alternative 2

On the portion of the Orinda WTP situated south of Manzanita Drive, Alternative 2 proposes the same facilities and would result in the same visual effects as those described for Alternative 1. In addition, Alternative 2 proposes modifications north of Manzanita Drive, including the installation of a new 220-foot-diameter clearwell and relatively low-profile electrical substation (with structures up to approximately 10 feet tall). These structures could be visible from a limited area of Manzanita Drive. The existing washwater settling basins are partially visible from a limited section of Manzanita Drive, where there is a break in the vegetation at the site access drive (refer to Photo O7, Figure 3.3-OWTP-3). A fleeting glimpse of the proposed new facilities might be available at this viewpoint; however, roadside landscaping and vegetation would generally screen public views of these new facilities from both Manzanita Drive and Camino Pablo. Vegetation clearing in this area would include removing 45 to 55 trees (refer to Table 3.6-4 in Section 3.6 and Map C-OWTP-2 for tree and shrub locations); however, vegetation would be preserved along the site's Camino Pablo and Manzanita Drive frontage. It is expected that this perimeter vegetation would generally screen views toward the site interior, including the new above-ground facilities. Implementation of Measures 3.3-2a through 3.3-2c would reduce the visual impact to a less-than-significant level.

Walnut Creek WTP – Alternative 1 or 2

Views from the Briones–Mt. Diablo Trail would be affected by the proposed Walnut Creek WTP project. Figures 3.3-WCWTP-5 and 3.3-WCWTP-6 are visual simulations showing the new pumping plant as seen looking south from the trail. A comparison of the "before" and "after" images indicates that a portion of the new pumping plant would be visible. The new structure would appear along the skyline next to (left of) the existing decant building. From this viewpoint, which is about one-quarter mile away, the new building would be comparable in scale and general appearance to the existing building. In this respect, the project would represent a relatively minor, incremental change in visual conditions from this segment of the trail. In addition, as indicated in the Figure 3.3-WCWTP-6 simulation, within five years the proposed landscaping would substantially screen the new pumping plant building and the existing decant building as seen from this portion of the Briones–Mt. Diablo Trail. From more distant locations, intervening topography and vegetation would generally screen views of the new facility.

Figures 3.3-WCWTP-7 and 3.3-WCWTP-8 present a second simulation view of the proposed Leland Pumping Plant No. 2. Looking west from a distance of less than a quarter mile away, this view shows the project from Alfred Avenue, a nearby residential street. A comparison of the "before" and "after" images indicates that a portion of the new pumping plant would be seen at the top of the slope. The new structure would appear against a partial landscape backdrop, beyond the existing basin structure. The new building would contrast with the natural hillside landscape in line and form. The project would introduce a new built form to the hillside, although it would be partially screened by existing residential landscaping in the foreground. To a degree, the project would alter visual conditions in this location during the initial period following construction. However, as illustrated in the Figure 3.3-WCWTP-6 simulation, within five years the landscaping installed by the District as part of the Walnut Creek Expansion Project will have matured, completely screening views of the new pumping plant building.

Neither the proposed project nor the recently installed site landscaping would obstruct distant ridgeline views that are currently available from this location. Views of the new filters would generally be screened by intervening vegetation, topography, and/or development. To the extent that they could be seen from places along the Acalanes Ridge, the new filters would not be particularly noticeable because they would appear within the context of the existing adjacent filters; as such, their effect on visual conditions would be minor and incremental. Therefore, the new filters would not substantially alter views as seen from the surrounding area. Implementation of Measures 3.3-2a through 3.3-2c would reduce visual impacts of the proposed Walnut Creek WTP and Leland Pumping Plant No. 2 to a less-than-significant level.

Sobrante WTP – Alternative 1 or 2

The proposed Sobrante WTP project could affect views from Amend Road. The proposed chlorine contact basin would be installed about 100 feet outside and northeast of the fence-line at the main part of the plant. Tank and pipeline construction would require the removal of several ornamental trees and potential removal of some established ornamental (pampas) grasses. The majority of trees in this area of the site would be preserved. The vegetation removal could be visible from nearby portions of Amend Road (refer to Photo S7, Figure 3.3-SOBWTP-3). In addition, these changes might be noticeable from a few residences along the north side of Amend Road. Because the site modifications would occur more than 1,000 feet from the roadway, and because the project does not involve the installation of any above-ground features in this part of the site, it is expected that the visual changes would not be highly noticeable from Amend Road and nearby residences; therefore, the project would not substantially alter the existing visual character found in this part of the Sobrante WTP site.

Improvements proposed at the western side of the plant would affect views from Valley View Road. Facility construction would require removing established landscaping, including approximately 10 oak, pine and ornamental trees and shrubs along a portion of the site's Valley View Road frontage (refer to Map C-SOBWTP-1 for the location of proposed tree/shrub removal). Figures 3.3-SOBWTP-6 and 3.3-SOBWTP-7 show close-range "before" and "after" views of the project (without landscaping and with landscaping at five years of maturity) as seen from Valley View Road near D'Avila Way. As shown in the Figure 3.3-SOBWTP-6 simulation, when seen from this roadway area, portions of the converted basins and perimeter fencing would initially be noticeable in the foreground. The removal of mature landscaping would also result in a visible change for Valley View Road motorists. In the initial period following construction, the new structures would contrast with the landscape setting in terms of their line and form. As shown in the Figure 3.3-SOBWTP-7 simulation, within five years the landscaping proposed as part of the project would substantially screen the new structures from public view. As the landscaping becomes established and matures, the new plant material would create an aesthetic enhancement, helping to integrate the facility's appearance with the surrounding setting. Implementation of Measures 3.3-2a through 3.3-2c would reduce the visual impact on the western side of the plant to less than significant.

Upper San Leandro WTP – Alternative 1 or 2

All of the physical modifications at the Upper San Leandro WTP are proposed within the site's interior, and mature stands of trees along the site's perimeter would be substantially preserved; as a result, changes at the site would not be particularly visible to the public, and the project would not cause a substantial effect on existing views from the surrounding area. Therefore, the visual impact is considered less than significant.

Orinda-Lafayette Aqueduct

Construction of the Orinda-Lafayette Aqueduct tunnel entry shaft would include a minor amount of disturbance within the southeast portion of the Orinda Sports Field (refer to Photos O10 and O11, Figure 3.3-OWTP-4). When completed, the tunnel shaft would be a low-profile concrete structure, about 16 by 16 feet and 1 foot tall. These changes would be relatively minor and would not substantially affect public views in the area. Therefore, the visual impact is considered less than significant.

Ardith Reservoir and Donald Pumping Plant

Figures 3.3-ARRES-6 and 3.3-ARRES-7 show close-range "before" and "after" views of the proposed Ardith Reservoir and Donald Pumping Plant project (without landscaping and with landscaping at five years of maturity) as seen from Ardith Drive, adjacent to the project site. After construction, the new tank and perimeter paved access would initially be visible from this location (as illustrated in Figure 3.3-ARRES-6). However, as illustrated in the Figure 3.3-ARRES-7 simulation, in less than five years existing and proposed landscaping would completely screen views of the facilities from Ardith Road. Fleeting glimpses of portions of the new tank and pumping plant might be available from a few nearby residences to the north or northwest; however, a combination intervening topography, existing vegetation, and proposed landscaping would generally provide substantial screening of the project from these locations. Implementation of Measures 3.3-2a through 3.3-2b would reduce the visual impact to less than significant.

Fay Hill Pumping Plant and Pipeline Improvements

The above-ground physical changes proposed at the Fay Hill Pumping Plant and Pipeline Improvements site (including the removal of one or two trees) would be very minor and would not be particularly noticeable from nearby locations, including the adjacent shopping center parking lot and the Moraga Way and Rheem Boulevard roadways (refer to Photos F5 and F6, Figure 3.3-FHPP/MORPL-2). Therefore, the visual impact is considered less than significant.

Fay Hill Reservoir

The proposed modifications at Fay Hill Reservoir could result in minor effects on views from some public roadway and residential locations. These visual changes would generally be seen from a distance of about one-half mile or more. Figure 3.3-FHRES-3 is a "before" and "after" view of the Fay Hill Reservoir as seen from Natalie Drive, a residential street about a half mile to the north of the project site. From this vantage point, the project site appears along the hilltop near the center of the photo. A comparison of the existing view and the visual simulation indicates that the project-related visual changes would barely be perceptible from this location. The simulation depicts a slight thinning in the stand of pine trees around the site's perimeter. In addition, the new tank would be slightly less visible along the skyline than the existing reservoir. As illustrated in the Figure 3.3-FHRES-3 simulations, these changes would not substantially affect views from the surrounding residential area. Therefore, the visual impact is considered less than significant.

Glen Pipeline Improvements

The proposed Glen Pipeline would be buried in roadways and would not be visible to the public following construction. Although some damage to trees could occur during installation of the pipeline, no trees are proposed for removal. With implementation of Measures 3.6-1a through 3.6-1d, potential tree damage would not substantially affect views. These tree-related measures ensure that trees are monitored and replaced if necessary. Therefore, this visual impact is considered less than significant.

Happy Valley Pumping Plant and Pipeline

The proposed installation of a new Happy Valley Pumping Plant on an undeveloped wooded site would affect views from a short segment of Lombardy Lane, a narrow, winding residential street. Visual simulations (Figures 3.3-HVPP-4 and 3.3-HVPP-5) show close-range views of the new pumping plant from Lombardy Lane looking southwest. As shown in the Figure 3.3-HVPP-4 simulation, the roof of the new pumping plant and portions of the new access drive, fence, and gate would be visible from this location. The new building's roof would appear against a backdrop of dense vegetation. The existing landform and vegetation would partially screen the new pumping plant building. In views from Lombardy Lane, a large oak tree would appear prominently in the foreground. Figure 3.3-HVPP-5 shows the Happy Valley Pumping Plant with proposed landscaping after approximately five years. The landscaping includes drought-tolerant evergreen shrubs clustered on the northern side of the new facility. As illustrated in this simulation, within five years the proposed planting would provide considerable visual screening. It is expected that a combination of existing trees and shrubs and proposed landscaping would generally screen views from adjacent or nearby residences. With implementation of Measures 3.3-2a through 3.3-2c, the visual impact is considered less than significant.

Regarding the Happy Valley Pipeline, the pipeline would be buried in roadways. Although some damage to trees could occur during installation of the pipeline (refer to Maps C-HVPP-1 through C-HVPP-3), no trees are proposed for removal. With implementation of Measures 3.6-1a through 3.6-1d, potential changes in the roadway from root damage would not substantially affect views. These tree-related measures ensure that trees are monitored and replaced if necessary. Therefore, this visual impact of the Happy Valley Pipeline is considered less than significant.

Highland Reservoir and Pipelines

The Highland Reservoir and Pipelines project is located within the City of Lafayette Hillside Overlay District and within the 250-foot setback area for a class II ridgeline. City policies preclude development within this setback, although the Highland Reservoir and Pipelines project would be exempt from this policy pursuant to Section 53091 of the California Water Code. The discussion below characterizes the effects on views of the Highland Reservoir and Pipelines project area.

The proposed installation of a new Highland Reservoir on an undeveloped hillside would affect views from a variety of places within the Lafayette Reservoir Recreation Area, including points along the adjacent Rim Trail. Construction of the partially buried concrete tank would require the removal of 30 to 35 oak trees (with dbh 18 inches or greater) at the reservoir site. The pipelines and construction access associated with this project would require the removal of 65–75 oak and pine trees. Refer to Map C-HIGHRES-1 at the end of Chapter 2.

The introduction of a partially buried tank on the site and the associated tree removal would represent a considerable visual change to existing landscape conditions. Figures 3.3-HIGHRES-5 and 3.3-HIGHRES-6 show close-range “before” and “after” views of the new tank structure as seen from the adjacent recreation trail. From this trail location, the tank would appear prominently in the foreground. New security fencing enclosing the tank and perimeter paving would also appear prominently. As shown in the simulations, the new tank would be seen against the skyline with a partial landscape backdrop. In terms of their line, form, and texture, these new built features would contrast noticeably with the surrounding setting when viewed at close range. As a result, these new project components would alter the visual character experienced from this segment of the trail. The oak tree removal would also be noticeable and would adversely affect the quality of views from this trail segment and from the trail vista point. Grading required for tank construction would also contrast with the surrounding natural landform. Figure 3.3-HIGHRES-6 demonstrates that the landscaping proposed as part of the project would partially screen the new structure, providing a measure of aesthetic integration with the surrounding landscape setting. However, the tank structure would still be noticeable and somewhat prominent in relationship to the natural landscape.

Figures 3.3-HIGHRES-7 and 3.3-HIGHRES-8 present a second simulation view of the proposed Highland Reservoir as seen from a recreation trail in the Lafayette Reservoir Recreation Area. Looking toward the northwest, this view shows the project from the Big Oak Trail at a distance of over one-half mile. A comparison of the “before” and “after” images indicates that the new tank would be seen beyond the reservoir in the cleared area toward the right side of the view. The tank would appear against a landscape backdrop. As seen from this viewpoint, the tank would be noticeable, although it would not be visually prominent. To some degree, its form and the graded terrain would contrast with the surrounding natural landscape. The removal of mature oak trees from the site would also be a noticeable visual change that would adversely affect this trail view. As demonstrated by the Figure 3.3-HIGHRES-8 simulation, within five years the proposed landscaping would provide some additional screening.

Given the degree of visual contrast between proposed project features and the natural landscape setting, and in light of City policies regarding hillside and tree protection as well as District policies regarding visual quality at recreation sites, the effect on trail views is considered significant and unavoidable, even with implementation of Measures 3.3-2a through 3.3-2c.

Lafayette Reclaimed Water Pipeline

Potential impacts resulting from installation of the Lafayette Reclaimed Water Pipeline are included within the discussions of Lafayette WTP Alternatives 1 and 2, Orinda-Lafayette Aqueduct, and the Highland Reservoir pipeline.

Leland Isolation Pipeline and Bypass Valves

The proposed Leland Isolation Pipeline and Bypass Valves would be located primarily underground; above-ground physical changes that would result from installation of the pipeline and bypass valves are very minor. The location of these facilities is shown on Maps C-LELPL-1 and C-LELPL-2. As described in the previous section, construction could require removal of two trees at the Danville Pumping Plant, which would remove some of the screening of the pumping plant site. This could affect public views from the Iron Horse Trail. Tree-related mitigation measures (3.6-1a through 3.6-1d) and Measure 3.3-2b would reduce the visual impact to a less-than-significant level.

Moraga Reservoir

Replacing the existing Moraga Reservoir with a new covered reservoir and installing a new valve pit could affect views from some nearby locations in the surrounding area. The new tank would have a low-profile dome roof and paved perimeter access. For the most part, the proposed changes would take place within the interior of the site. Because mature trees and shrubs along the site's perimeter would be preserved, the modifications would not generally be noticeable. Installation of the valve pit at the southwest corner of the site would require only minor disturbance and no tree removal. The modifications proposed at the Moraga Reservoir site would represent a relatively minor and incremental visual change that would not substantially affect public views in the area. Therefore, the visual impact would be considered less than significant.

Moraga Road Pipeline

The entire Lafayette Reservoir Recreation Area is within a City-designated Hillside Overlay District. The Moraga Road Pipeline alignment traverses ridgelines designated by the City as Class III and Class II ridges. City policies preclude development within 250 feet of a Class II ridge, although the Moraga Road Pipeline would be exempt from this policy pursuant to Section 53091 of the California Water Code. The discussion below characterizes the effects on views of the Moraga Road Pipeline area.

The proposed Moraga Road Pipeline would be installed underground and therefore would not be visible. As discussed under Impact 3.3-2, above, construction would result in vegetation clearing in the Lafayette Reservoir Recreation Area, including the removal of approximately 150 to 190 trees. As seen from nearby trail locations, the tree removal could result in a noticeable visual change. However, because numerous mature trees would remain along the pipeline corridor, the tree removal would represent an incremental change that would not substantially affect trail views. From the nearby residential area to the northeast, the tree removal would not generally be visible due to intervening vegetation. With the implementation of Measures 3.3-2a through 3.3-2b, this visual impact would be less than significant.

Sunnyside Pumping Plant

Because it is screened by topography and vegetation, the proposed Sunnyside Pumping Plant site is not very visible to the public. Figures 3.3-SUNPP-4 and 3.3-SUNPP-5 show close-range "before" and "after" views of the project from a vantage point along Happy Valley Road at the site entry road. The Figure 3.3-SUNPP-4 simulations show that a small portion of the pumping plant roof would be visible from this location (seen toward the center of the image). Because only a small portion of the structure is visible and because the view is fleeting, the facility would barely be noticeable from Happy Valley Road. As demonstrated by the Figure 3.3-SUNPP-5 simulation, in five years the proposed landscaping would almost completely screen the Sunnyside Pumping Plant from Happy Valley Road. Portions of the new pumping plant might be visible from the neighboring residences situated to the east and north; however, a combination of existing vegetation and proposed landscaping would generally provide substantial screening of the project from these locations. With the implementation of Measures 3.3-2a through 3.3-2c, this visual impact would be less than significant.

Tice Pumping Plant and Pipeline

The proposed installation of the Tice Pumping Plant near the base of an undeveloped hillside would affect views from nearby locations, including Olympic Boulevard and the adjacent recreation trail. The introduction of a new pumping plant facility on the site and the removal 10 mature trees would represent a considerable visual change to existing conditions. See Map C-TICEPP-1 regarding the location of tree removal as well as potential tree damage along the pipeline route. Although some damage to trees could occur during installation of the pipeline, no trees are proposed for removal. Tree-related mitigation measures (3.6-1a through 3.6-1d) address this potential damage, and therefore, no long-term visual effects are expected to result.

Figures 3.3-TICEPP-4 and 3.3-TICEPP-5 show "before" and "after" views of the new tank structure as seen from the adjacent recreation trail. From this location, the new pumping plant building would appear prominently in the foreground. The new transformer and switchgear structures, security fencing, and retaining wall would also appear prominently. However, the scale of the new pumping plant structures would not be dissimilar from or incompatible with the existing buildings and structures near the Olympic/Tice Valley Boulevard intersection. The new facility would appear against a landscape backdrop. The form and texture of these new built features would contrast noticeably with the surrounding landscape setting. As a result, the presence of these new project components would alter the visual character experienced from this segment of the recreation trail and adjacent roadway. The removal of mature trees from the site would also be highly noticeable and would adversely affect the quality of trail and roadway views in the immediate area. Figure 3.3-TICEPP-5 demonstrates that, within five years, the proposed landscaping would substantially screen the new pumping plant, providing a measure of aesthetic integration with the surrounding setting. With implementation of Measures 3.3-2a through 3.3-2c, the visual impact would be less than significant.

Withers Pumping Plant

Proposed site development would be visible from a limited area along Reliez Valley Road, a designated scenic route, and from a few residences along the northeast side of Reliez Valley Road. Figures 3.3-WITHPP-4 and 3.3-WITHPP-5 are visual simulations showing a close-range view of the new pumping plant as seen looking southeast from Reliez Valley Road near the site entry road. As shown in the simulations, a portion of the new pumping plant would be visible. The new structure would appear against a landscape backdrop, with part of the existing Grayson Reservoir visible against the skyline. Existing vegetation would partially screen the new pumping plant building as well as part of the reservoir. The Figure 3.3-WITHPP-5 simulation shows the Withers Pumping Plant with landscaping proposed as part of the project, which would include the installation of drought-tolerant trees and shrubs on the hillside near the new facility. As shown in this simulation, the proposed planting would complement the existing site landscaping and, within five years, considerable visual screening would be provided. With implementation of Measures 3.3-2a through 3.3-2c, the visual impact would be less than significant.

Mitigation Measure

Measure 3.3-3: Implement Measures 3.3-2a through 3.3-2c, as detailed above.

Impact 3.3-4: Effects on a scenic vista.

The majority of WTTIP projects would not be seen within the context of a scenic vista (i.e., a distant view encompassing valued natural or built landscape features such as ridgelines, water bodies, or landmark structures) once construction was complete. However, as discussed below and under Impact 3.3-3, the new Highland Reservoir has the potential to disrupt or obstruct a scenic vista that is currently available to the public. The pipelines and construction access associated with this project would require the removal of 65–75 oak and pine trees, and the tank would require removal of 30-35 large-diameter oak trees. Refer to Map C-HIGHRES-1 at the end of Chapter 2.

To varying degrees, the Highland Reservoir and associated tree removal would be visible from places along public trails in the Lafayette Reservoir Recreation Area. Figures 3.3-HIGHRES-7 and 3.3-HIGHRES-8 present “before” and “after” views of the proposed Highland Reservoir as seen from a vantage point along the Big Oak Trail, at a distance of over one-half mile. A comparison of the “before” and “after” images indicates that the new tank would be visible beyond the reservoir in the cleared area toward the right side of the view. The tank would appear against a landscape backdrop. From this viewpoint, the tank would be noticeable, although it would not appear visually prominent. To some degree, its form and the graded terrain would contrast with the surrounding natural landscape. The removal of mature oak trees from the site would also result in a noticeable visual change that would adversely affect views from this trail. As demonstrated by the Figure 3.3-HIGHRES-8 simulation, within five years proposed landscaping would provide a measure of additional screening. Given the degree of visual contrast between proposed project features and the natural landscape setting, and in light of City policies regarding hillside and tree protection as well as District policies regarding visual quality at recreation sites, even with the addition of new replacement trees and landscape screening, the effect on trail views is considered significant and unavoidable.

Mitigation Measure

> **Measure 3.3-4:** Implement Measures 3.3-2a through 3.3-2c, above, for Highland Reservoir.

Impact 3.3-5: New sources of light and glare.

Project Construction

Most project facilities are proposed to be constructed during daytime, weekday hours. The only exceptions to the daytime weekday hours for construction would be the Orinda-Lafayette Aqueduct (Alternative 2) and the pipeline segment that crosses the Lafayette Reservoir Recreation Area entrance/exit road for the Highland Inlet/Outlet Pipeline and Lafayette Reclaimed Water Pipeline projects. The pipeline crossing construction work would occur for two to four nights and would be performed at night to minimize conflicts with recreation traffic. Tunnel construction would occur 24 hours per day, seven days a week, at tunnel shafts (primarily the entry shaft at the Orinda Sports Field north of the Orinda WTP), and limited maintenance and inspection work would occur on weekend days. With installation of the sound barriers at these locations pursuant to Measure 3.10-1d (in Section 3.10, Noise and Vibration), existing intervening vegetation and topography, and implementation of Measure 3.3-5a, below, the potential temporary visual effects associated with the use of nighttime construction lighting would be less than significant.

Project Operations

The District would install low-impact, vandal-resistant, motion-sensor lights for nighttime use during operations at some of the facility sites, including the new facilities at all of the WTPs (except at Lafayette WTP under Alternative 2). EBMUD would also install low-impact, vandal-resistant, motion-sensor lights at the Fay Hill and Ardith Reservoirs and at the Happy Valley, Sunnyside, Tice, and Withers Pumping Plant sites. New lighting would be focused on specific areas to minimize or avoid light spill onto adjoining properties. Because proposed exterior lighting would be motion-sensor lighting, it would only be activated in the event that maintenance workers need to access the facility at night. Under normal operations, new exterior lighting would be turned off at the end of the workday. Given its infrequent use, and the design of new lighting to avoid light spill on adjoining properties, new lighting proposed for the WTTIP projects is not expected to create substantial new sources of light and glare. Therefore, the project would not have a substantial effect on existing nighttime visual conditions at the facility sites or in surrounding areas.

Mitigation Measures

Measure 3.3-5a (Applies to the Orinda-Lafayette Aqueduct and pipeline crossing at the recreation area entrance road): To the extent possible, the District will ensure that lighting used during nighttime construction is directed downward and oriented such that no light source is directly visible from neighboring residential areas.

Measure 3.3-5b (Applies to all facilities where permanent exterior lighting will be installed): The District will ensure that new lighting utilizes cutoff shields and nonglare fixture design.

Measure 3.3-5c (Applies to all facilities where permanent exterior lighting will be installed): To the extent possible, the District will ensure that all permanent exterior lighting is directed onsite and downward. In addition, new lighting will be oriented to ensure that no light source is directly visible from neighboring residential areas and will be installed with motion-sensor activation. In addition, highly reflective building materials and/or finishes will not be used in the designs for proposed structures, including fencing and light poles. In accordance with Measure 3.2-1b, above, landscaping will be provided around proposed facilities. This vegetation will be selected, placed, and maintained to minimize offsite light and glare in surrounding areas.

Program-Level Elements

To varying degrees, the program-level improvements proposed as part of the WTTIP could result in visual impacts.

Lafayette WTP

Construction of the additional high-rate sedimentation units and UV disinfection building would occur in the central, developed portion of the Lafayette WTP site (see Map D-LWTP-1). The appearance of these new facilities would not be dissimilar to existing facilities located throughout this part of site. In this respect, the programmatic changes proposed under Alternative 1 would represent an incremental visual change that would not substantially alter the site’s appearance, although construction of the proposed UV disinfection building could require removal of some riparian vegetation along Lafayette Creek. The installation of these new facilities would not substantially affect views from the surrounding area provided that, when these facilities are built, the vegetation along the site’s perimeter would provide a level of screening that is comparable to or greater than existing visual conditions in 2006.

Orinda WTP

Program-level facilities at the Orinda WTP under Alternative 1 would be similar to project- and program-level facilities under Alternative 2 (see Maps D-OWTP-1 and D-OWTP-2). The high-rate sedimentation unit would be installed south of Manzanita Drive in an area that is east and uphill of the site access drive. The new facility would be situated between the existing parking lot and Manzanita Drive. The new facility would not be dissimilar to existing facilities located at the

Orinda WTP and therefore would not substantially affect the site's appearance. However, depending on the degree of vegetation removal required for construction, views from Manzanita Drive could be affected.

The visual effects associated with the Alternative 1 program-level facilities north of Manzanita Drive, within the existing washwater settling basin area, are discussed under the project-level analysis of Alternative 2.

To the north, a new UV disinfection building and new chlorine contact basin would be installed in the Orinda Sports Field parking area along Camino Pablo; the locations shown on Map D-OWTP-1 are set back about 60 feet from the roadway. The Orinda Sports Field would be replaced by a new clearwell, which could be approximately 350 feet in diameter. The clearwell would be set back more than 100 feet from Camino Pablo and would be situated near the northern edge of the Orinda Sports Field area. Construction of the UV disinfection building and chlorine contact basin would result in the removal of some existing trees. In addition, there would likely be some vegetation removal required to accommodate the pipeline construction connecting the Orinda WTP with the new northernmost clearwell. The installation of the clearwell (which would require substantial excavation), chlorine contact basin, and UV disinfection building would considerably alter the appearance of this portion of the site, particularly during the construction period. To some extent, the new facilities would affect views from Camino Pablo, a designated scenic corridor. Changes in this part of the site could also affect views from a limited number of residences along the west side of Camino Pablo.

Following construction these facilities would be largely below grade, but could include low-profile, above-ground features. With incorporation of appropriate mitigation measures, including preparation of site-specific landscape plans and aesthetic treatment of proposed new structures (similar to Measures 3.3-2a through 3.3-2c), these visual impacts are expected to be less than significant.

Walnut Creek WTP

Under Alternative 1 or 2, the additional Walnut Creek WTP facilities would include high-rate sedimentation units and UV disinfection building. These new facilities would be installed near the existing filters and clearwell (see Map D-WCWTP-1). These new facilities would be comparable in general appearance and scale to the existing facilities found at the Walnut Creek WTP. Therefore, the new structures would not substantially alter the site's appearance. However, to varying degrees, the new structures might be visible from the surrounding area, including locations within the Acalanes Ridge Open Space and along the Briones–Mt. Diablo Trail. These impacts on public views could be reduced to a less-than-significant level through implementation of mitigation measures similar to those proposed for the project-level components described above.

Leland Reservoir Replacement

Replacement of the Leland Reservoir could result in the removal of landscaping, which would change the visual character of the site. This project could also potentially affect public views from the surrounding area. These impacts likely could be reduced to a less-than-significant level with implementation of measures similar to Measures 3.3-2a through 3.3-2c, but further study would be required following completion of conceptual design.

New Leland Pressure Zone Reservoir and Pipeline

Current plans call for siting a new reservoir on an undeveloped hillside site owned by Caltrans (refer to Maps B7 and C-NLELRES-1). This site, located south of Rudgear Road, has low-density residential development to the north and east, public open space to the south, and I-680 to the west. This portion of I-680 is a designated state scenic highway. A pipeline would be constructed to connect the new tank with existing District facilities at Rudgear Road and Danville Boulevard in a residential area just west of I-680.

This site has undergone topographic alteration. Construction at this site could affect views of open ridgelines as well as views from I-680, public trails, and nearby residences. Implementation of mitigation, including careful facility siting, backfilling, site restoration, aesthetic color treatment, and appropriate landscaping, could reduce these impacts; however, visual impacts at this site could remain significant and unavoidable.

St. Mary’s Road/Rohrer Drive Pipeline

This pipeline would be installed underground and therefore would not be visible. Map B6 shows the alignment of the St. Mary’s Road/Rohrer Drive Pipeline. Project construction could require vegetation clearing, including tree removal (refer to the discussion in Section 3.6, Biological Resources). These impacts could be reduced to a less-than-significant level through implementation of measures similar to Measures 3.3-2a through 3.3-2c.

San Pablo Pipeline

The pipeline alignment would be constructed almost entirely within open space and watershed lands (see Map B5). A portion of the proposed alignment follows Old San Pablo Dam Road, which is partly paved. This pipeline would be installed underground and therefore would not be visible. Project construction could require vegetation clearing, including tree removal (refer to the discussion in Section 3.6). These impacts could be reduced to a less-than-significant level through implementation of measures similar to Measures 3.3-2a through 3.3-2c.

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Lafayette Water Treatment Plant

Figures 3.3-LWTP-1 to 3.3-LWTP-8

1 Photo Viewpoint   3 Simulation Viewpoint

SOURCE: Environmental Vision

EBMUD Water Treatment and Transmission Improvements Program . 204369

Figure 3.3-LWTP-1
Location of Photo Viewpoints - Lafayette WTP and Highland Reservoir Sites


L1. Looking southeast from Highway 24 *


L2. Looking southeast from Walter Costa Trail*


L3. Looking northwest from Walter Costa Trail


L4. Looking northwest from Walter Costa Trail

SOURCE: Environmental Vision

*Simulation Photo

For Viewpoint Locations Refer to: Figure 3.3-LWTP-1

EBMUD Water Treatment and Transmission Improvements Program . 204369

Figure 3.3-LWTP-2

Photographs of Lafayette WTP Site and Surroundings

L5. Looking northeast from Mt. Diablo Boulevard toward WTP Entry Road

L6. Looking northeast from concrete bridge at WTP entrance

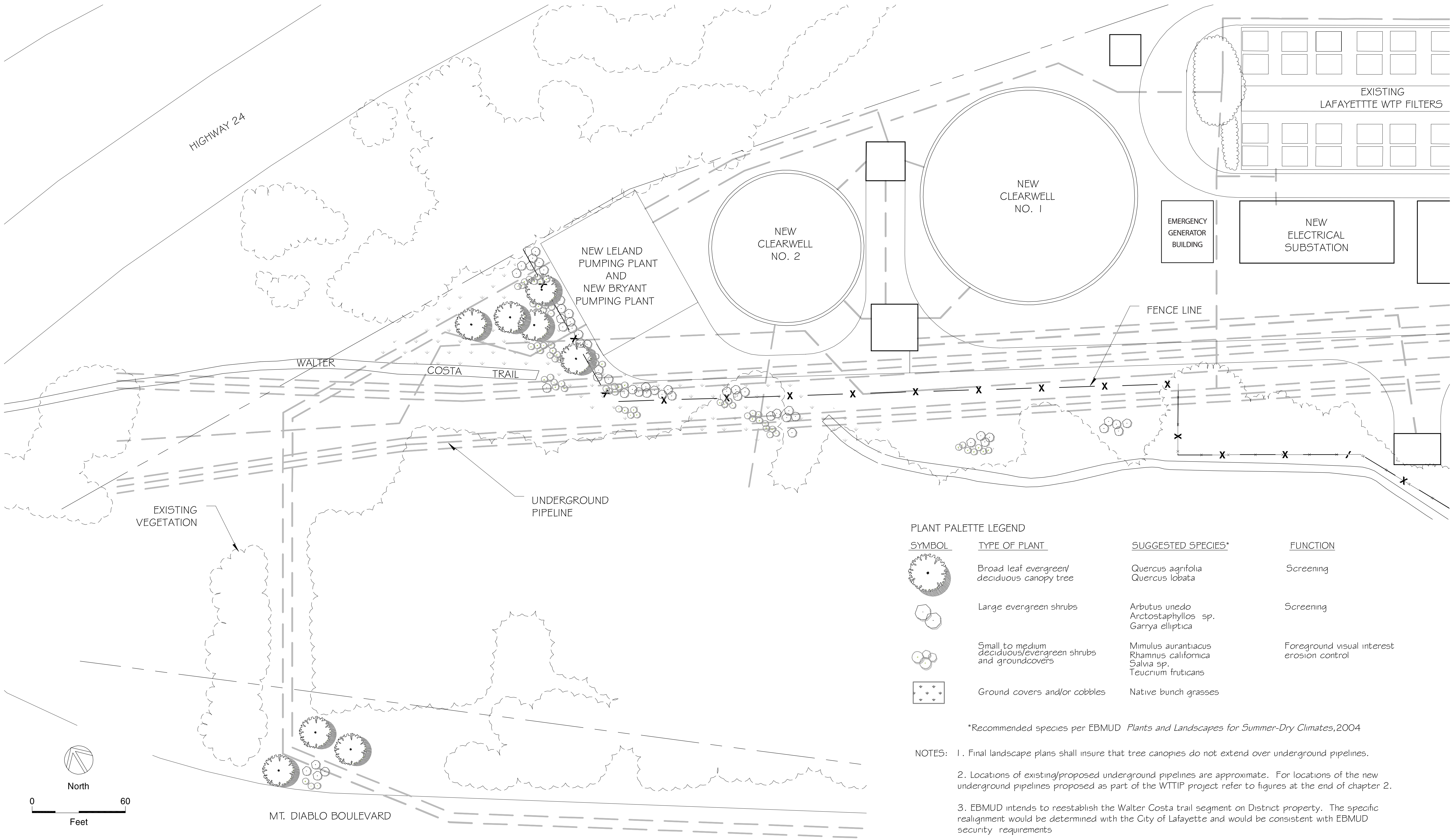
L7. Looking northwest from Mt. Diablo Boulevard at Lafayette Reservoir Recreation Area entrance

L8. Looking west from Mt. Diablo Boulevard at WTP Exit Road

SOURCE: Environmental Vision

For Viewpoint Locations Refer to: Figure 3.3-LWTP-1

Figure 3.3-LWTP-3
Photographs of Lafayette WTP Site and Surroundings



PLANT PALETTE LEGEND

SYMBOL	TYPE OF PLANT	SUGGESTED SPECIES*	FUNCTION
	Broad leaf evergreen/ deciduous canopy tree	Quercus agrifolia Quercus lobata	Screening
	Large evergreen shrubs	Arbutus unedo Arctostaphyllos sp. Garrya elliptica	Screening
	Small to medium deciduous/evergreen shrubs and groundcovers	Mimulus aurantiacus Rhamnus californica Salvia sp. Teucrium fruticans	Foreground visual interest erosion control
	Ground covers and/or cobbles	Native bunch grasses	

*Recommended species per EBMUD *Plants and Landscapes for Summer-Dry Climates*, 2004

NOTES: 1. Final landscape plans shall insure that tree canopies do not extend over underground pipelines.

2. Locations of existing/proposed underground pipelines are approximate. For locations of the new underground pipelines proposed as part of the WTTIP project refer to figures at the end of chapter 2.

3. EBMUD intends to reestablish the Walter Costa trail segment on District property. The specific realignment would be determined with the City of Lafayette and would be consistent with EBMUD security requirements

SOURCE: Environmental Vision

Figure 3.3-LWTP-4

Conceptual Landscape Plan - Lafayette WTP Alternative 1


Existing View looking southeast from Highway 24


Visual Simulation of Proposed Improvements without landscaping

For Viewpoint Location Refer to: Figure 3.3-LWTP-1

SOURCE: Michael Willis Architects

Figure 3.3-LWTP-5

Visual Simulation without Landscaping– Lafayette WTP from Highway 24

Existing View looking southeast from Highway 24

Visual Simulation of Proposed Improvements with landscaping at 5 years maturity

For Viewpoint Location Refer to: Figure 3.3-LWTP-1

SOURCE: Michael Willis Architects
and Environmental Vision

Figure 3.3-LWTP-6
Visual Simulation with Landscaping– Lafayette WTP from Highway 24

Existing View looking southeast from Walter Costa Trail

Visual Simulation of Proposed Improvements without landscaping

For Viewpoint Location Refer to: Figure 3.3-LWTP-1

SOURCE: Michael Willis Architects

Figure 3.3-LWTP-7
Visual Simulation without Landscaping– Lafayette WTP

Existing View looking southeast from Walter Costa Trail

Visual Simulation of Proposed Improvements with landscaping at 5 years maturity

For Viewpoint Location Refer to: Figure 3.3-LWTP-1

SOURCE: Michael Willis Architects

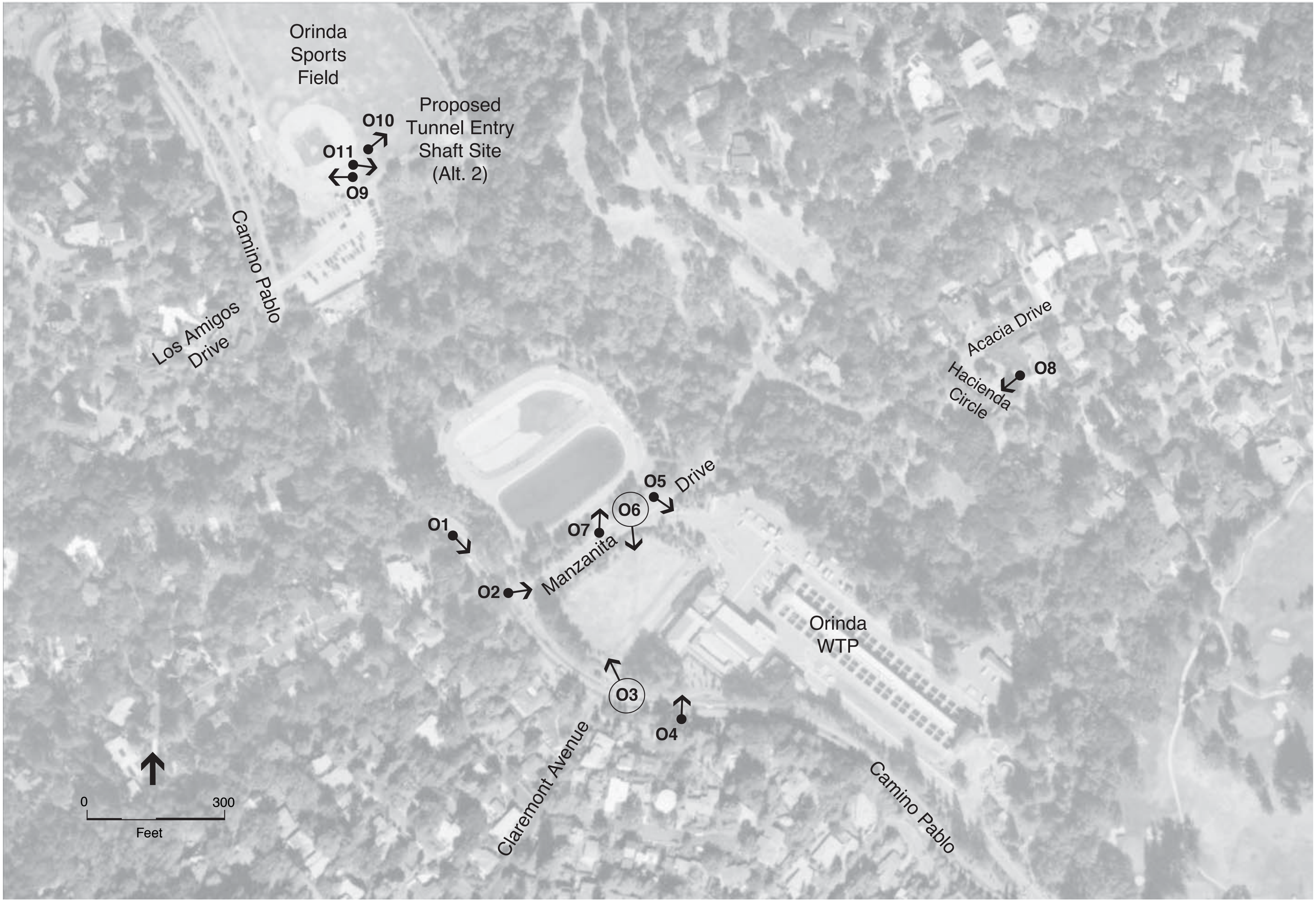
EBMUD Water Treatment and Transmission Improvements Program . 204369

Figure 3.3-LWTP-8

Visual Simulation with Landscaping– Lafayette WTP

Orinda Water Treatment Plant

Figures 3.3-OWTP-1 to 3.3-OWTP-9



SOURCE: Environmental Vision

1 Photo Viewpoint

3 Simulation Viewpoint

Figure 3.3-OWTP-1
Location of Photo Viewpoints - Orinda WTP and Orinda-Lafayette Aqueduct, Tunnel Entry Shaft Site

O1. Looking southeast toward Manzanita Drive from Camino Pablo

O2. Looking east from Camino Pablo at Manzanita Drive

O3. Looking northeast from Camino Pablo at Claremont Avenue*

O4. Looking north from Camino Pablo

SOURCE: Environmental Vision

*Simulation Photo

For Viewpoint Locations Refer to: Figure 3.3-OWTP-1

EBMUD Water Treatment and Transmission Improvements Program . 204369

Figure 3.3-OWTP-2

Photographs of Orinda WTP Site and Surroundings

O5. Orinda WTP entry looking southeast from Manzanita Drive

O6. Orinda WTP looking south from Manzanita Drive*

O7. Orinda WTP washwater setting basins looking north from Manzanita Drive

O8. Looking southwest from Hacienda Circle residential area

SOURCE: Environmental Vision

*Simulation Photo

For Viewpoint Locations Refer to: Figure 3.3-OWTP-1

Figure 3.3-OWTP-3

Photographs of Orinda WTP Site and Surroundings

O9. Orinda Sports Field looking west

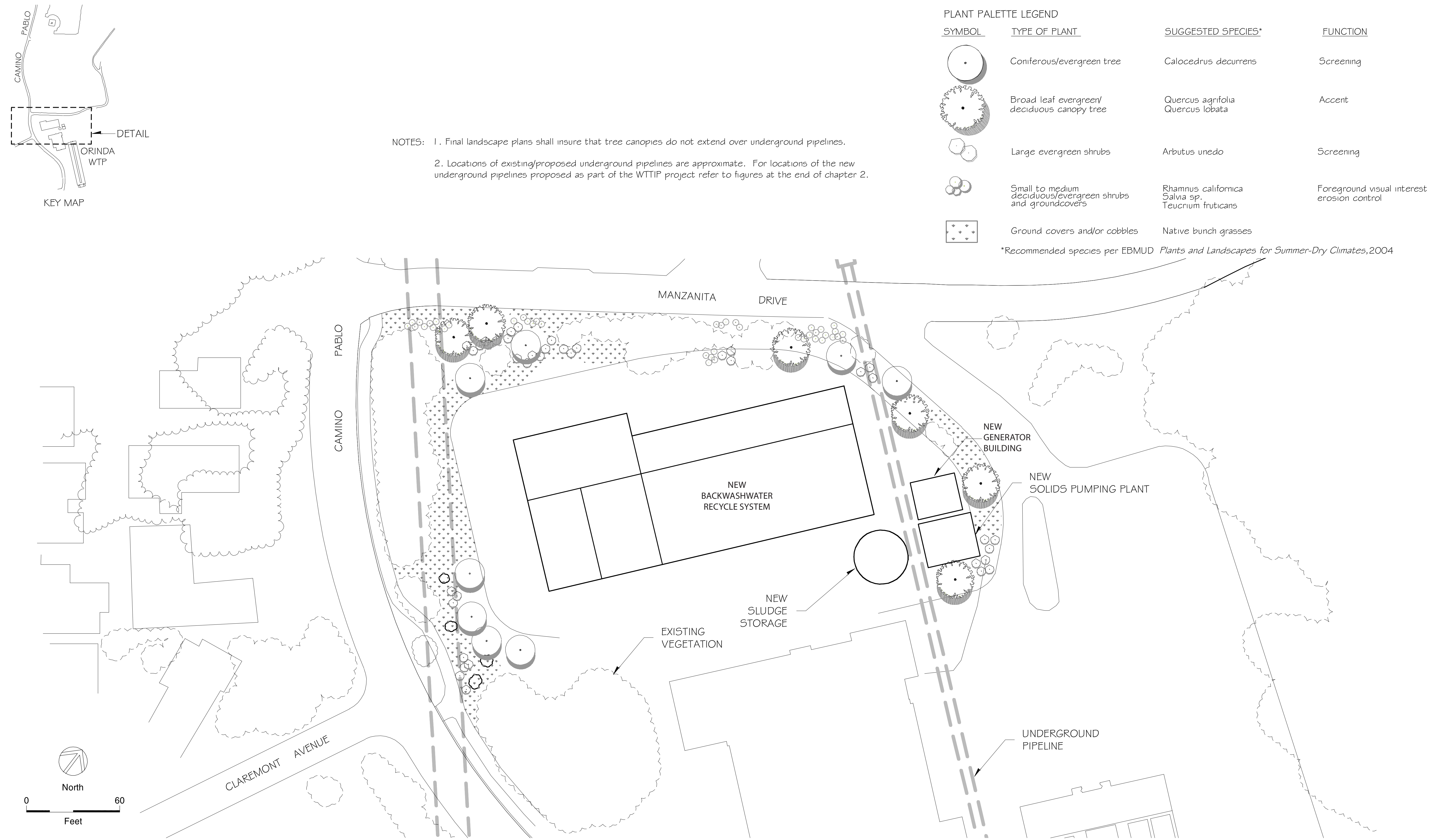
O10. Looking northeast towards proposed Tunnel Entry Shaft location

O11. Looking east from Orinda Sports Field towards San Pablo Creek

SOURCE: Environmental Vision

For Viewpoint Locations Refer to: Figure 3.3-OWTP-1

Figure 3.3-OWTP-4
Photographs of Orinda WTP Site and
Tunnel Entry Shaft Site of Orinda-Lafayette Aqueduct



SOURCE: Environmental Vision

EBMUD Water Treatment and Transmission Improvements Program . 204369

Figure 3.3-OWTP-5

Conceptual Landscape Plan - Orinda WTP Alternative 1 or 2

Existing View looking northwest from Camino Pablo at Claremont Avenue

Visual Simulation of Proposed Improvements without landscaping

For Viewpoint Location Refer to: Figure 3.3-OWTP-1

SOURCE: Michael Willis Architects

EBMUD Water Treatment and Transmission Improvements Program . 204369

Figure 3.3-OWTP-6
Visual Simulation without Landscaping –
Orinda WTP from Camino Pablo

Existing View looking northwest from Camino Pablo at Claremont Avenue

Visual Simulation of Proposed Improvements with landscaping at 5 years maturity

For Viewpoint Location Refer to: Figure 3.3-OWTP-1

SOURCE: Michael Willis Architects

Figure 3.3-OWTP-7
Visual Simulation with Landscaping –
Orinda WTP from Camino Pablo

Existing View looking south from Manzanita Drive

Visual Simulation of Proposed Improvements without landscaping

For Viewpoint Location Refer to: Figure 3.3-OWTP-1

SOURCE: Michael Willis Architects

Figure 3.3-OWTP-8

Visual Simulation without Landscaping - Orinda WTP from Manzanita Drive

Existing View looking south from Manzanita Drive

Visual Simulation of Proposed Improvements with landscaping at 5 years maturity

For Viewpoint Location Refer to: Figure 3.3-OWTP-1

SOURCE: Michael Willis Architects
and Environmental Vision

Figure 3.3-OWTP-9
Visual Simulation with Landscaping – Orinda WTP from Manzanita Drive

Walnut Creek Water Treatment Plant

Figures 3.3-WCWTP-1 to 3.3-WCWTP-8

ESA

SOURCE: Environmental Vision

1 Photo Viewpoint   3 Simulation Viewpoint

EBMUD Water Treatment and Transmission Improvements Program . 204369

Figure 3.3-WCWTP-1
Location of Photo Viewpoints - Walnut Creek WTP Site

WC1. Looking south from Briones - Mt. Diablo Trail

WC2. Looking south from Briones - Mt. Diablo Trail*

WC3. Looking east from Briones - Mt. Diablo Trail

WC4. Looking east from Briones - Mt. Diablo Trail

SOURCE: Environmental Vision and Michael Willis Architects

*Simulation Photo

For Viewpoint Locations Refer to: Figure 3.3-WCWTP-1

Figure 3.3-WCWTP-2

Photographs of Walnut Creek WTP Site and Surroundings

WC5. Looking south from Ramsay Circle

WC6. Looking northwest from Alfred Avenue*

WC7. Looking northwest from on-site near Clearwell

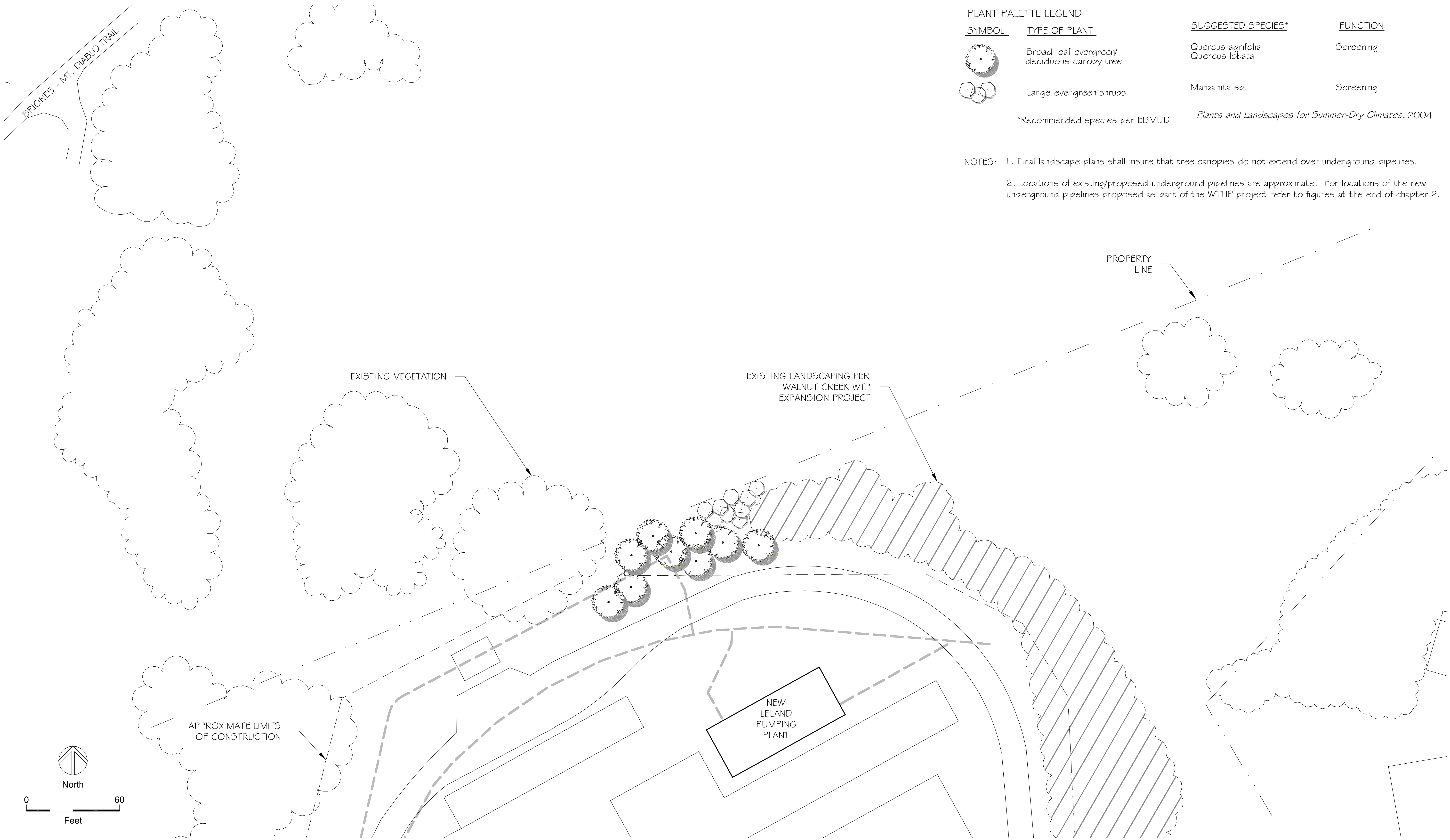
WC8. Looking east from on-site near New Leland Pumping Plant

SOURCE: Environmental Vision and Michael Willis Architects

*Simulation Photo

For Viewpoint Locations Refer to: Figure 3.3-WCWTP-1

Figure 3.3-WCWTP-3
Photographs of Walnut Creek WTP Site and Surroundings



SOURCE: Environmental Vision

EBMUD Water Treatment and Transmission Improvements Program . 204369

Figure 3.3-WCWTP-4

Conceptual Landscape Plan - Walnut Creek WTP Alternative 1 or 2

Existing View looking south from Briones - Mt. Diablo Trail

Visual Simulation of Proposed Improvements without landscaping

For Viewpoint Location Refer to: Figure 3.3-WCWTP-1

SOURCE: Michael Willis Architects

EBMUD Water Treatment and Transmission Improvements Program . 204369

Figure 3.3-WCWTP-5

Visual Simulation without Landscaping - Walnut Creek WTP from Recreation Trail

Existing View looking south from Briones - Mt. Diablo Trail

Visual Simulation of Proposed Improvements with landscaping at 5 years maturity

For Viewpoint Location Refer to: Figure 3.3-WCWTP-1

SOURCE: Michael Willis Architects

Figure 3.3-WCWTP-6
Visual Simulation with Landscaping – Walnut Creek WTP from Trail


Existing View looking west from Alfred Avenue


Visual Simulation of Proposed Improvements without landscaping

For Viewpoint Location Refer to: Figure 3.3-WCWTP-1

SOURCE: Michael Willis Architects

Figure 3.3-WCWTP-7
Visual Simulation without Landscaping - Walnut Creek WTP from Alfred Avenue

Existing View looking west from Alfred Avenue

Visual Simulation of Proposed Improvements with landscaping at 5 years maturity

For Viewpoint Location Refer to: Figure 3.3-WCWTP-1

SOURCE: Michael Willis Architects

EBMUD Water Treatment and Transmission Improvements Program . 204369

Figure 3.3-WCWTP-8

Visual Simulation with Landscaping – Walnut Creek WTP from Trail

Sobrante Water Treatment Plant

Figures 3.3-SOBWTP-1 to 3.3-SOBWTP-7

1 Photo Viewpoint   3 Simulation Viewpoint

SOURCE: Environmental Vision

EBMUD Water Treatment and Transmission Improvements Program . 204369

Figure 3.3-SOBWTP-1
Location of Photo Viewpoints - Sobrante WTP Site

S1. Looking south from Valley View Road at D' Avila Way

S2. Looking southwest from Valley View Road south of D' Avila Way*

S3. Looking northeast from D' Avila Way near Valley View Road

S4. Looking north from Valley View Road at D' Avila Way

SOURCE: Environmental Vision

*Simulation Photo

For Viewpoint Locations Refer to: Figure 3.3-SOBWTP-1

EBMUD Water Treatment and Transmission Improvements Program . 204369

Figure 3.3-SOBWTP-2

Photographs of Sobrante WTP Site and Surroundings

S5. Looking southeast from Valley View Road at Christopher Court

S6. Looking southeast from Valley View Road at Amend Road

S7. Looking southeast from Amend Road near Valley View Road

S8. Looking south from Heavenly Ridge Lane near Amend Road

SOURCE: Environmental Vision

For Viewpoint Locations Refer to: Figure 3.3-SOBWTP-1

Figure 3.3-SOBWTP-3
Photographs of Sobrante WTP Site and Surroundings


S9. Looking southwest from Amend Road near Simoni Court

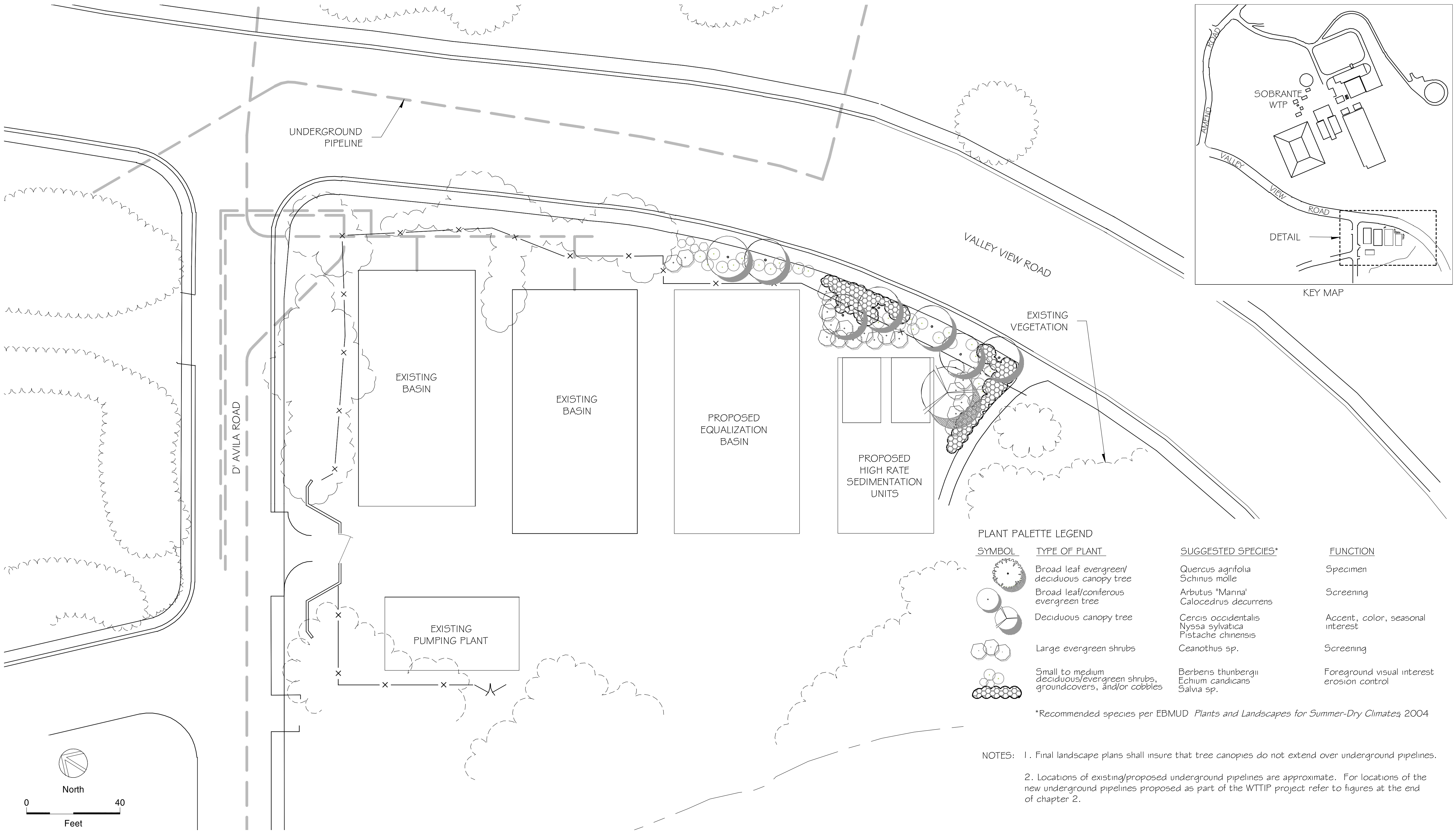

S10. Looking west from Amend Road near Pamela Court


S11. Looking southwest from Amend Road near Dias Court

SOURCE: Environmental Vision

For Viewpoint Locations Refer to: Figure 3.3-SOBWTP-1

Figure 3.3-SOBWTP-4
Photographs of Sobrante WTP Site and Surroundings



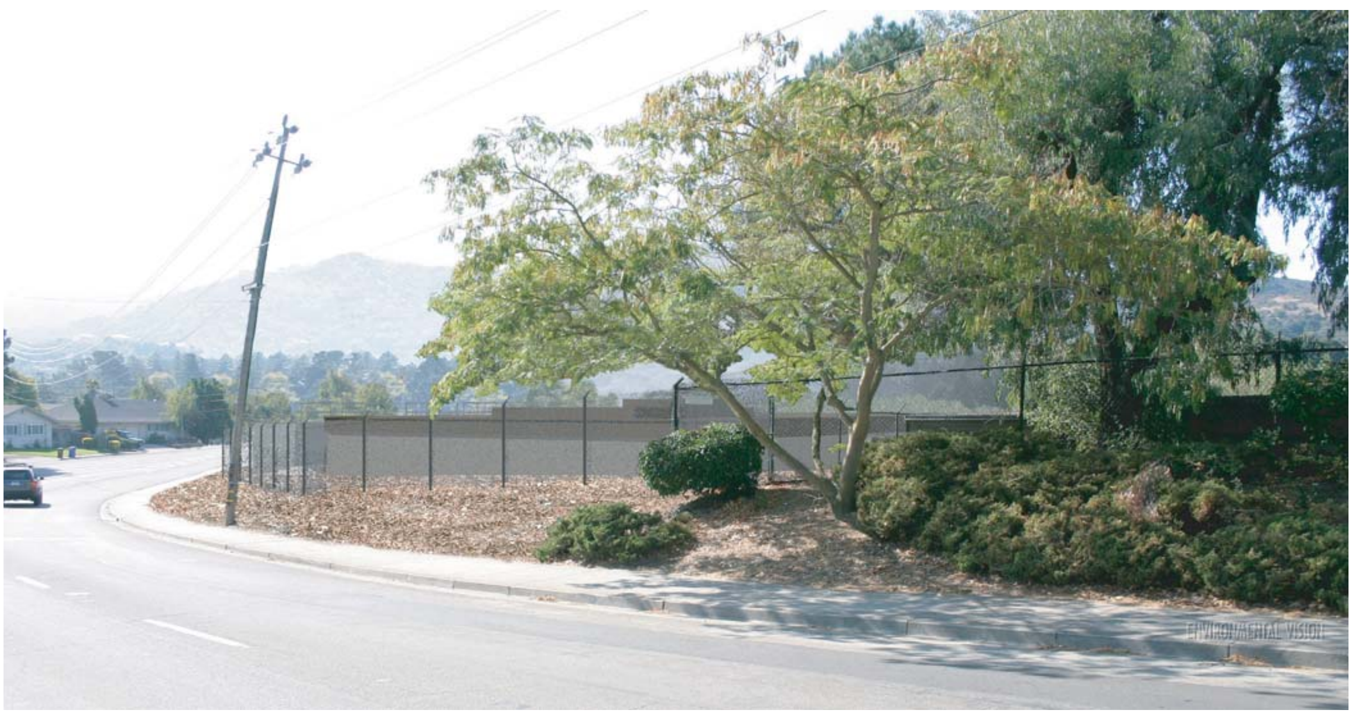
SOURCE: Environmental Vision

EBMUD Water Treatment and Transmission Improvements Program . 204369

Figure 3.3-SOBWTP-5

Conceptual Landscape Plan - Sobrante WTP Alternative 1 or 2

Existing View looking southwest from Valley View Road south of D' Avila Way



Visual Simulation of Proposed Improvements without landscaping

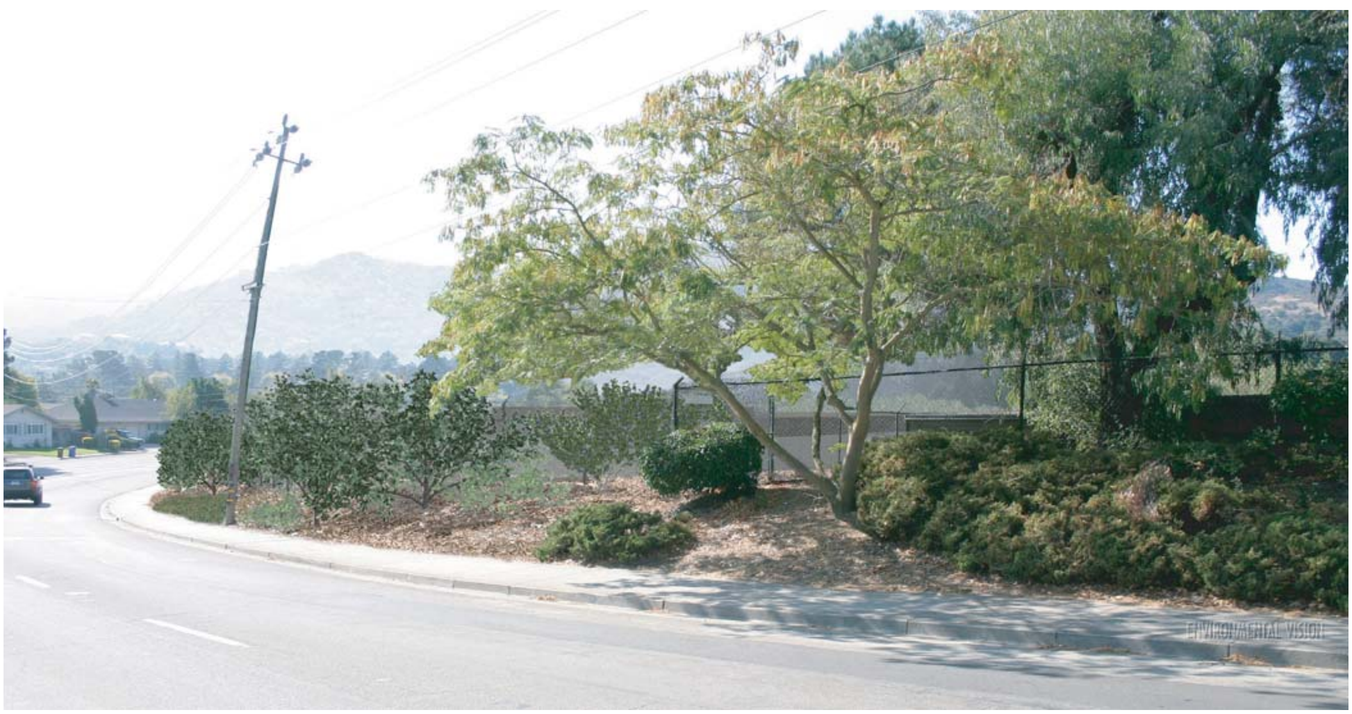
For Viewpoint Location Refer to: Figure 3.3-SOBWTP-1

SOURCE: Environmental Vision

Figure 3.3-SOBWTP-6

Visual Simulation without Landscaping – Sobrante WTP

Existing View looking southwest from Valley View Road south of D' Avila Way



Visual Simulation of Proposed Improvements with landscaping at 5 years maturity

For Viewpoint Location Refer to: Figure 3.3-SOBWTP-1

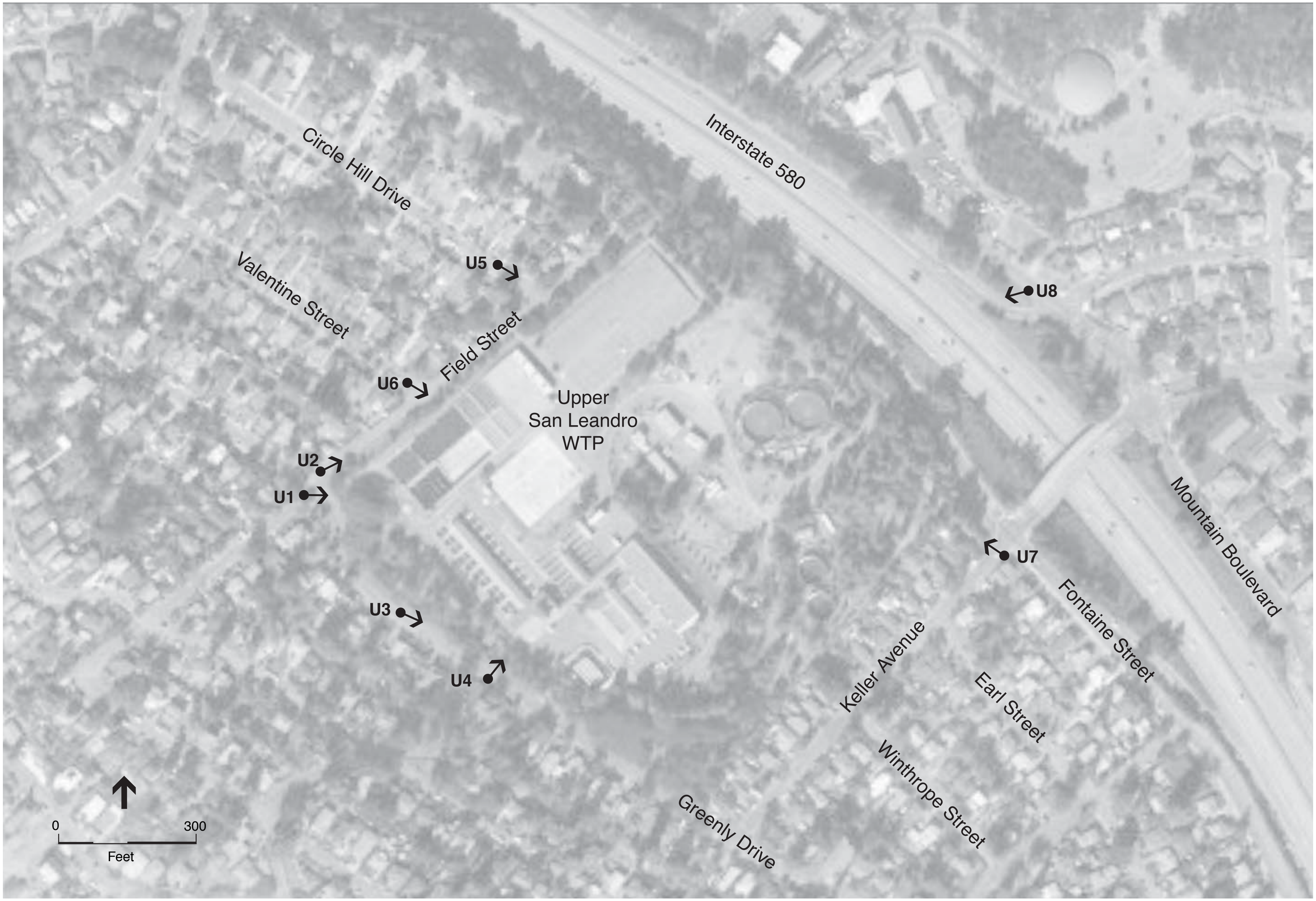
SOURCE: Environmental Vision

Figure 3.3-SOBWTP-7
Visual Simulation with Landscaping– Sobrante WTP

Upper San Leandro Water Treatment Plant

Figures 3.3-USLWTP-1 to 3.3-USLWTP-3

ESA



SOURCE: Environmental Vision

1 Photo Viewpoint

EBMUD Water Treatment and Transmission Improvements Program . 204369

Map 3.3-USLWTP-1

Location of Photo Viewpoints - Upper San Leandro WTP Site

U1. Upper San Leandro WTP looking east from Field Street at Greenly Drive

U2. Looking northeast from Field Street near Greenly Drive

U3. Looking southeast along Greenly Drive

U4. Upper San Leandro WTP looking northeast from Greenly Drive

SOURCE: Environmental Vision

For Viewpoint Locations Refer to: Figure 3.3-USLWTP-1

Figure 3.3-USLWTP-2
Photographs of Upper San Leandro WTP Site and Surroundings

U5. Looking southeast from Circle Hill Drive near Field Street

U6. Looking southeast from Valentine Street near Field Street

U7. Looking northwest from Keller Avenue at Fontaine Street

U8. Looking southwest from Mountain Boulevard at Interstate 580 on-ramp

SOURCE: Environmental Vision

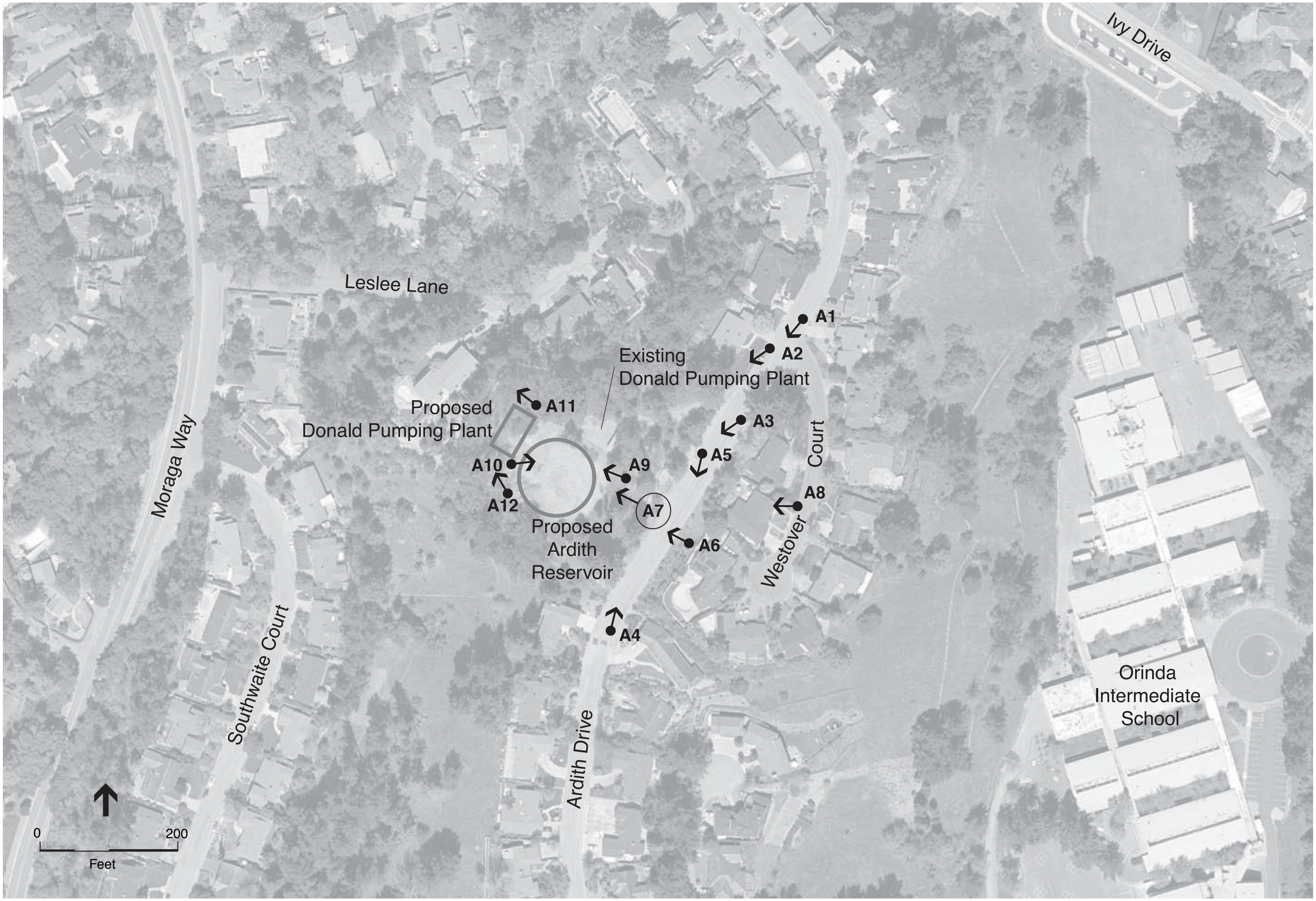
For Viewpoint Locations Refer to: Figure 3.3-USLWTP-1

Figure 3.3-USLWTP-3

Photographs of Upper San Leandro WTP Site and Surroundings

Ardith Reservoir and Donald Pumping Plant

Figures 3.3-ARRES-1 to 3.3-ARRES-7



SOURCE: Environmental Vision

1 Photo Viewpoint   3 Simulation Viewpoint

EBMUD Water Treatment and Transmission Improvements Program . 204369

Figure 3.3-ARRES-1

Location of Photo Viewpoints - Donald Pumping Plant and Ardith Reservoir Sites


A1. Looking southwest from Ardith Drive north of Westover Court


A2. Looking southwest from Ardith Drive at Westover Court


A3. Looking southwest from Ardith Drive south of Westover Court


A4. Looking north from Ardith Drive

SOURCE: Environmental Vision

For Viewpoint Locations Refer to: Figure 3.3-ARRES-1

Figure 3.3-ARRES-2
Photographs of Donald Pumping Plant and Ardith Reservoir Site and Surroundings

A5. Looking south from Ardith Drive toward Westover Court Residences

A6. Looking west from Ardith Drive embankment

A7. Ardith Reservoir Site looking west from Ardith Drive*

A8. Looking west from Westover Court

SOURCE: Environmental Vision

*Simulation Photo

For Viewpoint Locations Refer to: Figure 3.3-ARRES-1

EBMUD Water Treatment and Transmission Improvements Program . 204369

Figure 3.3-ARRES-3

Photographs of Donald Pumping Plant and Ardith Reservoir Site and Surroundings

A9. Looking west at the Ardith Reservoir Site

A10. Looking east at the Ardith Reservoir Site

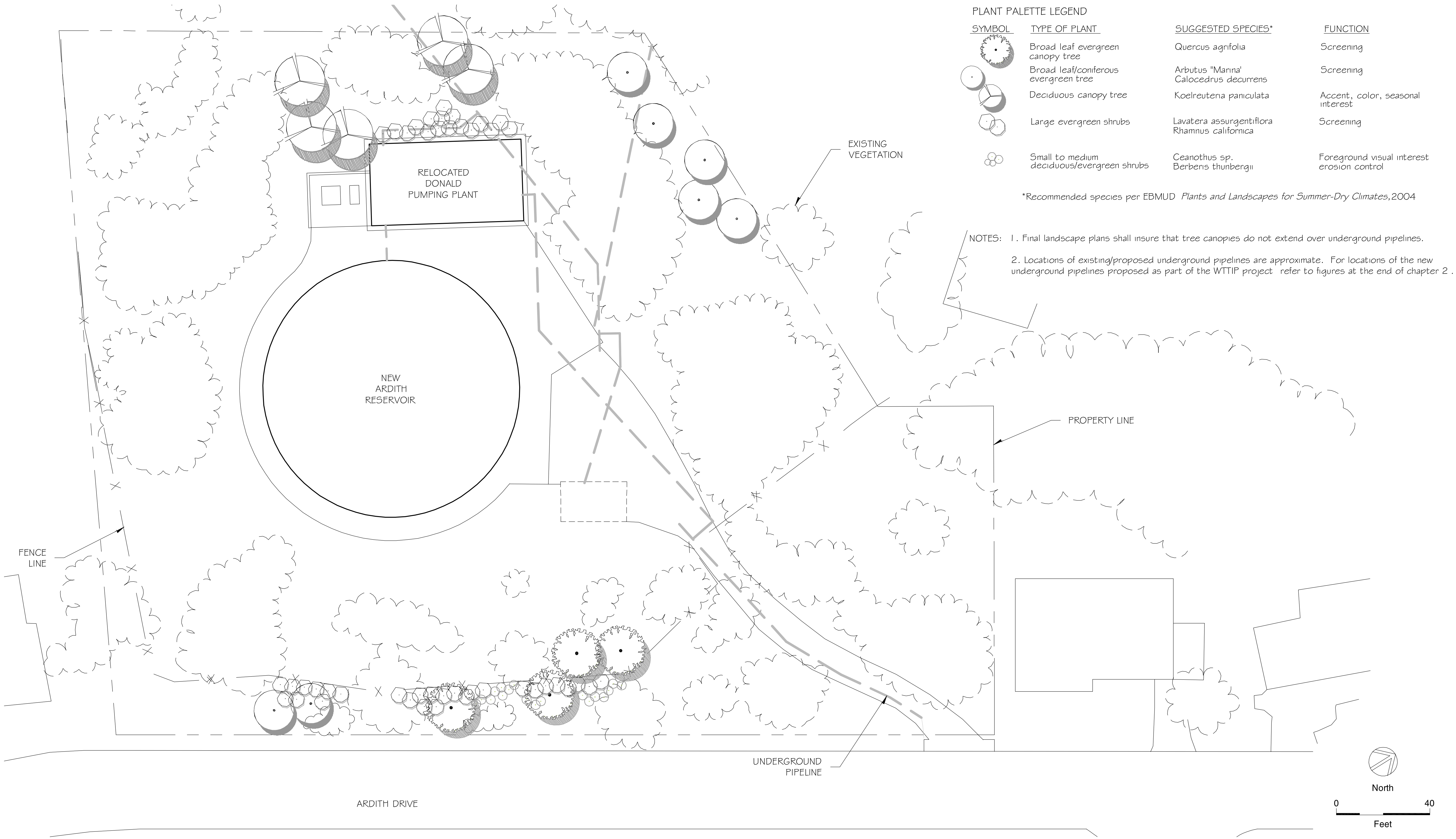
A11. Looking northwest at the Ardith Reservoir Site

A12. Looking northwest at the Ardith Reservoir Site

SOURCE: Environmental Vision

For Viewpoint Locations Refer to: Figure 3.3-ARRES-1

Figure 3.3-ARRES-4
Photographs of Donald Pumping Plant and Ardith Reservoir Site and Surroundings



SOURCE: Environmental Vision

EBMUD Water Treatment and Transmission Improvements Program . 204369

Figure 3.3-ARRES-5

Conceptual Landscape Plan - Ardith Reservoir and Donald Pumping Plant

Existing View looking west from Ardith Drive

Visual Simulation of Proposed Improvements without landscaping

For Viewpoint Location Refer to: Figure 3.3-ARRRES-1

SOURCE: Environmental Vision

Figure 3.3-ARRES-6
Visual Simulation without Landscaping – Ardith Reservoir Site

Existing View looking west from Ardith Drive

Visual Simulation of Proposed Improvements with landscaping at 5 years maturity

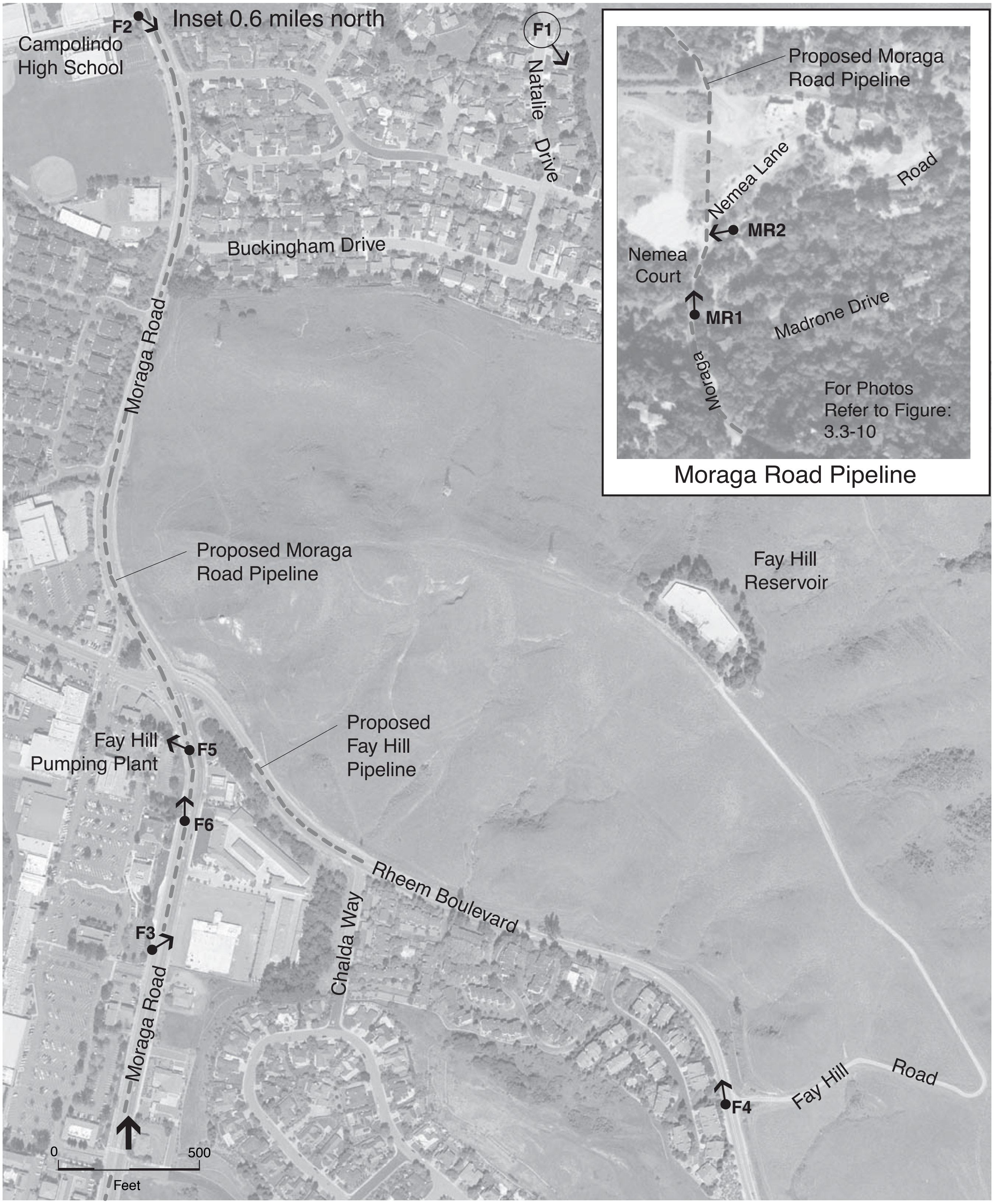
For Viewpoint Location Refer to: Figure 3.3-ARRES-1

SOURCE: Environmental Vision

Figure 3.3-ARRES-7
Visual Simulation with Landscaping – Ardith Reservoir Site

Fay Hill Reservoir

Figures 3.3-FHRES-1 to 3.3-FHRES-3



1 Photo Viewpoint   3 Simulation Viewpoint

SOURCE: Environmental Vision

EBMUD Water Treatment and Transmission Improvements Program . 204369

Figure 3.3-FHRES-1
Location of Photo Viewpoints – Fay Hill Pumping Plant, Fay Hill Reservoir, and Moraga Road Pipeline Alignment

F1. Looking south from Natalie Drive *

F2. Looking southeast from Moraga Road near Campolindo High School

F3. Looking northeast from Moraga Road south of Rheem Boulevard

F4. Looking north from Rheem Boulevard at Fay Hill Road

SOURCE: Environmental Vision

*Simulation Photo

For Viewpoint Locations Refer to: Figure 3.3-FHRES-1

Figure 3.3-FHRES-2

Photographs of Fay Hill Reservoir Site and Surroundings

Existing View looking south from Natalie Drive

Visual Simulation of Proposed Improvements
(Note subtle change: minor tree thinning and new tank less visible on ridge)

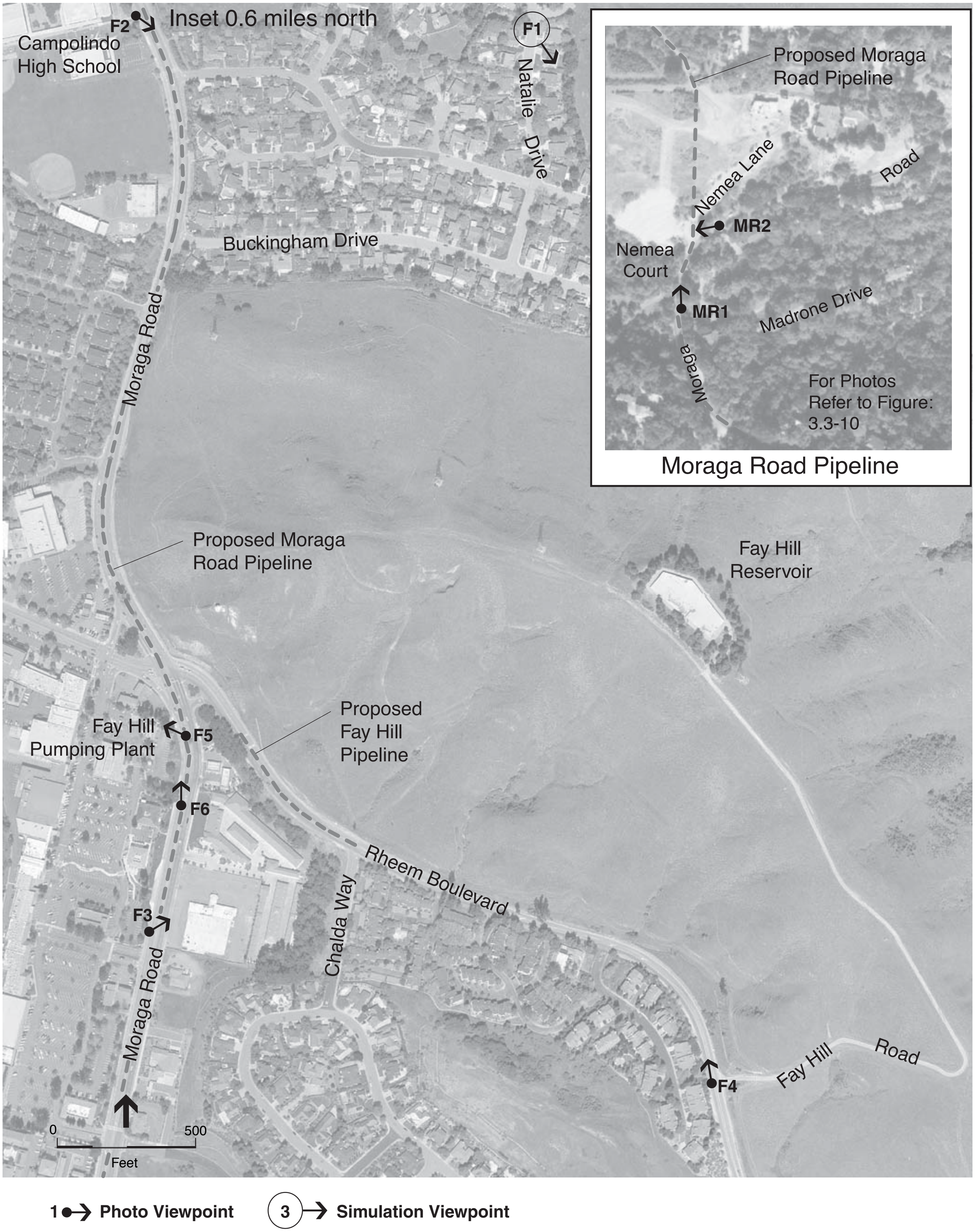
For Viewpoint Location Refer to: Figure 3.3-FHRES-1

SOURCE: Environmental Vision

Figure 3.3-FHRES-3
Visual Simulation - Fay Hill Reservoir Site

Fay Hill Pumping Plant and Moraga Road Pipeline Alignment

Figures 3.3-FHPP/MORPL-1 to
3.3-FHPP/MORPL-2



SOURCE: Environmental Vision

Figure 3.3-FHPP/MORPL-1
Location of Photo Viewpoints – Fay Hill Pumping Plant, Fay Hill Reservoir, and Moraga Road Pipeline Alignment

F5. Fay Hill Pumping Plant looking northwest from Moraga Road near Rheem Boulevard

F6. Fay Hill Pumping Plant looking north from Moraga Road

MR1. Looking north from Moraga Road at Madrone Drive

MR2. Looking southwest from Moraga Road at Nemea Lane

SOURCE: Environmental Vision

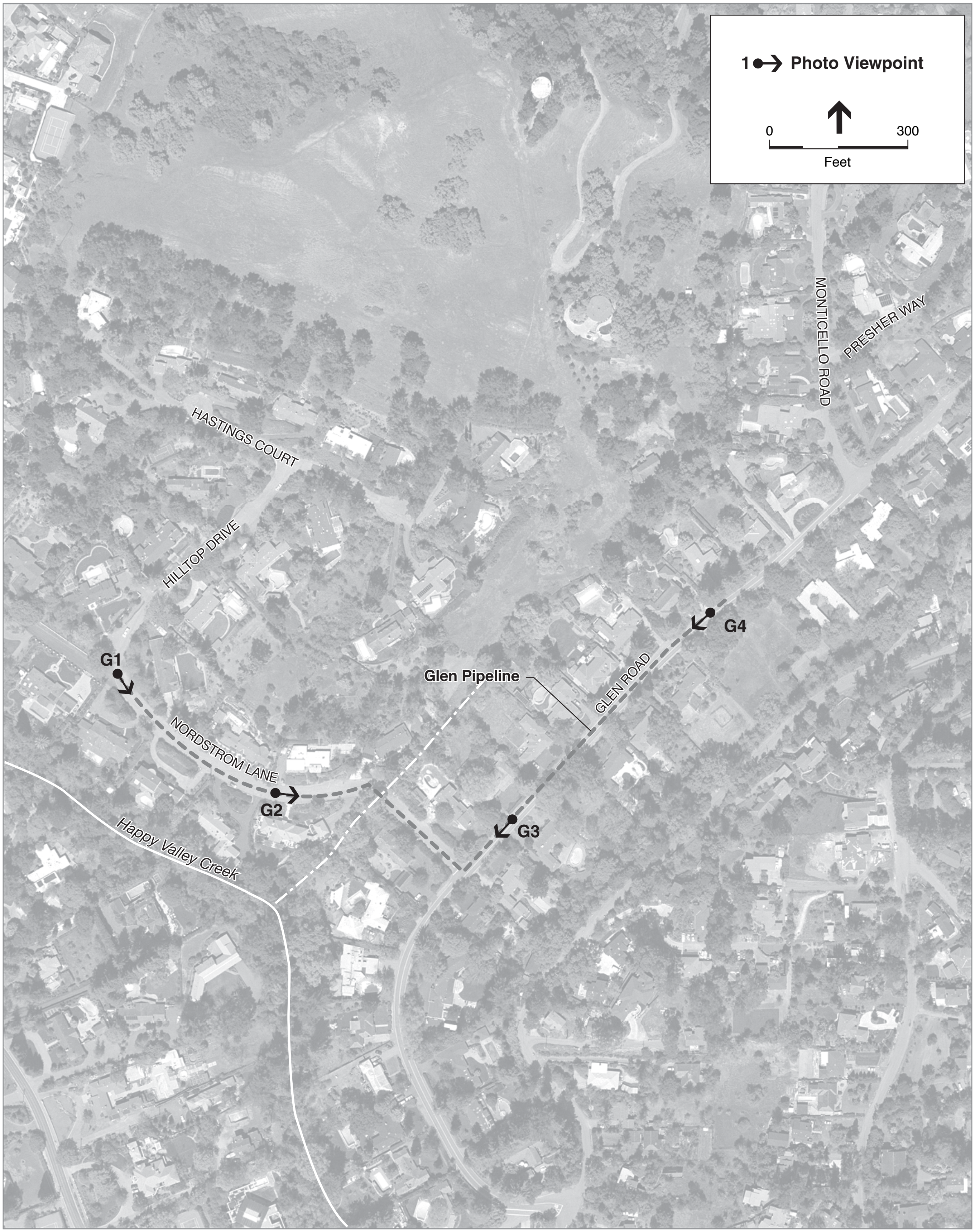
For Viewpoint Locations Refer to: Figure 3.3-FHPP/MORPL-1

Figure 3.3-FHPP/MORPL-2

Photographs of Fay Hill Pumping Plant Site and Surroundings and Moraga Road Pipeline Alignment

Glen Pipeline

Figures 3.3-GLENPL-1 to 3.3-GLENPL-**2**



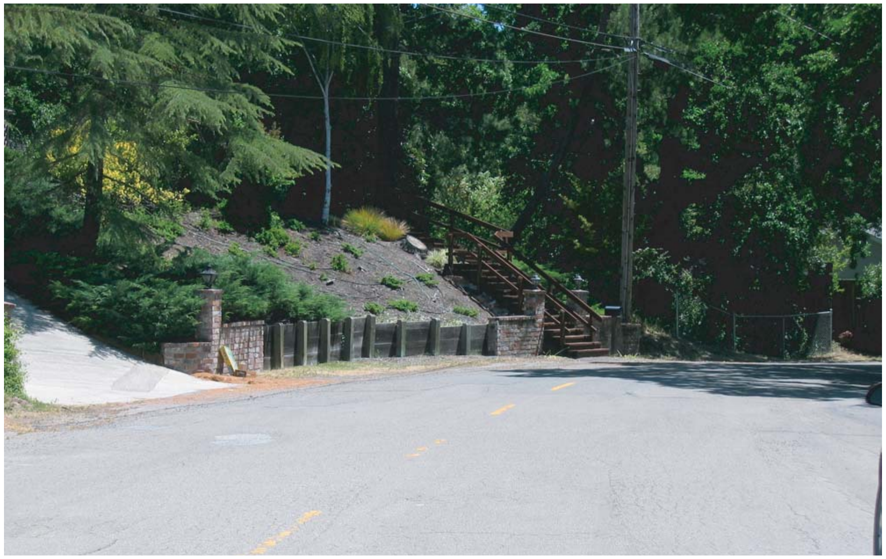
SOURCE: ESA; Aerial Photos: Contra Costa County, 2004

EBMUD Water Treatment and Transmission Improvements Program . 204369

Figure 3.3-GLENPL-1

Location of Photo Viewpoints - Glen Pipeline Alignment

G1. Looking southeast from Nordstrom Lane near Hilltop Drive



G2. Looking east along Nordstrom Lane

G3. Looking southwest towards the intersection of Glen Road and Nordstrom Lane

G4. Looking southwest along Glen Road

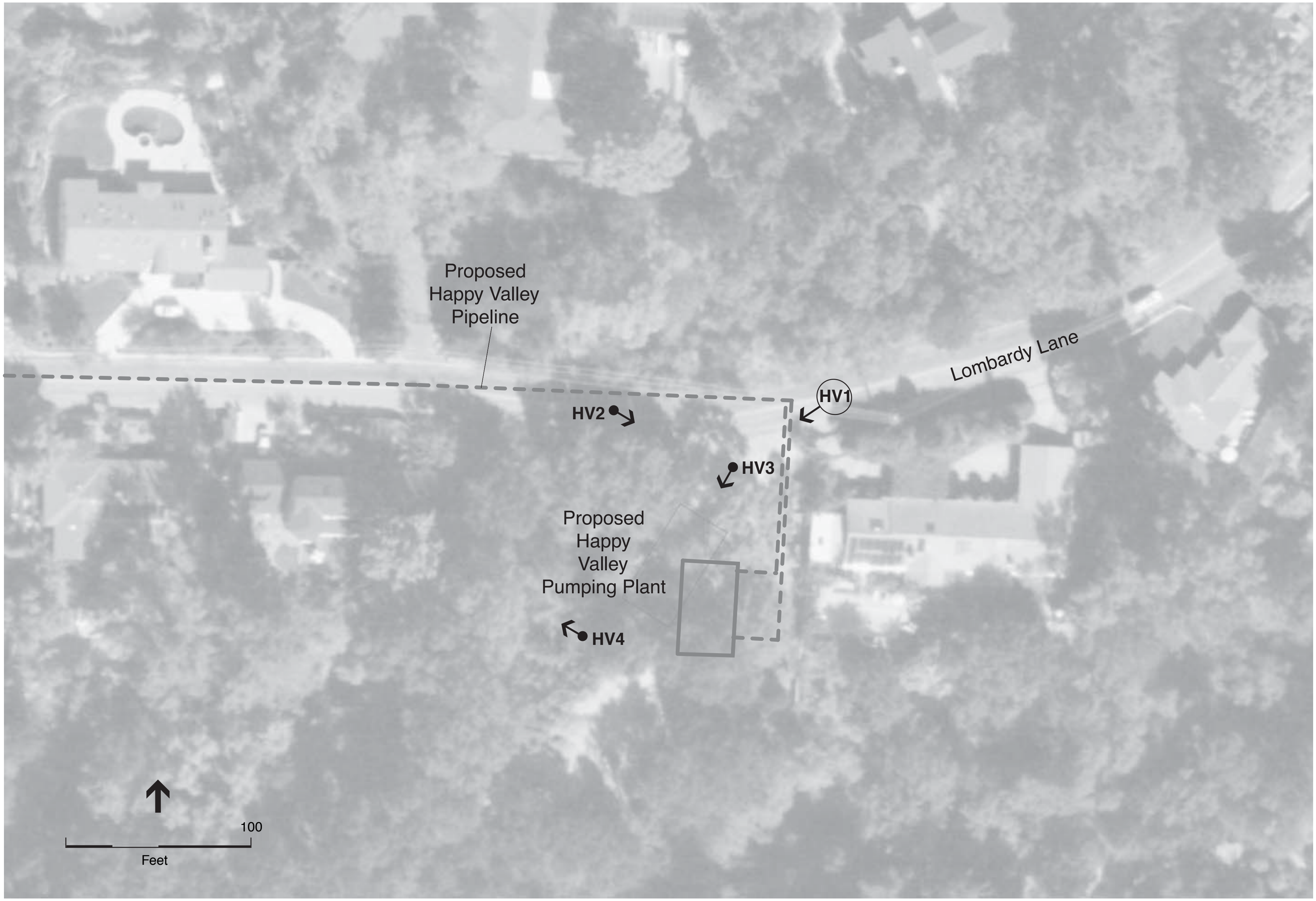
SOURCE: Environmental Vision

For Viewpoint Locations Refer to: Figure 3.3-GLENPL-1

Figure 3.3-GLENPL-2
Photographs of Glen Pipeline Alignment

Happy Valley Pumping Plant

Figures 3.3-HVPP-1 to 3.3-HVPP-5



SOURCE: Environmental Vision

1 Photo Viewpoint   3 Simulation Viewpoint

Figure 3.3-HVPP-1
Location of Photo Viewpoints -
Happy Valley Pumping Plant Site

HV1. Looking southwest from Lombardy Lane*

HV2. Looking southeast from Lombardy Lane

HV3. Looking southwest from north edge of proposed Pumping Plant site

HV4. Looking northwest toward adjacent home

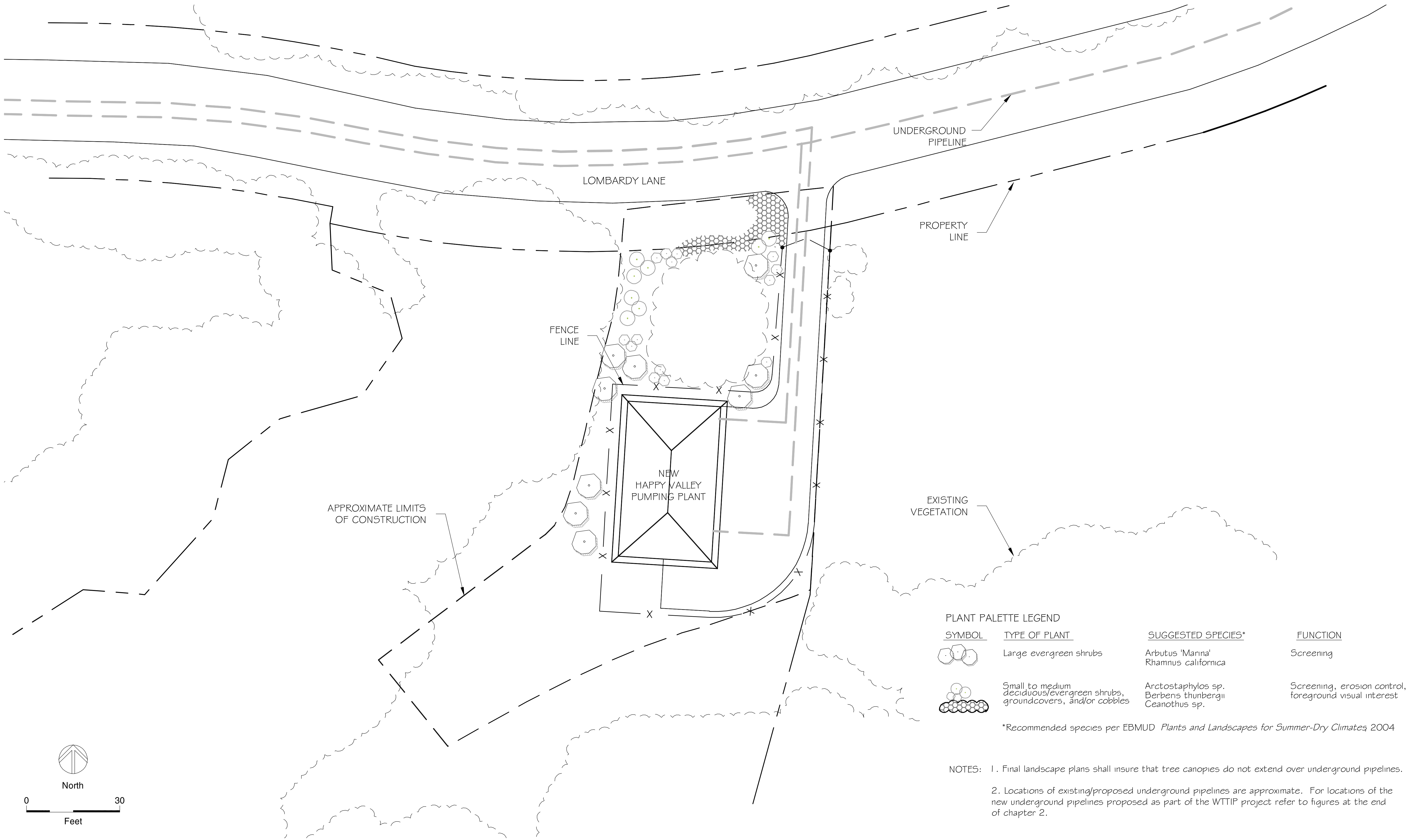
SOURCE: Environmental Vision

*Simulation Photo

For Viewpoint Locations Refer to: Figure 3.3-HVPP-1

Figure 3.3-HVPP-2

Photographs of Happy Valley Pumping Plant Site and Surroundings



NOTES: 1. Final landscape plans shall insure that tree canopies do not extend over underground pipelines.

2. Locations of existing/proposed underground pipelines are approximate. For locations of the new underground pipelines proposed as part of the WTTIP project refer to figures at the end of chapter 2.

SOURCE: Environmental Vision

EBMUD Water Treatment and Transmission Improvements Program . 204369

Figure 3.3-HVPP-3

Conceptual Landscape Plan - Happy Valley Pumping Plant

Existing View looking southwest from Lombardy Lane

Visual Simulation of Proposed Improvements without landscaping

For Viewpoint Location Refer to: Figure 3.3-HVPP-1

SOURCE: Michael Willis Architects

Figure 3.3-HVPP-4
Visual Simulation without Landscaping – Happy Valley Pumping Plant Site

Existing View looking southwest from Lombardy Lane

Visual Simulation of Proposed Improvements with landscaping at 5 years maturity

For Viewpoint Location Refer to: Figure 3.3-HVPP-1

SOURCE: Michael Willis Architects

Figure 3.3-HVPP-5
Visual Simulation with Landscaping – Happy Valley Pumping Plant Site

Highland Reservoir and Pipeline

Figures 3.3-HIGHRES-1 to 3.3-HIGHRES-8

1 Photo Viewpoint   3 Simulation Viewpoint

SOURCE: Environmental Vision

EBMUD Water Treatment and Transmission Improvements Program . 204369

Figure 3.3-HIGHRES-1
Location of Photo Viewpoints - Lafayette WTP and Highland Reservoir Sites

H1. Looking northwest from Lafayette Reservoir Recreation Area Rim Trail *

H2. Looking northwest across Lafayette Reservoir Dam

H3. Looking northwest from Lafayette Reservoir Recreation Area perimeter trail

H4. Looking northwest from Lafayette Reservoir Recreation Area Big Oak Trail *

SOURCE: Environmental Vision

*Simulation Photo

For Viewpoint Locations Refer to: Figure 3.3-HIGHRES-1

Figure 3.3-HIGHRES-2

Photographs of Highland Reservoir Site and Surroundings

HP1. Looking northeast from Lafayette Reservoir Recreation Area Rim Trail

HP2. Looking northeast near Lafayette Reservoir Recreation Area Rim Trail

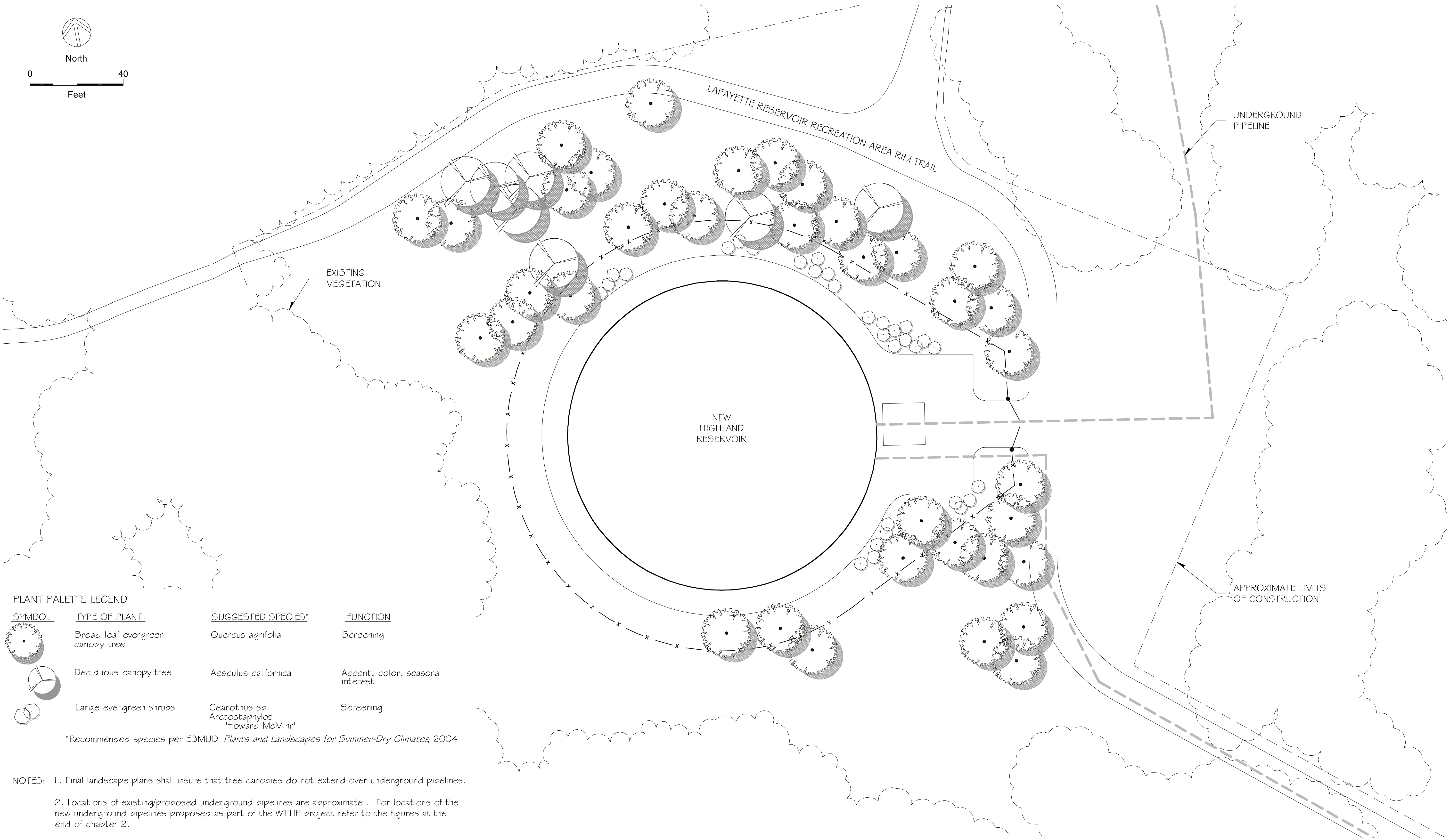
HP3. Looking northeast from trail near Lafayette Reservoir Recreation Area entrance

HP4. Looking southeast from Mount Diablo Boulevard at Lafayette Reservoir Recreation Area entrance

SOURCE: Environmental Vision

For Viewpoint Locations Refer to: Figure 3.3-HIGHRES-1

Figure 3.3-HIGHRES-3
Photographs of Highland Pipeline Alignments



PLANT PALETTE LEGEND

SYMBOL	TYPE OF PLANT	SUGGESTED SPECIES*	FUNCTION
	Broad leaf evergreen canopy tree	Quercus agrifolia	Screening
	Deciduous canopy tree	Aesculus californica	Accent, color, seasonal interest
	Large evergreen shrubs	Ceanothus sp. Arctostaphylos 'Howard McMinn'	Screening

*Recommended species per EBMUD *Plants and Landscapes for Summer-Dry Climates* 2004

NOTES: 1. Final landscape plans shall insure that tree canopies do not extend over underground pipelines.

2. Locations of existing/proposed underground pipelines are approximate . For locations of the new underground pipelines proposed as part of the WTTIP project refer to the figures at the end of chapter 2.

SOURCE: Environmental Vision

Figure 3.3-HIGHRES-4
Conceptual Landscape Plan - Highland Reservoir

Existing View looking northwest from Rim Trail

Visual Simulation of Proposed Improvements without landscaping

For Viewpoint Location Refer to: Figure 3.3-HIGHRES-1

SOURCE: Environmental Vision

Figure 3.3-HIGHRES-5

Visual Simulation without Landscaping – Highland Reservoir Site from Rim Trail

Existing View looking northwest from Rim Trail

Visual Simulation of Proposed Improvements with landscaping at 5 years maturity

For Viewpoint Location Refer to: Figure 3.3-HIGHRES-1

SOURCE: Environmental Vision

Figure 3.3-HIGHRES-6

Visual Simulation with Landscaping– Highland Reservoir Site from Rim Trail

Existing View looking northwest from Big Oak Trail

Visual Simulation of Proposed Improvements without landscaping

For Viewpoint Location Refer to: Figure 3.3-HIGHRES-1

SOURCE: Environmental Vision

Figure 3.3-HIGHRES-7
Visual Simulation without Landscaping –
Highland Reservoir Site from Big Oak Trail

Existing View looking northwest from Big Oak Trail

Visual Simulation of Proposed Improvements with landscaping at 5 years maturity

For Viewpoint Location Refer to: Figure 3.3-HIGHRES-1

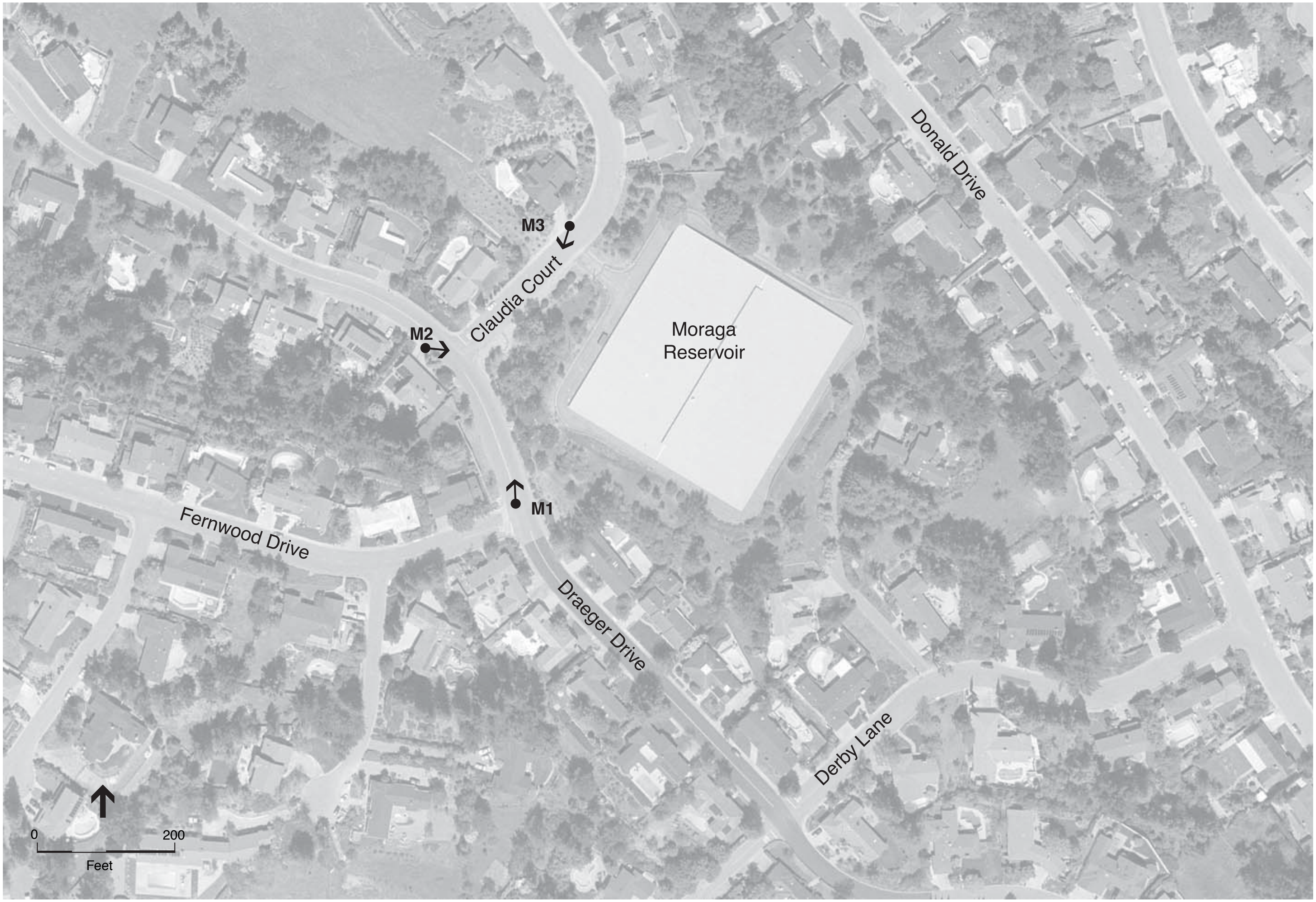
SOURCE: Environmental Vision

Figure 3.3-HIGHRES-8
Visual Simulation with Landscaping –
Highland Reservoir Site from Big Oak Trail

Moraga Reservoir

Figures 3.3-MORRES-1 to 3.3-MORRES-2

ESA



SOURCE: Environmental Vision

1 Photo Viewpoint

EBMUD Water Treatment and Transmission Improvements Program . 204369

Figure 3.3-MORRES-1

Location of Photo Viewpoints - Moraga Reservoir Site


M1. Looking north from Draeger Drive at Fernwood Drive


M2. Looking east from Draeger Drive at Claudia Court


M3. Looking southeast from Claudia Court

SOURCE: Environmental Vision

For Viewpoint Locations Refer to: Figure 3.3-MORRES-1

Figure 3.3-MORRES-2
Photographs of Moraga Reservoir Site and Surroundings

Sunnyside Pumping Plant

Figures 3.3-SUNPP-1 to 3.3-SUNPP-5

ESA

SOURCE: Environmental Vision

1 Photo Viewpoint   3 Simulation Viewpoint

EBMUD Water Treatment and Transmission Improvements Program . 204369

Figure 3.3-SUNPP-1
Location of Photo Viewpoints - Sunnyside Pumping Plant Site

SS1. Looking northeast from Proposed Sunnyside Pumping Plant entry road

SS2. Looking southeast from Happy Valley Road

SS3. Looking southeast from Happy Valley Road at entry road*

SS4. Looking southwest from Happy Valley Road

SOURCE: Environmental Vision

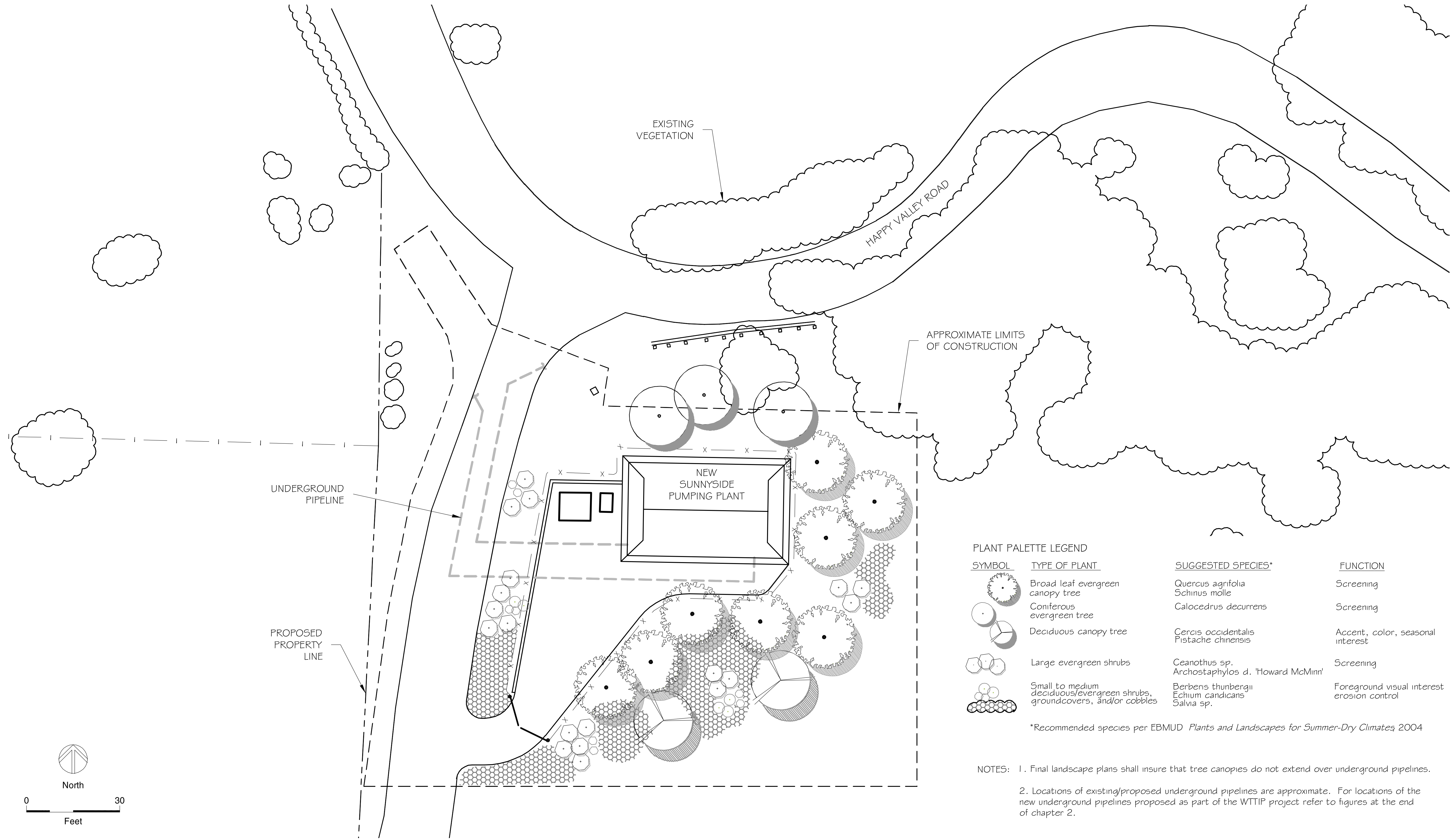
*Simulation Photo

For Viewpoint Locations Refer to: Figure 3.3-SUNPP-1

EBMUD Water Treatment and Transmission Improvements Program . 204369

Figure 3.3-SUNPP-2

Photographs of Sunnyside Pumping Plant Site and Surroundings



SOURCE: Environmental Vision

Figure 3.3-SUNPP-3

Conceptual Landscape Plan - Sunnyside Pumping Plant

Existing View looking southeast from Happy Valley Road at Proposed Sunnyside Pumping Plant entry road

Visual Simulation of Proposed Improvements without landscaping

For Viewpoint Location Refer to: Figure 3.3-SUNPP-1

SOURCE: Michael Willis Architects

Figure 3.3-SUNPP-4

Visual Simulation without Landscaping– Sunnyside Pumping Plant Site

Existing View looking southeast from Happy Valley Road at Proposed Sunnyside Pumping Plant entry road

Visual Simulation of Proposed Improvements with landscaping at 5 years maturity

For Viewpoint Location Refer to: Figure 3.3-SUNPP-1

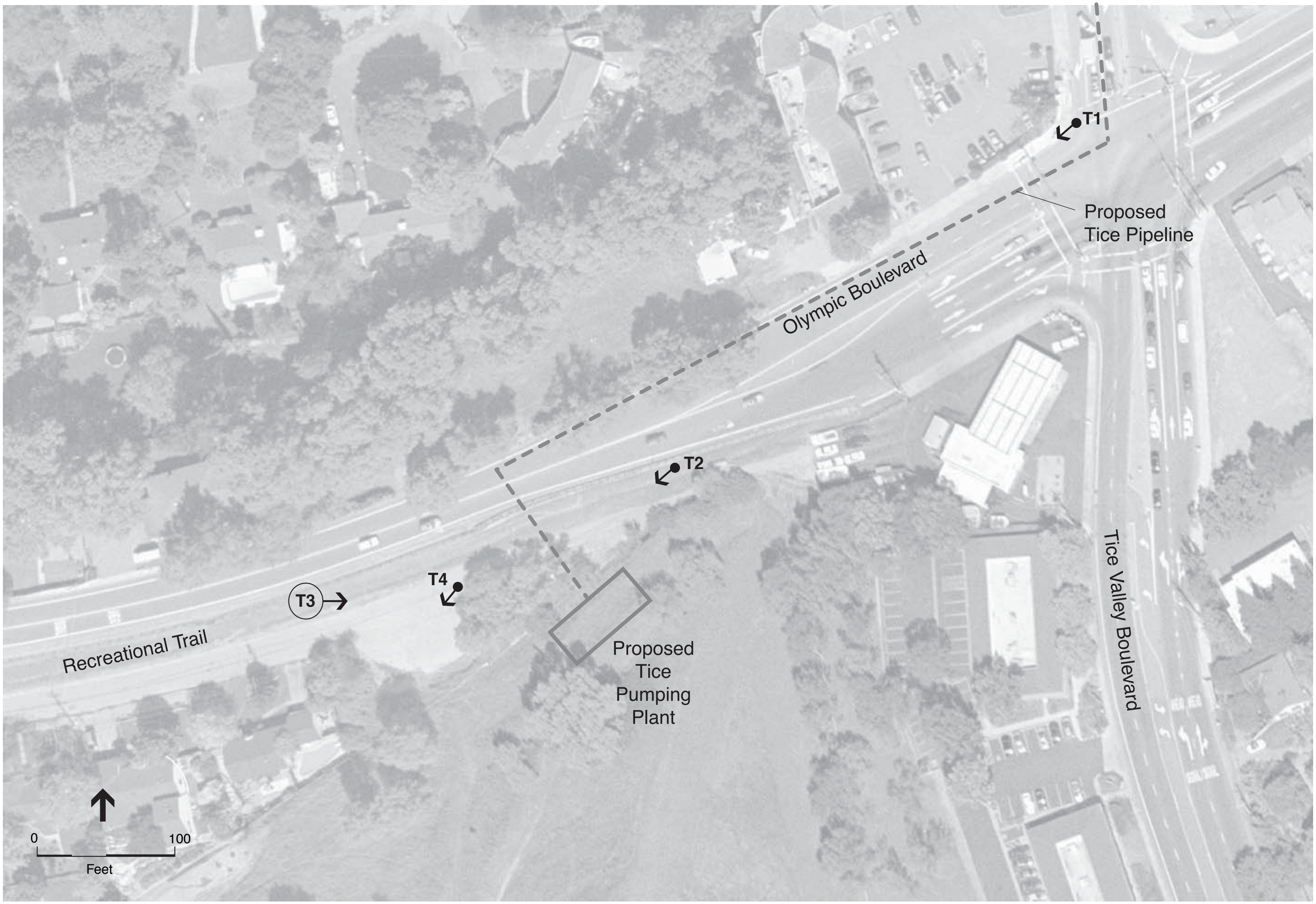
SOURCE: Michael Willis Architects

Figure 3.3-SUNPP-5

Visual Simulation with Landscaping– Sunnyside Pumping Plant Site

Tice Pumping Plant

Figures 3.3-TICEPP-1 to 3.3-TICEPP-5



SOURCE: Environmental Vision

1 Photo Viewpoint   3 Simulation Viewpoint

EBMUD Water Treatment and Transmission Improvements Program . 204369

Figure 3.3-TICEPP-1
Location of Photo Viewpoints - Tice Pumping Plant Site

T1. Looking southwest from Olympic Boulevard at Tice Valley Boulevard

T2. Looking southwest from Recreational Trail

T3. Looking east from Recreational Trail *

T4. Looking southwest toward adjacent homes

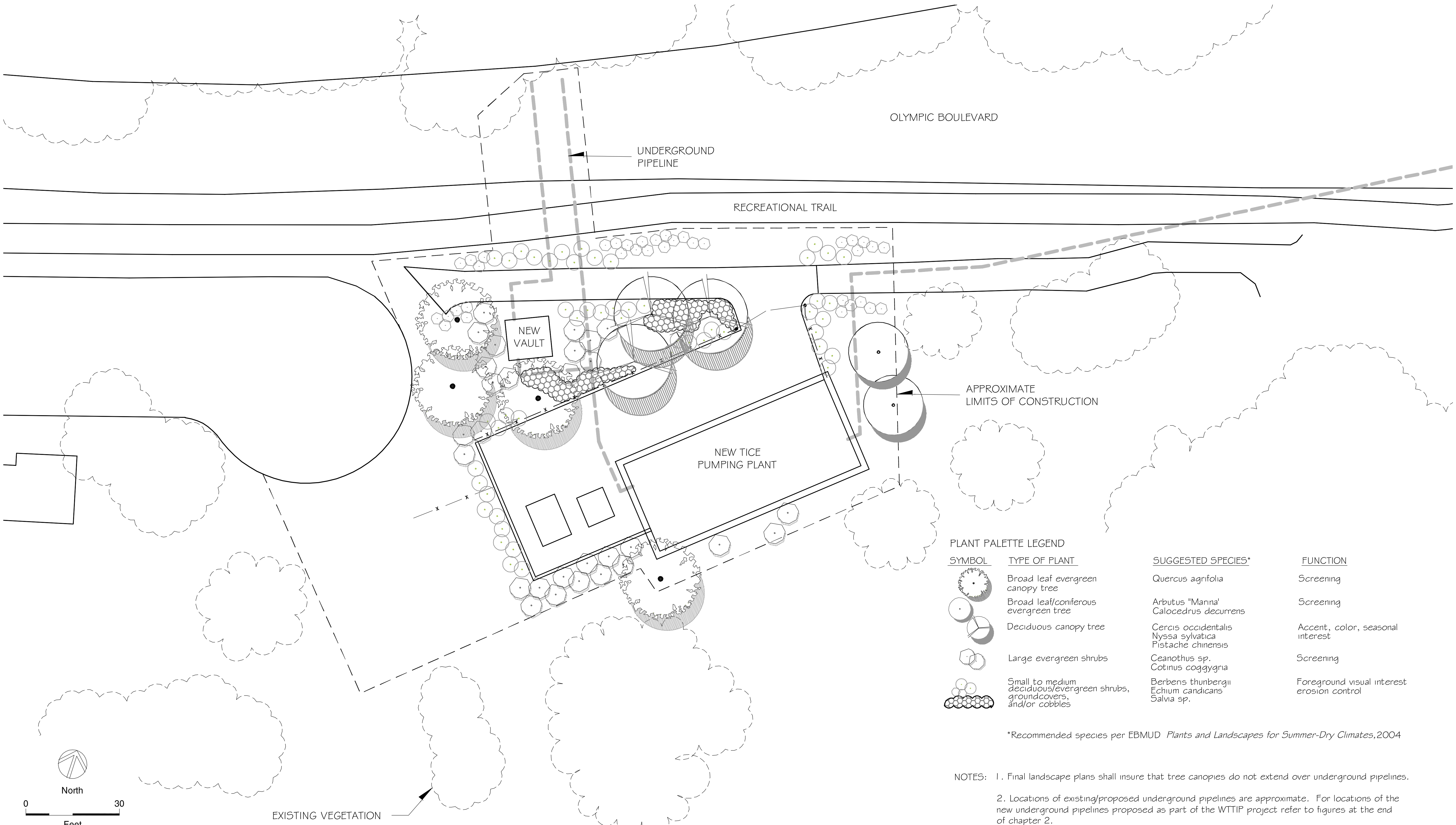
SOURCE: Environmental Vision

*Simulation Photo

For Viewpoint Locations Refer to: Figure 3.3-TICEPP-1

Figure 3.3-TICEPP-2

Photographs of Tice Pumping Plant Site and Surroundings



NOTES: 1. Final landscape plans shall insure that tree canopies do not extend over underground pipelines.

2. Locations of existing/proposed underground pipelines are approximate. For locations of the new underground pipelines proposed as part of the WTTIP project refer to figures at the end of chapter 2.

SOURCE: Environmental Vision

EBMUD Water Treatment and Transmission Improvements Program . 204369

Figure 3.3-TICEPP-3

Conceptual Landscape Plan - Tice Pumping Plant

Existing View looking east from Recreational Trail

Visual Simulation of Proposed Improvements without landscaping

For Viewpoint Location Refer to: Figure 3.3-TICEPP-1

SOURCE: Environmental Vision

Figure 3.3-TICEPP-4

Visual Simulation without Landscaping – Tice Pumping Plant Site

Existing View looking east from Recreational Trail

Visual Simulation of Proposed Improvements with landscaping at 5 years maturity

For Viewpoint Location Refer to: Figure 3.3-TICEPP-1

SOURCE: Environmental Vision

Figure 3.3-TICEPP-5

Visual Simulation with Landscaping – Tice Pumping Plant Site

Withers Pumping Plant

Figures 3.3-WITHPP-1 to 3.3-WITHPP-5

1 Photo Viewpoint
3 Simulation Viewpoint

SOURCE: Environmental Vision

EBMUD Water Treatment and Transmission Improvements Program . 204369

Figure 3.3-WITHPP-1
Location of Photo Viewpoints - Withers Pumping Plant Site

W1. Looking southeast from Reliez Valley Boulevard

W2. Looking southeast from Reliez Valley Boulevard at entry road*

W3. Looking south from Reliez Valley Boulevard embankment

W4. Looking northwest from Reliez Valley Boulevard at Silverhill Way

SOURCE: Environmental Vision

*Simulation Photo

For Viewpoint Locations Refer to: Figure 3.3-WITHPP-1

Figure 3.3-WITHPP-2

Photographs of Withers Pumping Plant Site and Surroundings

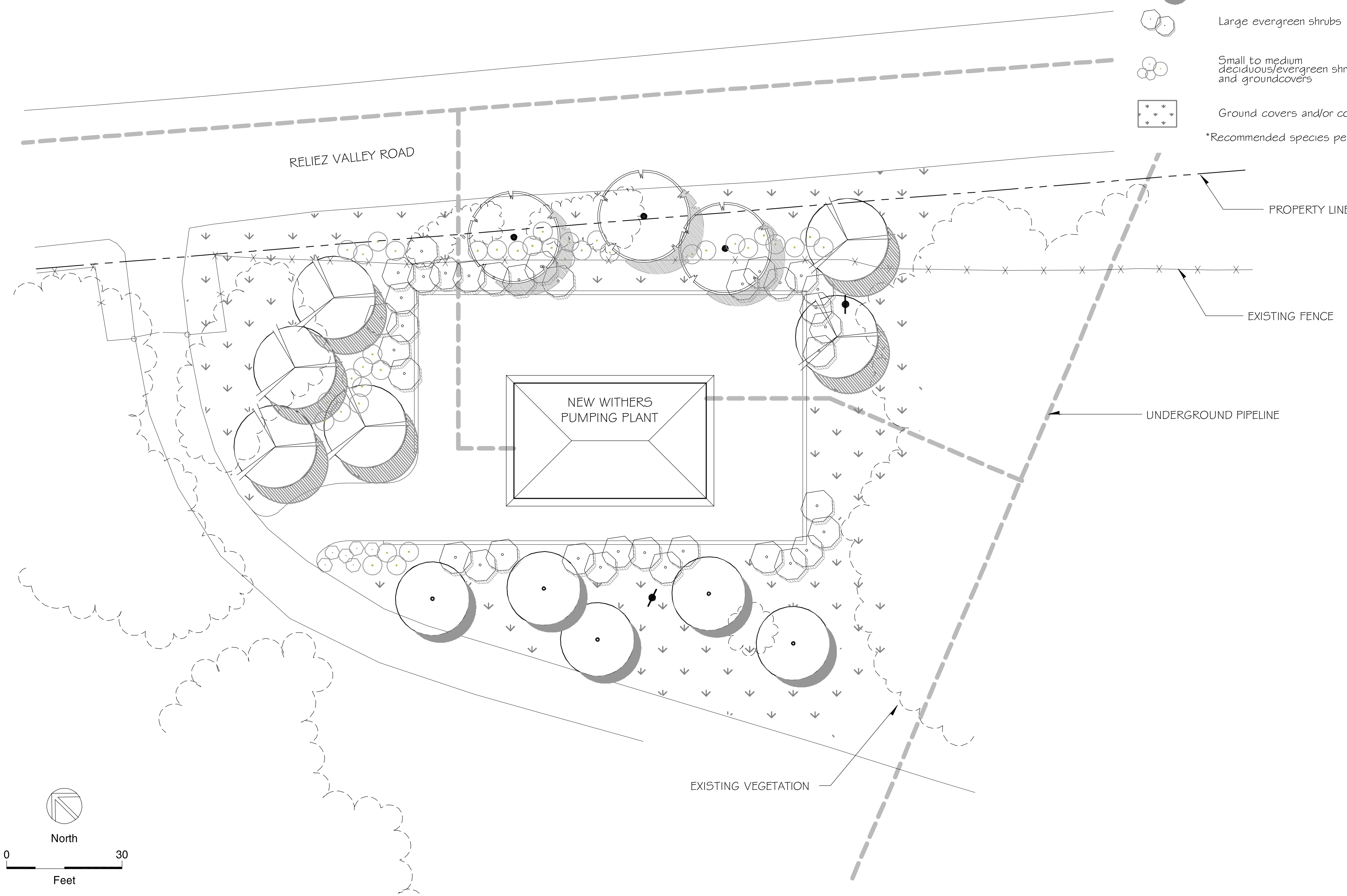
NOTES: 1. Final landscape plans shall insure that tree canopies do not extend over underground pipelines.

2. Locations of existing/proposed underground pipelines are approximate. For locations of the new underground pipelines proposed as part of the WTTIP project refer to figures at the end of chapter 2.

PLANT PALETTE LEGEND

SYMBOL	TYPE OF PLANT	SUGGESTED SPECIES*	FUNCTION
	Coniferous/evergreen tree	Calocedrus decurrens	Screening
	Broad leaf evergreen canopy tree	Quercus agrifolia Arbutus "Marina"	Backdrop
	Deciduous canopy tree	Aesculus californica Nyssa sylvatica Pistache chinensis	Accent, color, seasonal interest
	Large evergreen shrubs	Ceanothus sp. Garrya elliptica	Screening
	Small to medium deciduous/evergreen shrubs and groundcovers	Berberis thunbergii Osmanthus sp. Rhamnus californica Salvia sp.	Foreground visual interest erosion control
	Ground covers and/or cobbles	Native bunch grasses	

*Recommended species per EBMUD *Plants and Landscapes for Summer-Dry Climates*, 2004



SOURCE: Environmental Vision

EBMUD Water Treatment and Transmission Improvements Program . 204369

Figure 3.3-WITHPP-3

Conceptual Landscape Plan - Withers Pumping Plant

Existing View looking southeast from Reliez Valley Boulevard at entry road

Visual Simulation of Proposed Improvements without landscaping

For Viewpoint Location Refer to: Figure 3.3-WITHPP-1

SOURCE: Environmental Vision

Figure 3.3-WITHPP-4
Visual Simulation without Landscaping – Withers Pumping Plant Site

Existing View looking southeast from Reliez Valley Boulevard at entry road

Visual Simulation of Proposed Improvements with landscaping at 5 years maturity

For Viewpoint Location Refer to: Figure 3.3-WITHPP-1

SOURCE: Environmental Vision

Figure 3.3-WITHPP-5

Visual Simulation with Landscaping – Withers Pumping Plant Site

3.4 Geology, Soils, and Seismicity

3.4.1 Approach to Analysis

This section evaluates whether construction and operation of the proposed WTTIP would result in potential adverse impacts related to local geology, existing soil conditions, or seismicity. The analysis is based, in part, on review of various geologic maps and reports. The primary sources include:

- *Draft Geotechnical Impact Assessment, EBMUD Water Treatment and Transmission Improvements Program, AGS, Inc.* (AGS, Inc., 2005)
- *Draft Lamorinda Tunnel Conceptual Study, EBMUD Water Treatment & Transmission Improvement Program* (Jacobs Associates, 2005)
- *Seismic Stability Evaluation Report, Moraga Reservoir Dam* (EBMUD, 2003)
- Geologic and geotechnical reports and information from state and local agencies

The geotechnical evaluation of the project-level elements, the regional water treatment and major transmission system alternatives, and program-level projects considered in this section is also based on review of available geotechnical studies, subsurface boring data, and boring logs compiled by Caltrans for major freeway undercrossings in the vicinity of proposed facilities.

3.4.2 Setting

Regional Geology

The WTTIP study area lies within the geologically complex region of California referred to as the Coast Ranges geomorphic province.[1] The Coast Ranges province lies between the Pacific Ocean and the Great Valley province (Sacramento and San Joaquin Valleys) and stretches from the Oregon border to the Santa Ynez Mountains near Santa Barbara. Much of the Coast Ranges province is composed of marine sedimentary deposits and volcanic rocks that form northwest-trending mountain ridges and valleys, running roughly parallel to the San Andreas Fault Zone.

The project sites are generally located in the East Bay Hills, northwest-trending hills characterized by highly folded and deformed sedimentary rocks and alluvial-filled stream valleys. Bedrock consists primarily of the Great Valley Sequence, which is comprised of marine and nonmarine sedimentary rocks such as sandstones, siltstones, and claystones. The Great Valley Sequence has been further subdivided into different assemblages, which contain rocks deposited under similar conditions but during different time periods. Geologic units mapped at the various project sites contain rocks from these assemblages and include, from youngest to oldest, the Mulholland Formation, Contra Costa Group, Neroly Formation, Briones Formation, Rodeo Formation, Hambre Formation, Las Juntas Formation, Vine Hill Formation, and igneous rocks of

[1] A geomorphic province is an area that possesses similar bedrock, structure, history, and age. California has 11 geomorphic provinces (CGS, 2002a).

the Coast Range Ophiolite (AGS, Inc., 2005). With the exception of the igneous rocks, these units generally contain sandstones, mudstones, siltstones, shale, conglomerates, and/or claystones.

Topography

The topography within the study area is highly variable, as the project sites are located over a large area of Contra Costa County and a portion of Alameda County. Generally, the project sites are located either within the low-lying stream drainages or along ridge tops; exceptions are the proposed Moraga Road Pipeline alignment, which crosses from one stream valley to another over the intervening ridge tops, and the proposed Orinda-Lafayette Aqueduct, which includes a tunnel beneath the intervening ridges. Maps B1 through B7, presented at the end of Chapter 2, Project Description, show project locations on topographic base maps (U.S. Geological Survey [USGS] 7.5-minute quadrangles); and the D Maps (design drawings) include site-specific topography.

Improvements in the major stream valleys would be located at elevations ranging between about 200 and 425 feet above mean sea level (msl). Facilities in smaller tributary drainages would be located at elevations ranging from about 350 to 580 feet above msl. Facilities on ridgelines, mostly reservoirs, would be located at elevations ranging from about 540 feet to nearly 1,000 feet above msl. (See Table 2-10 in Chapter 2 for reservoir site elevations.)

Soils

The U.S. Department of Agriculture (USDA) Soil Conservation Service's *Soil Survey of Contra Costa County, California* (1977) was reviewed to determine soil conditions beneath the proposed project sites in Contra Costa County. The USDA Soil Conservation Service's *Soil Survey of Alameda County, California, Western Part* (1981) was reviewed for the Upper San Leandro WTP site. Table 3.4-1 provides a summary of the key engineering properties of soils at each site. Many of the proposed facilities would be constructed at developed sites where soil conditions have been altered by construction and utility installation.

The Lafayette WTP, Orinda WTP, Happy Valley Pumping Plant and Pipeline, and Leland Isolation Pipeline and Bypass Valve facilities are underlain by lowland soil associations (AGS, Inc., 2005). Most of the lowland soils exhibit slow permeability, moderate to high expansivity, corrosivity, and low erosivity. The Walnut Creek WTP, Upper San Leandro WTP, Ardith Reservoir/Donald Pumping Plant, Fay Hill Reservoir, Highland Reservoir and Pipelines, Moraga Reservoir, Sunnyside Pumping Plant and Pipeline, and Withers Pumping Plant facilities are underlain by upland soil associations. Upland soils generally have slow permeability, high expansivity, corrosivity, and moderate to high erosivity. The Sobrante WTP, Orinda-Lafayette Aqueduct, Fay Hill Pumping Plant and Pipeline Improvements, Glen Pipeline Improvements, Moraga Road Pipeline, and Tice Pumping Plant and Pipeline sites are underlain partially by lowland and partially by upland soils associations.

TABLE 3.4-1
SOIL PROPERTIES AT PROPOSED WTTIP PROJECT SITES (PROJECT LEVEL)

Location	Soil Type and Symbol	Slope	Erosion Hazard	Shrink/Swell Potential	Corrosivity
Lafayette WTP	Clear Lake clay (Cc)	0%	none	high	very high
Orinda WTP	Botella clay loam (BaC)	0–2%	slight	moderate	moderate
Walnut Creek WTP	Lodo clay loam (LcF)	30–50%	high	moderate	moderate
Sobrante WTP	Altamont–Fontana Complex (AcF)	30–50%	moderate to high	moderate to high	high
	Conejo clay loam (CeA)	0–2%	none	moderate	moderate
	Cropley clay (CkB)	2–5%	slight	high	high
	Cut-and-fill land, Los Osos Complex (CnE)	9–30%	high	high	high
	Diablo clay (DdE)	15–30%	moderate	high	high
Upper San Leandro WTP	Xerorthents–Altamont Complex (157)	30–50%	moderate	high	high
	Xerorthents–Los Osos Complex (158)	30–50%	moderate	high	moderate
Orinda-Lafayette Aqueduct	Botella clay loam (BaC)	0–2%	slight	moderate	moderate
	Clear Lake clay (Cc)	0%	none	high	very high
	Los Osos clay loam (LhE)	15–30%	moderate	high	high
Ardith Reservoir/ Donald Pumping Plant	Cut-and-fill land, Los Osos Complex (CnE)	9–30%	high	high	high
	Dibble silty clay loam (DeE)	15–30%	moderate	moderate to high	moderate to high
Fay Hill Pumping Plant and Pipeline Improvements	Cropley clay (CkB)	2–5%	slight	high	high
	Los Osos clay loam (LhF)	30–50%	moderate to high	high	high
Fay Hill Reservoir	Millsholm loam (MeF)	30–50%	high	low	high
Glen Pipeline Improvements	Clear Lake clay (Cc)	0%	none	high	very high
Happy Valley Pumping Plant and Pipeline	Cropley clay (CkB)	2–5%	slight	high	high
Highland Reservoir and Pipelines	Lodo clay loam (LcF)	30–50%	moderate to high	moderate	moderate
	Los Osos clay loam (LhF)	30–50%	moderate to high	high	high
Lafayette Reclaimed Water Pipeline	Lodo clay loam (LcF)	30–50%	moderate to high	moderate	moderate
	Clear Lake clay (Cc)	0%	none	high	very high

TABLE 3.4-1 (continued)
SOIL PROPERTIES AT PROPOSED WTTIP PROJECT SITES (PROJECT LEVEL)

Location	Soil Type	Slope	Erosion Hazard	Shrink/Swell Potential	Corrosivity
Leland Isolation Pipeline and Bypass Valves	Botella clay loam (BaA)	0–2%	slight	moderate	moderate
	Conejo clay loam (CeA)	0–2%	none	moderate	moderate
Moraga Reservoir	Los Osos clay loam (LhF)	30–50%	moderate to high	high	high
Moraga Road Pipeline	Alo clay (AaE)	15–30%	moderate	high	high
	Alo clay (AaF)	30–50%	moderate to high	high	high
	Clear Lake clay (Cc)	0%	none	high	very high
	Cropley clay (CkB)	2–5%	slight	high	high
	Los Osos clay loam (LhE)	15–30%	moderate	high	high
	Millsholm loam (MeG)	50–75%	very high	low	high
Sunnyside Pumping Plant	Diablo clay (DdF)	30–50%	moderate to high	high	high
Tice Pumping Plant and Pipeline	Botella clay loam (BaA)	0–2%	slight	moderate	moderate
	Clear Lake clay (Cc)	0%	none	high	very high
	Los Osos clay loam (LhE)	15–30%	moderate	high	high
	Tierra loam (TaD)	9–15%	moderate to high	low-moderate	high
Withers Pumping Plant	Altamont clay (AbE)	15–30%	moderate	high	high

SOURCE: USDA Soil Conservation Service, 1977 and 1981, as compiled by AGS, Inc. (AGS, Inc., 2005).

Seismicity

The San Francisco Bay Area is a region of high seismic activity with numerous active and potentially active faults.[2] Major earthquakes have affected the region in the past and are expected to occur in the near future on one of the principal active faults in the San Andreas Fault System. The USGS Working Group on California Earthquake Probabilities determined there is a 62 percent likelihood of one or more earthquakes of magnitude 6.7 or greater occurring in the San Francisco Bay Area region within the 30-year period from 2002 to 2032 (USGS, 2003).

2 An *active* fault is defined by the State of California as a fault that has had surface displacement within Holocene time (approximately the last 11,000 years). A *potentially active* fault is a fault that has shown evidence of surface displacement during the last 1.6 million years, unless direct geologic evidence demonstrates inactivity for the last 11,000 years or longer. This definition does not mean that faults lacking evidence of surface displacement are necessarily inactive. *Sufficiently active* is also used to describe a fault if there is some evidence that Holocene surface displacement occurred on one or more of its segments or branches (Hart, 1997).

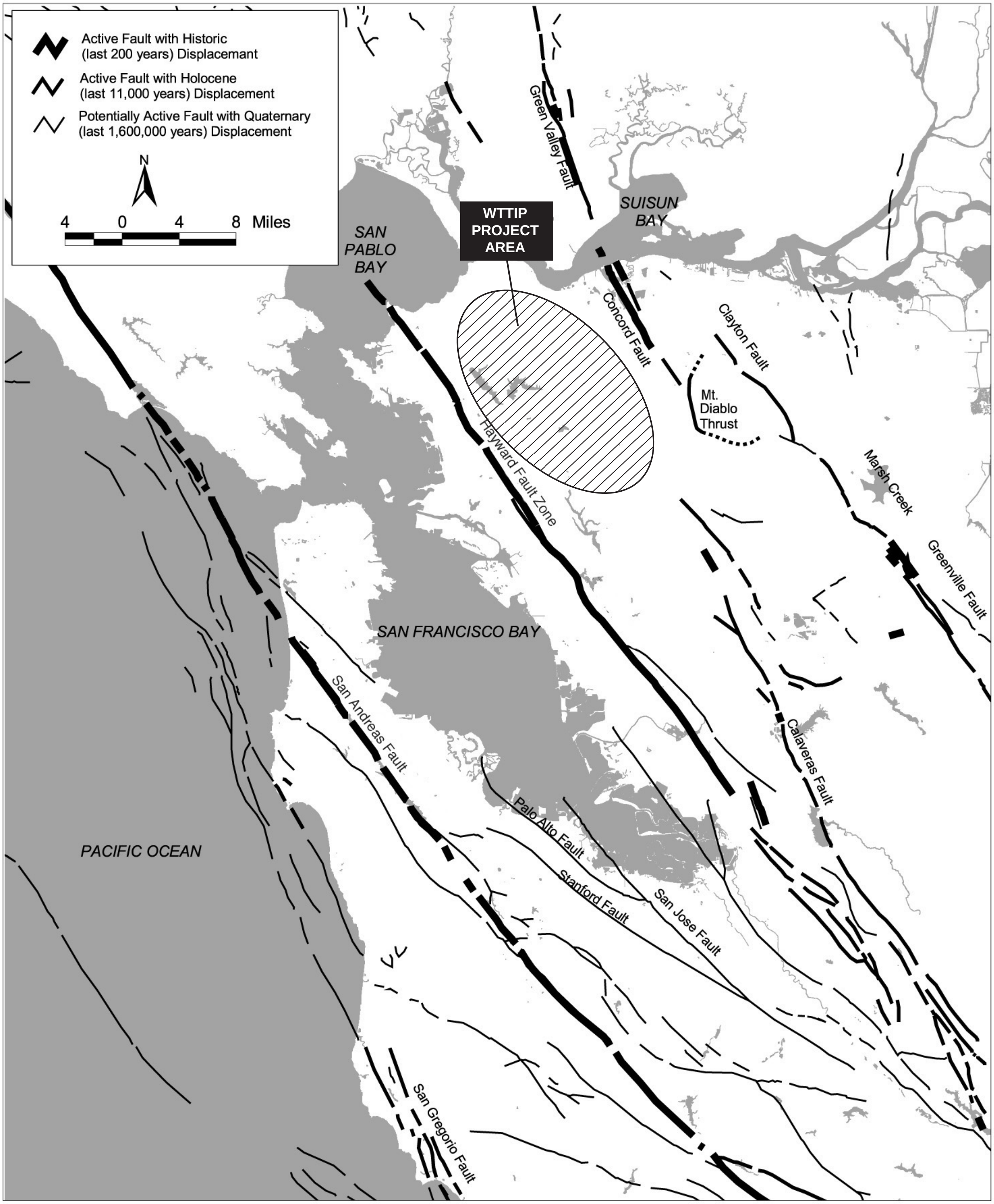
Richter magnitude (M) is a measure of the size of an earthquake as recorded by a seismograph. The reported Richter magnitude for an earthquake represents the highest amplitude measured by the seismograph at a distance of 100 kilometers from the epicenter. Richter magnitudes vary logarithmically, with each whole-number step representing a tenfold increase in the amplitude of the recorded seismic waves. Earthquake magnitudes are also measured by their moment magnitude (Mw), which is related to the physical characteristics of a fault, including the rigidity of the rock, the size of fault rupture, and the movement or displacement across a fault (CGS, 2002b).

The San Andreas Fault System forms the boundary between the North American and Pacific crustal plates and includes the San Andreas, Hayward, San Gregorio–Hosgri, Rodgers Creek–Healdsburg, Calaveras, Mt. Diablo Thrust, Marsh Creek–Greenville, and the Concord–Green Valley Faults (Figure 3.4-1). A number of these faults, such as the San Andreas and Hayward, have experienced significant activity during historic time (within the last 200 years). Table 3.4-2 lists the location of regionally active faults and potentially active faults significant to proposed WTTIP projects due to proximity, activity status, date of most recent motion, and maximum moment magnitude (Mmax). The Mmax is the strongest earthquake that is likely to be generated along a fault and is based on empirical relationships of surface rupture length, rupture area, and fault type, all of which are related to the physical size of fault rupture and displacement across a fault.

The Hayward (when combined with the Rodgers Creek) and the San Andreas Faults have the highest probabilities of generating an M 6.7 or greater earthquake before 2032 (USGS, 2003). The Hayward Fault is of particular concern because of the density of urban development along its length and the major infrastructure lines (water, electricity, gas, and transportation) that cross it. A characteristic feature of the Hayward Fault is its well-expressed and relatively consistent fault creep.[3] Although large earthquakes on the Hayward Fault have been rare since 1868, slow fault creep has continued to occur and has caused measurable offset across the fault trace. Fault creep on the East Bay segment of the Hayward Fault is estimated at 9 millimeters per year (mm/yr) (Peterson et al., 1996). However, a large earthquake could occur on the Hayward Fault with an estimated Mmax of 7.1 (Table 3.4-2).

The San Andreas Fault, although at least 19 miles from any of the project facilities, was the source of two major seismic events in recent geologic history that affected the San Francisco Bay region. The 1906 San Francisco earthquake, estimated at M 7.9, resulted in approximately 290 miles of surface fault rupture, the longest of any known to occur on a continental strike-slip fault. The more recent 1989 Loma Prieta earthquake, with a magnitude of M 7.1, resulted in widespread damage throughout the Bay Area.

3 Fault creep is the slow, continuous deformation observed across a fault trace as a result of constant seismic stress.



SOURCE: ESA

Figure 3.4-1
Active and Potentially Active Bay Area Earthquake Faults

TABLE 3.4-2
ACTIVE FAULTS IN THE PROJECT VICINITY

Fault	Location and Direction from Nearest WTTIP Project Site	Recency of Movement	Fault Classification[a]	Historical Seismicity[b]	Maximum Moment Magnitude Earthquake (Mmax)[c]
Concord–Green Valley	2.5 miles northeast (Walnut Creek WTP)	Historic (1955) Holocene	Active	Historic active creep	6.8
Mt. Diablo Thrust	1.9 miles northeast (New Leland Pressure Zone Reservoir)	Holocene	Active (Blind)	Many <M 4.5	6.65
Hayward	0.2 mile west (Upper San Leandro WTP; San Pablo Pipeline crosses fault)	Historic (1868 rupture) Holocene	Active	M 6.8, 1868 Many <M 4.5	7.1
Calaveras (northern)	6 miles south (Upper San Leandro WTP; St. Mary's Pipeline)	Historic (1861 rupture) Holocene	Active	M 5.6 to M 6.4, 1861 M 4 to M 4.5 swarms 1970, 1990	6.8
Marsh Creek–Greenville	11.9 miles southeast (New Leland Pressure Zone Reservoir)	Historic (1980 rupture) Holocene	Active	M 5.6, 1980	6.9
San Andreas	18.9 miles west (Upper San Leandro WTP)	Historic (1906; 1989 ruptures)	Active	M 7.1, 1989 M 7.9, 1906 M 7.0, 1838 Many <M 6	7.9

[a] Jennings, 1994, and Hart, 1997. An active fault is defined by the California Geological Survey as one that has had surface displacement within approximately the last 11,000 years. A potentially active fault is defined as a fault that has showed evidence of surface displacement during approximately the last 1.6 million years.
[b] Richter magnitude (M) and year for recent and/or large events. Richter magnitude scale reflects the maximum amplitude of a seismic wave measured at a distance of 100 kilometers from the epicenter.
[c] Moment magnitude is related to the physical size of a fault rupture and movement across a fault. The maximum moment magnitude (Mmax) is the strongest earthquake that is likely to be generated along a fault and is based on empirical relationships of surface rupture length, rupture area, and fault type.

SOURCE: Jennings, 1994; Hart, 1997, AGS, Inc., 2005.

The closest active faults to the various project sites are the Hayward, Mt. Diablo Thrust, and the Concord Faults. The Mt. Diablo Thrust and the Concord Faults are the faults with the least likelihood of causing an M 6.7 earthquake (USGS, 2003). The historical record indicates that no large earthquakes have occurred on the Mt. Diablo or Concord Faults; however, a moderate earthquake of M 5.4 occurred on the Concord Fault segment in 1955.

Other Regional Faults

Several smaller faults have been mapped in the vicinity of the project sites, including the Pinole, Franklin, Las Trampas, and Lauterwasser Faults. The California Geological Survey (CGS) does not consider these faults to be active, and they are therefore not zoned as Earthquake Fault Zones under the Alquist-Priolo Earthquake Fault Zoning Act.[4] Activity on these faults is much less

[4] The Alquist-Priolo Earthquake Fault Zoning Act (formerly the Alquist-Priolo Special Studies Zone Act), signed into law in December 1972, requires the delineation of zones along active faults in California. As previously noted, an *active* fault is a fault that has had surface displacement within approximately the last 11,000 years.

likely to occur than movement on the principal active faults. If seismicity on these faults were to occur, the result would likely be occasional, small earthquakes (less than M 4) (AGS, Inc., 2005).

Seismic Hazards

Surface Fault Rupture

Seismically induced ground rupture is defined as the physical displacement of surface deposits in response to an earthquake's seismic waves. The magnitude and nature of fault rupture can vary for different faults, or even along different strands of the same fault. Ground rupture is considered more likely along active faults, which are referenced in Table 3.4-2.

None of the WTTIP project-level elements are within an Alquist-Priolo Earthquake Fault Zone, as designated through the Alquist-Priolo Earthquake Fault Zoning Act, and no mapped active faults are known to pass through the immediate project region. Therefore, the risk of ground rupture is low.

Of the program-level projects, only the proposed San Pablo Pipeline project is located on or near an active fault. The San Pablo Pipeline crosses the Hayward Fault and associated Alquist-Priolo Earthquake Fault Zone. Although the Alquist-Priolo Act requirements do not apply to this project because it would not include a surface building for human occupancy, there would be a potential risk of damage from ground rupture.

Groundshaking

Earthquakes in the Bay Area could produce strong groundshaking in the project region. Groundshaking intensity is partly related to the size of an earthquake, the distance to the site, and the response of the geologic materials that underlie a site. As a rule, the greater the earthquake magnitude and the closer the fault rupture to a site, the greater the intensity of groundshaking. Violent groundshaking is generally expected at and near the epicenter of a large earthquake; however, different types of geologic materials respond differently to earthquake waves. For instance, deep unconsolidated materials can amplify earthquake waves and cause longer periods of groundshaking.

While the magnitude is a measure of the energy released in an earthquake, intensity is a measure of the observed groundshaking effects at a particular location. The Modified Mercalli (MM) scale is commonly used to measure earthquake intensity due to groundshaking. Table 3.4-3 presents a description of the Modified Mercalli scale. The MM values for intensity range from I (earthquake not felt) to XII (damage nearly total). MM intensities ranging from IV to X can cause moderate to significant structural damage, although the damage will not be uniform. Some structures experience substantially more damage than others. The age, material, type, method of construction, size, and shape of a structure affect its performance in an earthquake.

TABLE 3.4-3
MODIFIED MERCALLI INTENSITY SCALE

Intensity Value	Intensity Description	Average Peak Acceleration (% g[a])
I	Not felt except by a very few persons under especially favorable circumstances.	< 0. 17
II	Felt only by a few persons at rest, especially on upper floors on buildings. Delicately suspended objects may swing.	0.17–1.4
III	Felt noticeably indoors, especially on upper floors of buildings, but many people do not recognize it as an earthquake. Standing motor cars may rock slightly, vibration similar to a passing truck.	0.17–1.4
IV	During the day felt indoors by many, outdoors by few. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably.	1.4–3.9
V	Felt by nearly everyone, many awakened. Some dishes and windows broken; a few instances of cracked plaster; unstable objects overturned. Disturbances of trees, poles may be noticed. Pendulum clocks may stop.	3.5–9.2
VI	Felt by all, many frightened and run outdoors. Some heavy furniture moved; and fallen plaster or damaged chimneys. Damage slight.	9.2–18
VII	Everybody runs outdoors. Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable in poorly built or badly designed structures; some chimneys broken. Noticed by persons driving.	18–34
VIII	Damage slight in specially designed structures; considerable in ordinary substantial buildings, with partial collapse; great in poorly built structures. Panel walls thrown out of frame structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned. Sand and mud ejected in small amounts. Changes in well water. Persons driving motor cars disturbed.	34–65
IX	Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb; great in substantial buildings, with partial collapse. Buildings shifted off foundations. Ground cracked. Underground pipes broken.	65–124
X	Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations; ground badly cracked. Rails bent. Landslides considerable from riverbanks and steep slopes. Shifted sand and mud. Water splashed over banks.	> 124
XI	Few, if any, masonry structures remain standing. Bridges destroyed. Broad fissures in ground. Underground pipelines completely out of service. Earth slumps and land slips in soft ground. Rails bent greatly.	> 124
XII	Damage total. Practically all works of construction are damaged greatly or destroyed. Waves seen on ground surface. Lines of sight and level are distorted. Objects are thrown upward into the air.	> 1.24

[a] g (gravity) = 980 centimeters per second squared. 1.0 g of acceleration is a rate of increase in speed equivalent to a car traveling 328 feet from rest in 4.5 seconds.

SOURCE: ABAG, 2003; CGS, 2003.

As a comparison, the 1906 San Francisco earthquake, with an M 7.9 on the San Andreas Fault, produced shaking intensities modeled to range from moderate (MM VI) to strong (MM VII) within the project area. The 1989 Loma Prieta earthquake, with an M 7.1 near the San Andreas Fault, produced light (MM V) to moderate (MM VI) shaking intensities (AGS, Inc., 2005).

Ground motion during an earthquake can also be described using the motion parameters of acceleration, velocity, and duration of shaking. A common measure of ground motion is the peak ground acceleration (PGA). The PGA for a given component of motion is the largest value of horizontal acceleration obtained from a seismograph. PGA is expressed as the percentage of the acceleration due to gravity (g), which is approximately 980 centimeters per second squared. For comparison purposes, the maximum peak acceleration value recorded during the Loma Prieta earthquake was in the vicinity of the epicenter, near Santa Cruz, at 0.64 g. The lowest recorded value was 0.06 g in the bedrock on Yerba Buena Island. The highest value measured in the Contra Costa County area was 0.13 g (CDMG, 1990). However, an earthquake on the nearby Hayward Fault would likely produce far more severe groundshaking in the project area than was observed during the Loma Prieta earthquake. As Table 3.4-4 shows, calculations indicate that the PGA could reach as high as 0.93 g in the project region (AGS, Inc., 2005).[5]

An Mmax 7.1 earthquake on the Hayward Fault yields the highest calculated PGA for the Orinda WTP, Sobrante WTP, Upper San Leandro WTP, Orinda-Lafayette Aqueduct, Ardith Reservoir/Donald Pumping Plant, Happy Valley Pumping Plant and Pipeline, Highland Reservoir and Pipelines, Sunnyside Pumping Plant and San Pablo Pipeline sites (AGS, Inc., 2005). An Mmax 6.7 earthquake on the Mt. Diablo Thrust Fault yields the highest calculated PGA for the Lafayette WTP, Walnut Creek WTP, Fay Hill Pumping Plant and Pipeline Improvements, Fay Hill Reservoir, Glen Pipeline Improvements, Highland Reservoir and Pipelines, Moraga Reservoir, Moraga Road Pipeline, New Leland Pressure Zone Reservoir and Pipeline, and Tice Pumping Plant and Pipeline sites. An Mmax 6.65 earthquake on the Concord–Green Valley fault yields the highest calculated PGA for the Withers Pumping Plant facility. Calculated PGAs for earthquakes on other regionally active faults were less than those shown in Table 3.4-4. It should be noted that the values shown in the table are based on minimum distances from each facility to the respective faults. For pipeline alignments, multiple locations were analyzed to determine the PGA for the entire pipeline length.

After the Loma Prieta earthquake in 1989, EBMUD initiated a seismic evaluation program to evaluate the performance of essential components of the water system following a major earthquake, and to identify and evaluate projects to improve the system's post-earthquake performance. The seismic evaluation program studied three faults passing through or close to the

5 PGA values were calculated using a deterministic seismic hazard assessment approach. First, the faults near a site are identified and assessed for activity. Then, for each seismic source, an earthquake scenario consisting of the maximum magnitude a fault is capable of generating at the closest distance to the site is used to determine the ground motion estimate.

TABLE 3.4-4
ESTIMATED PEAK GROUND MOTIONS, PROJECT-LEVEL ELEMENTS

Facility Name	Distance to Hayward Fault (km)	Peak Ground Acceleration[a] (g)	Distance to Mt. Diablo Thrust Fault (km)	Peak Ground Acceleration[b] (g)	Distance to Concord Fault (km)	Peak Ground Acceleration[c] (g)
Lafayette WTP	9	0.43	9	**0.46**	13	0.28
Orinda WTP	5	**0.59**	14	0.33	17	0.22
Walnut Creek WTP	15	0.29	5	**0.66**	6	0.47
Sobrante WTP	3	**0.71**	24	0.20	20	0.19
Upper San Leandro WTP	<0.5	**0.93**	17	0.28	22	0.18
Orinda-Lafayette Aqueduct	5	**0.59**	9	0.46	13	0.28
Ardith Reservoir/ Donald Pumping Plant	6	**0.54**	10	0.43	15	0.25
Fay Hill Pumping Plant and Pipeline Improvements	8	0.46	7	**0.54**	12	0.29
Fay Hill Reservoir	8	0.46	7	**0.54**	12	0.29
Glen Pipeline Improvements	10	0.39	8	**0.50**	11	0.32
Happy Valley Pumping Plant and Pipeline	6	**0.54**	14	0.33	15	0.25
Highland Reservoir and Pipelines	8	**0.46**	9	**0.46**	13	0.28
Lafayette Reclaimed Water Pipeline	8	**0.46**	9	**0.46**	13	0.28
Moraga Reservoir	8	0.46	7	**0.54**	12	0.29
Moraga Road Pipeline	8	0.46	7	**0.54**	12	0.29
Sunnyside Pumping Plant	8	**0.46**	13	0.35	14	0.26
Tice Pumping Plant and Pipeline	13	0.32	4	**0.73**	7	0.43
Withers Pumping Plant	16	0.27	9	0.46	6	**0.47**

Values in **Bold** indicate the highest calculated PGA for that project location.

[a] Average PGA value calculated using Mmax of 7.1 for the Hayward–Rodgers Creek Fault taken from three different sources.
[b] Average PGA value calculated using Mmax of 6.65 for Mt. Diablo Thrust Fault taken from three different sources.
[c] Average PGA value calculated using Mmax of 6.7 for Concord–Green Valley Fault taken from three different sources.

km = kilometers
g = gravity

SOURCE: AGS, Inc., 2005.

service area: the Hayward, Calaveras, and Concord.[6] The seismic evaluation studies, conducted between 1991 and 1994, involved investigations to:

- Establish target levels of service (service goals) for post-earthquake conditions
- Assess site seismic hazards (groundshaking, liquefaction, landslides, and surface faulting)
- Evaluate the structural integrity of facilities
- Develop seismic scenarios
- Prioritize improvements
- Prepare cost estimates
- Estimate total system recovery times and achievement of service goals

The seismic evaluation program was designed to identify and prioritize those facilities most prone to seismic damage that would cause an unacceptable level of service, life safety hazard, and/or cost to customers. The service goals were developed to help define what constituted unacceptable service and addressed the system as a whole as well as water needs for firefighting, hospitals and disaster centers, and domestic and other water users. As a result of the seismic evaluation program, many of the WTPs and other facilities received seismic upgrades.

Secondary Earthquake Hazards

Secondary earthquake hazards in the project region include earthquake-induced landsliding, settlement, and liquefaction. Strong ground motions that occur during earthquakes are capable of inducing landslides and related forms of ground failure. Settlement is the gradual downward movement of an engineered structure (such as a building) due to the compaction of unconsolidated material below the foundation. Settlement accelerated by earthquakes can result in vertical or horizontal separations of structures or portions of one structure; cracked foundations, roads, sidewalks, and walls; and, in severe situations, building collapse and bending or breaking of underground utility lines. Soil liquefaction (a phenomenon in which soils lose strength) can result in ground failure. The soils most susceptible to liquefaction are clean, loose, uniformly graded, saturated, fine-grained soils that occur close to the ground surface, usually at depths of less than 50 feet. In general, upland areas have a low liquefaction potential, except where significant alluvium is present in creek bottoms or swales.

Other Geologic Hazards

Landslides and Slope Failure

Slope failures, commonly referred to as landslides, include many phenomena that involve the downslope displacement and movement of material, either triggered by static (i.e., gravity) or dynamic (i.e., earthquake) forces. A slope failure is a mass of rock, soil, and debris displaced downslope by sliding, flowing, or falling. Exposed rock slopes undergo rockfalls, rockslides, or rock avalanches, while soil slopes experience shallow soil slides, rapid debris flows, and deep-seated rotational slides. Landslides may occur on slopes of 15 percent or less; however, the

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6 The seismic evaluation program evaluated both “probable” and “maximum” earthquakes on the Hayward Fault, and the maximum-level earthquakes on the Calaveras and Concord Faults. Other likely earthquake events, such as an earthquake along the San Andreas Fault, are not expected to produce as much damage to the water system.

probability is greater on steeper slopes that exhibit old landslide features such as scarps, slanted vegetation, and transverse ridges. Landslide-susceptible areas are characterized by steep slopes and downslope creep of surface materials. Debris flows consist of a loose mass of rocks and other granular material that, if saturated and present on a steep slope, can move downslope. The rate of rock and soil movement can vary from a slow creep over many years to a sudden mass movement. Landslides occur throughout the state of California, but the density of incidents increases in zones of active faulting.

Slope stability can depend on a number of complex variables. The geology, structure, and amount of groundwater in the slope affect slope failure potential, as do external processes (i.e., climate, topography, slope geometry, and human activity). The factors that contribute to slope movements include those that decrease the resistance in the slope materials and those that increase the stresses on the slope. Slope failure under static forces occurs when those forces initiating failure overcome the forces resisting slope movement. For example, a soil slope may be considered stable until it becomes saturated with water (e.g., during heavy rains or due to a broken pipe or sewer line). Under saturated conditions, the water pressure in the individual pores within the soil increases, reducing the strength of the soil. Cutting into the slope and removing the lower portion, or slope toe, can reduce or eliminate the slope support, thereby increasing stress on the slope.

Earthquake motions can induce significant horizontal and vertical dynamic stresses in slopes that can trigger failure. Earthquake-induced landslides can occur in areas with steep slopes that are susceptible to strong ground motion during an earthquake. The 1989 Loma Prieta earthquake triggered thousands of landslides over an epicentral area of 770 square miles. The Oakland-Berkeley Hills could experience some earthquake-induced rockfalls, slumps, and debris flows during an event on the Hayward Fault or other active Bay Area fault capable of generating strong ground motion.

Squeezing Ground

Squeezing ground is a tunneling term used to describe the slow advancement of exposed, low-strength rock surfaces into the tunnel. This slow creep of the rock material is often imperceptible at the time of construction, but ultimately causes a reduction in the tunnel cross-section and a convergence of installed support. Squeezing conditions are often associated with materials that have a low swelling capacity and high overburden pressure.[7] The degree of squeezing ground potential is a significant factor in the selection of appropriate excavation methods and equipment and in the development of tunnel support systems.

Mineral Resources

The CGS has classified lands within the San Francisco Bay region into four Mineral Resource Zones (MRZs). The classification of MRZs is based on guidelines adopted by the California State Mining and Geology Board, as mandated by the Surface Mining and Reclamation Act of 1975. MRZ-1 zones are areas where adequate information indicates that no significant mineral deposits

7 Overburden pressure is the vertical pressure from overlying materials.

are present, or where it is judged that little likelihood for their presence exists. MRZ-2 zones, which were not found on any of the project sites, are areas where adequate information indicates significant mineral resources are present, or where it is judged that a high likelihood for their presence exists. MRZ-3 zones are considered to have potential mineral deposits, but their significance cannot be evaluated from available data. MRZ-4 zones are areas where available information is inadequate for assignment to any other MRZ category. The various project sites are mapped by the CGS as MRZ-1, MRZ-3, or MRZ-4 zones (Stinson et al., 1987).

Regulatory Framework

California Building Code

The California Building Code (CBC) has been codified in the California Code of Regulations (CCR) as Title 24, Part 2, which is a portion of the California Building Standards Code. The California Building Standards Commission is responsible for coordinating building standards under Title 24. Under state law, all building standards must be centralized in Title 24 or they are not enforceable. The purpose of the CBC is to provide minimum standards to safeguard property and public welfare by regulating and controlling the design, construction, quality of materials, use and occupancy, location, and maintenance of building and structures within its jurisdiction. The Uniform Building Code (UBC), published by the International Conference of Building Officials, is a widely adopted building code in the United States. The CBC is based on the 1997 UBC, with necessary California amendments. These amendments include significant building design criteria that have been tailored for California earthquake conditions.

The project region is located within Zone 4, one of the four seismic zones designated in the United States. Zone 4 is expected to experience the greatest effects from earthquake groundshaking and therefore has the most stringent requirements for seismic design. The national standards adopted into Title 24 apply to all occupancies in California, except for modifications adopted by state agencies and local governing bodies.

In addition, EBMUD has its own seismic design standards that in some areas can be more conservative than the CBC due to the criticality of providing water service following a seismic event.

Division of Safety of Dams

Since 1929, the State of California has supervised the construction and operation of dams to prevent failure and to safeguard life and property. The California Department of Water Resources, Division of Safety of Dams (DSOD) supervises the construction, enlargement, alteration, repair, maintenance, operation, and removal of dams and reservoirs. The DSOD has jurisdiction over all dams in the state that are not federally owned, that are 25 feet or higher (regardless of storage capacity), and that have a storage capacity of 50 acre-feet of water or greater (regardless of height). Dams that are 6 feet or less in height (regardless of storage capacity) or dams with a storage capacity of 15 acre-feet or less (regardless of height) are not under the jurisdiction of the DSOD.

The DSOD has jurisdiction over the existing Moraga Reservoir, Fay Hill Reservoir, and Leland Reservoir. The circular tanks proposed for the project are not considered to be dams (California Water Code, Section 6004a) and are not under DSOD jurisdiction. None of the proposed reservoirs are expected to meet the criteria for DSOD jurisdiction.

3.4.3 Impacts and Mitigation Measures

Significance Criteria

For the purpose of this EIR and consistent with Appendix G of the CEQA Guidelines, a geologic or seismic impact is considered significant if it would:

- Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:
  - Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault
  - Strong seismic groundshaking
  - Seismic-related ground failure, including liquefaction
  - Landslides
- Result in substantial soil erosion or the loss of topsoil;
- Be located on a geologic unit or soil that is unstable or that would become unstable as a result of the project, and potentially result in onsite or offsite landslide, lateral spreading, subsidence (i.e., settlement), liquefaction, or collapse;
- Be located on expansive soil, as defined in Table 18-1-B of the 1994 Uniform Building Code, creating substantial risks to life or property;
- Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater;
- Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state; or
- Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan.

Based on the proposed construction of the various project elements and the geologic environment in the project area, the proposed WTTIP would not result in impacts related to fault rupture, soil erosion, settlement from tunneling, wastewater disposal, or mineral resources. No impact discussion is provided for these topics for the following reasons:

- *Fault Rupture*. The faults most susceptible to earthquake rupture are active faults, which are faults that have experienced surface displacement within the last 11,000 years. There are no active faults that cross any of the project-level sites, and the nearest project facility to an active fault is at least 0.2 mile away. Therefore, the potential for fault rupture to affect the proposed project elements is very low. Of the program-level projects, the San Pablo Pipeline would cross the active Hayward Fault and is therefore discussed below in the program-level projects discussion.

- *Soil Erosion*. Construction work would incorporate best management practices for erosion control, in accordance with applicable local policies and/or stormwater pollution prevention plan requirements (see Section 3.5, Hydrology and Water Quality). These erosion control measures would reduce the potential for short- or long-term structural damage to fills, foundations, and other engineered structures.

- *Settlement from Tunneling*. The tunnel shafts at either end of the proposed tunnel would extend from 75 to 220 feet deep for the east-end shaft and the west-end shaft, respectively. The entire length of the tunnel would be located within bedrock materials, which would reduce the potential for surface settlement. In addition, interior tunnel supports, successfully used in the nearby Lafayette Tunnel No. 2, installed as tunneling progresses, will reduce the potential for subsidence to affect overlying structures.

- *Corrosivity*. Despite the identification of corrosive soils at some project sites, modern pipeline construction materials and methods include measures to reduce the potential for corrosion to a less-than-significant level.

- *Wastewater Disposal*. None of the project elements require the use of septic or other alternative disposal wastewater systems, and therefore no impact associated with this hazard would result.

- *Mineral Resources*. None of the project elements would alter, destroy, or limit access to any existing significant mineral resources.

Impacts and Mitigation Measures

Table 3.4-5 provides a summary of geologic and seismic impacts by project facility.

Impact 3.4-1: Potential injury and/or damage resulting from unstable slopes.

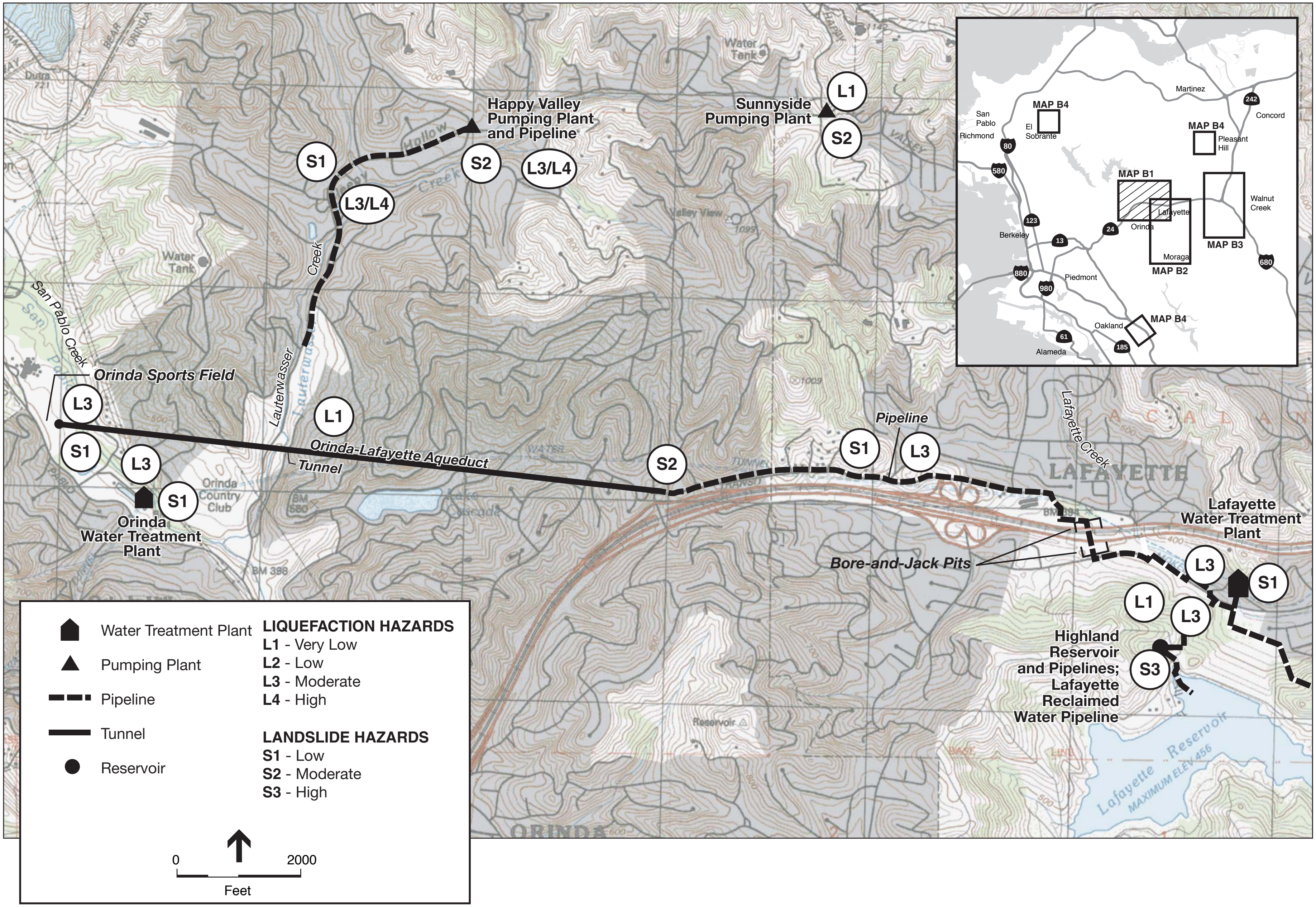
Figures 3.4-2 through 3.4-5 identify a potential slope stability hazard associated with proposed WTTIP project sites evaluated at a project level of detail. The designations shown in the figures (S_1, S_2, and S_3) are based on site-specific reports reviewed by AGS, Inc. and on resources from the Association of Bay Area Governments. Sites with the S_1 designation are considered to have the lowest potential for slope stability hazards, and sites with the S_3 designation are considered to have the highest potential for slope stability hazards because of previously identified slope failures on or near the subject site. WTTIP sites assigned the S_3 designation include the following:

- Walnut Creek WTP
- Highland Reservoir and Pipelines
- Moraga Road Pipeline
- Fay Hill Reservoir

TABLE 3.4-5
SUMMARY OF POTENTIAL PROJECT-LEVEL GEOLOGY, SOILS, AND SEISMICITY IMPACTS

Facility	Impact 3.4-1 Slope Stability	Impact 3.4-2 Ground-shaking	Impact 3.4-3 Expansive Soils	Impact 3.4-4 Liquefaction	Impact 3.4-5 Squeezing Ground
Lafayette WTP					
Alternative 1	LTS	SM	SM	SM	–
Alternative 2	LTS	SM	SM	LTS	–
Orinda WTP					
Alternative 1	LTS	SM	SM	SM	–
Alternative 2	LTS	SM	SM	SM	–
Walnut Creek WTP					
Alternative 1 or 2	SM	SM	SM	LTS	–
Sobrante WTP					
Alternative 1 or 2	SM	SM	SM	LTS	–
Upper San Leandro WTP					
Alternative 1 or 2	LTS	SM	SM	LTS	–
Orinda-Lafayette Aqueduct					
Alternative 2 only	SM	SM	SM	SM	SM
Ardith Reservoir/ Donald Pumping Plant	SM	SM	SM	LTS	–
Fay Hill Pumping Plant and Pipeline Improvements	LTS	SM	SM	LTS	–
Fay Hill Reservoir	SM	SM	SM	LTS	–
Glen Pipeline Improvements	LTS	SM	SM	SM	–
Happy Valley Pumping Plant and Pipeline	SM	SM	SM	SM	–
Highland Reservoir and Pipelines	SM	SM	SM	SM	–
Lafayette Reclaimed Water Pipeline	SM	SM	SM	SM	--
Leland Isolation Pipeline and Bypass Valves	LTS	SM	SM	SM	--
Moraga Reservoir	SM	SM	SM	LTS	–
Moraga Road Pipeline	SM	SM	SM	SM	–
Sunnyside Pumping Plant	SM	SM	SM	LTS	–
Tice Pumping Plant and Pipeline	SM	SM	SM	SM	–
Withers Pumping Plant	SM	SM	SM	LTS	–

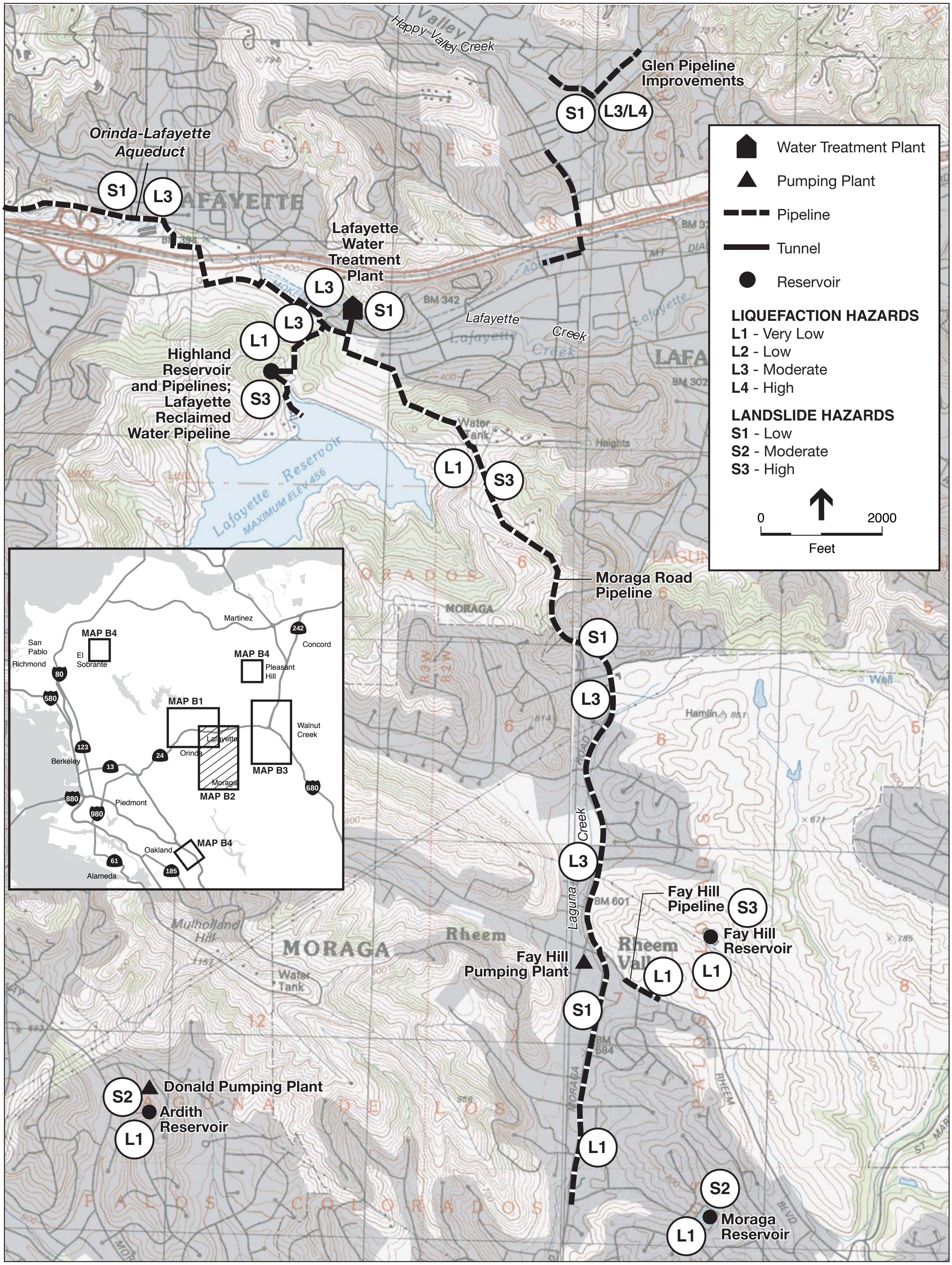
SM = Significant Impact, Can Be Mitigated
SU = Significant Impact, Unavoidable
LTS = Less-Than-Significant Impact
– = No Impact



SOURCE: USGS; ESA

EBMUD Water Treatment and Transmission Improvements Program . 204369

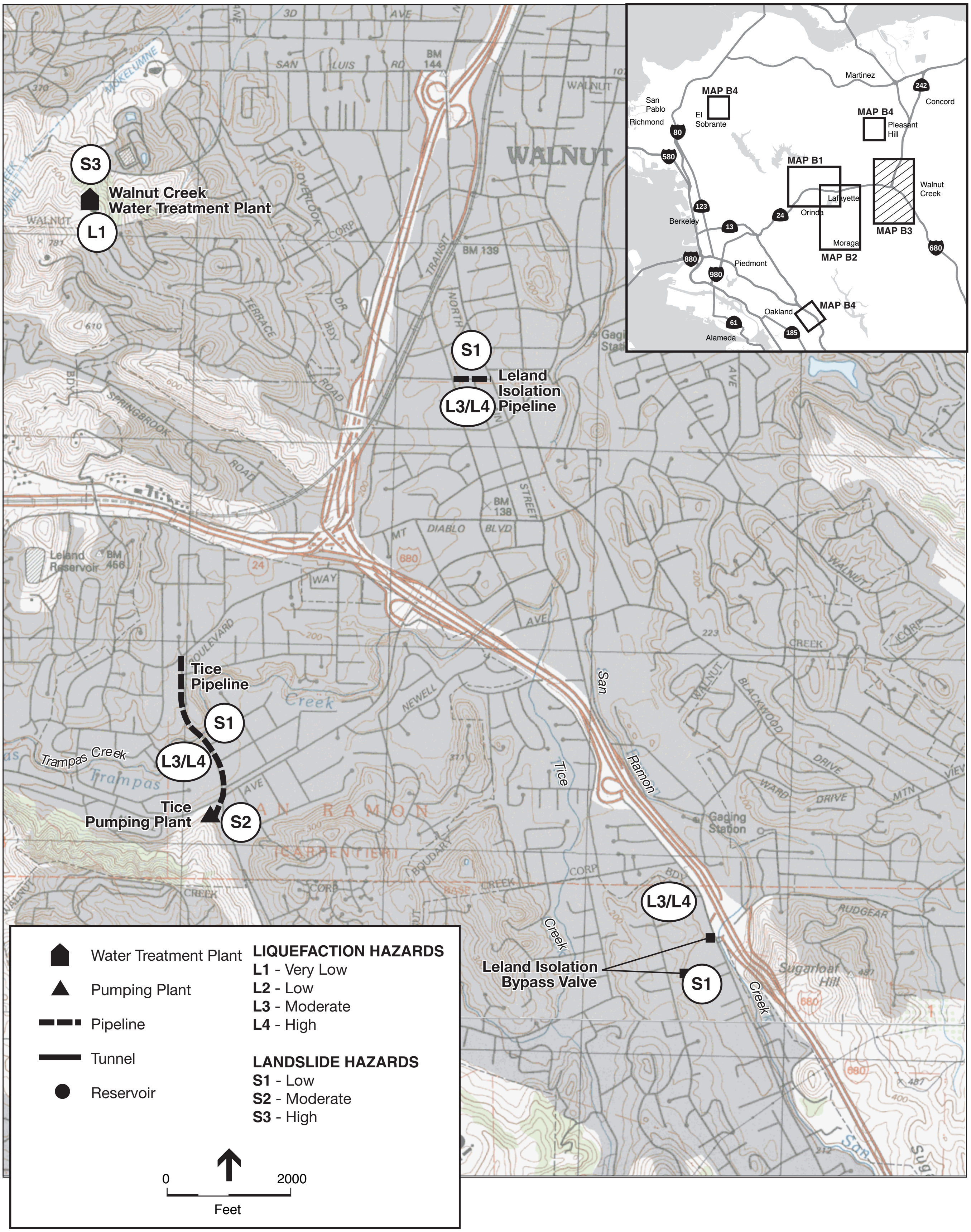
Figure 3.4-2
Potential Geologic Hazard Locations



SOURCE: USGS; ESA

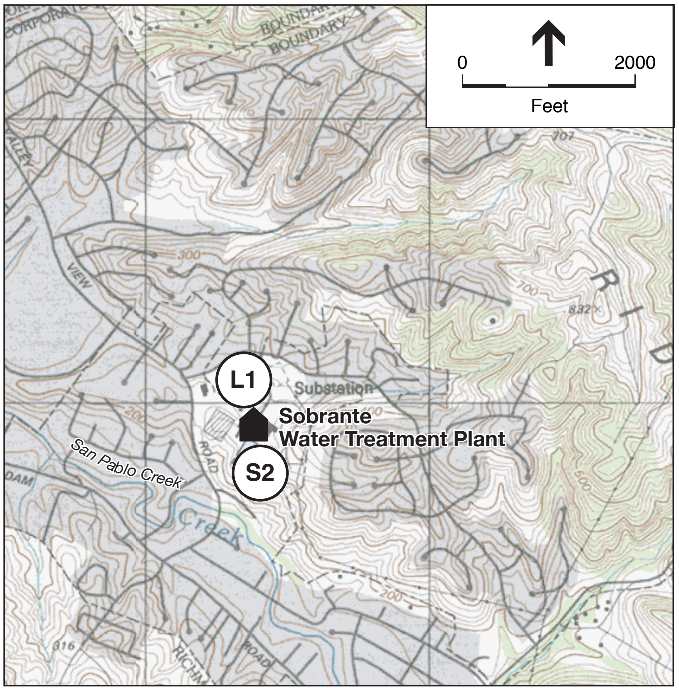
EBMUD Water Treatment and Transmission Improvements Program . 204369

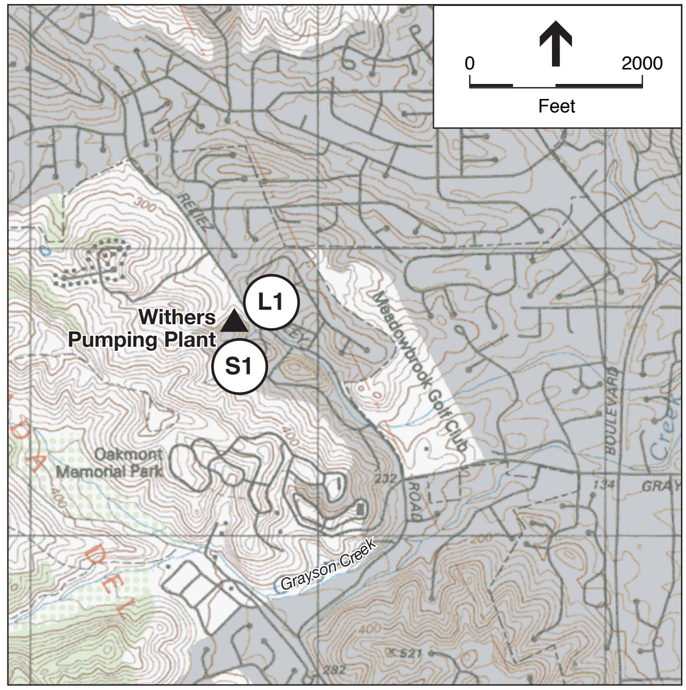
Figure 3.4-3
Potential Geologic Hazard Locations

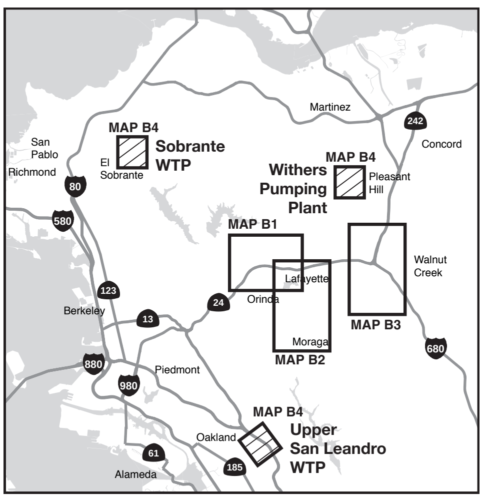


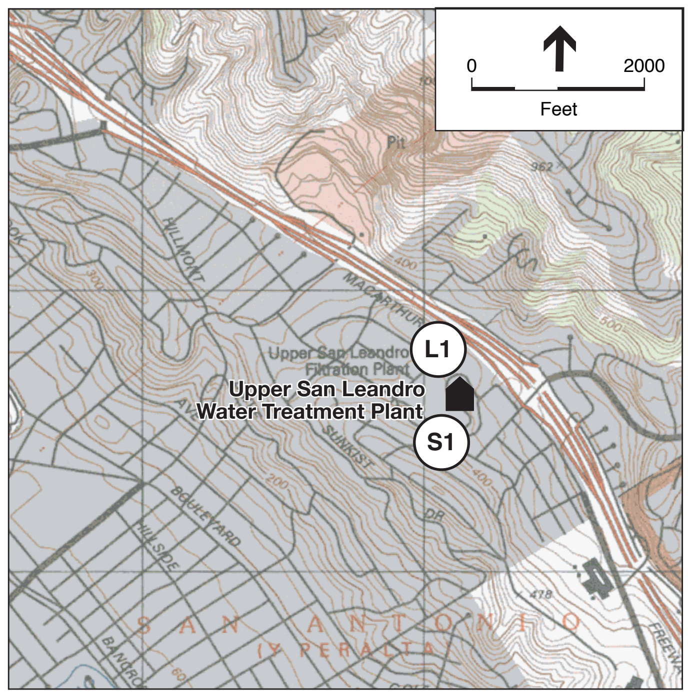
SOURCE: USGS; ESA

Figure 3.4-4
Potential Geologic Hazard Locations









Water Treatment Plant

Pumping Plant

LIQUEFACTION HAZARDS
L1 - Very Low
L2 - Low
L3 - Moderate
L4 - High

LANDSLIDE HAZARDS
S1 - Low
S2 - Moderate
S3 - High

SOURCE: USGS; ESA

EBMUD Water Treatment and Transmission Improvements Program . 204369

Figure 3.4-5
Potential Geologic Hazard Locations

Lafayette WTP – Alternative 1 or 2

The Lafayette WTP site has been previously graded for development and is relatively level. The majority of the proposed project elements would be located in the previously developed area or in an area that would not present a hazard associated with unstable slopes (also see the discussion under the Lafayette Reclaimed Water Pipeline, below). Therefore, the potential impact at this site would be less than significant.

Orinda WTP – Alternative 1 or 2

The Orinda WTP site has been previously graded for development and is relatively level. The proposed project elements would be located in the previously developed area or in an area that would not present a hazard associated with unstable slopes. Therefore, the potential impact at this site would be less than significant.

Walnut Creek WTP – Alternative 1 or 2

The Walnut Creek WTP is located near a ridgeline in an area of relatively steep terrain. Recent geotechnical studies identified unstable slopes in this area and recommended mitigation measures that were incorporated into the design of improvements currently being completed at the WTP. The proposed new filters would be located within the developed portion of the WTP by the operations building in an area with a low potential for slope instability. The proposed Leland Pumping Plant No. 2 would be located towards the northern end of the WTP where the slopes become greater. With implementation of Measure 3.4-1, below, the potential impact associated with unstable slopes would be less than significant.

Sobrante WTP – Alternative 1 or 2

The Sobrante WTP is located in a relatively level area, with the exception of the parcel situated west of Valley View Drive. The proposed backwash water equalization basins and sedimentation units would be sited at this location, where the relatively steep slopes are showing signs of soil instability (e.g., failure of an asphalt walkway). As part of the project, EBMUD would convert the existing basins into equalization basins and install a new basin and new sedimentation units to the south. With implementation of Measure 3.4-1, below, the potential impact associated with unstable slopes would be less than significant.

Upper San Leandro WTP – Alternative 1 or 2

The topography of the Upper San Leandro WTP is characterized by gentle slopes. The proposed project elements would be located in the previously developed area or in an area that would not present a hazard associated with unstable slopes. Therefore, the potential impact at this site would be less than significant.

Orinda-Lafayette Aqueduct – Alternative 2

The only near-surface features of the tunnel would be the two vertical shafts installed for entry and exit purposes during construction. The tunnel itself would be located sufficiently deep into the bedrock (between 75 feet and 400 feet, see Map D-OLA-4 for profile) and would not present a potential hazard due to slope instability. The pipeline alignments at either end of the tunnel shafts would generally be located in gently sloping areas and would not be subject to slope stability hazards. The west shaft would be located in a relatively level area that would also not be susceptible to unstable slopes. The east shaft would be located in a moderately sloping area. In consideration of the above and with implementation of Measure 3.4-1, the potential impact would be less than significant.

Ardith Reservoir and Donald Pumping Plant

The Ardith Reservoir site is located on moderate to steep topography that could potentially be susceptible to slope instability. A previous geotechnical investigation for this site (formerly referred to as the Moraga Reservoir site), indicated that there was evidence of shallow surface soil slides on the eastern slope of the site (Marliave, 1955). Although the existing Donald Pumping Plant is located in an area of level terrain, the project would relocate the plant to the downhill (western) side of the site, which would require measures to ensure slope stability. With implementation of Measure 3.4-1, the potential impact would be less than significant.

Fay Hill Pumping Plant and Pipeline Improvements

The Fay Hill Pumping Plant site is located within a relatively level area adjacent to a roadway. The potential impact due to slope instability at this site would be less than significant.

Fay Hill Reservoir

As with the Walnut Creek WTP, the Fay Hill Reservoir is located in an area of relatively steep terrain with previously identified unstable slopes. Slope stabilization improvements have been implemented to the north of the existing reservoir. Previous geotechnical reports indicate that landslides have affected only shallow soils, because the bedrock is found at shallow depths (AGS, Inc., 2005). With implementation of Measure 3.4-1, the potential impact due to slope instability would be less than significant.

Glen Pipeline Improvements

The proposed pipeline improvements would not be located in any areas of unstable slopes. Therefore, the potential impact would be less than significant.

Happy Valley Pumping Plant and Pipeline

The proposed location of the Happy Valley Pumping Plant is near the convergence of two surface water drainages. The topography is nearly level at the proposed plant location and becomes moderately steep toward the drainages. Evidence of soil instability was observed along the southern end of the property, adjacent to the creek.

Along the proposed pipeline route, numerous small landslides along Lombardy Lane and Miner Road have affected the adjacent slopes; however, the pipeline would be buried within the roadway and would not be affected by these deposits (AGS, Inc., 2005). With implementation of Measure 3.4-1, the potential impact due to slope instability would be less than significant.

Highland Reservoir and Pipelines

The topography at the Highland Reservoir site consists of a moderate slope at the crest of an eastward-facing ridge, with moderate to steep slopes in unpaved areas along the pipeline alignment. The proposed access road to the reservoir site is moderate to very steep in inclination. Landslides have been identified on the northern and southern slopes of the ridgeline. One of the previously identified landslides coincides with the location of the proposed access road; however, none of the landslides are within 300 feet of the proposed reservoir site or overflow pipeline, or within 100 feet of the joint pipe alignment (EBMUD, 2006). Colluvial deposits have been identified along the roadway to the southeast of the reservoir site along the proposed pipeline alignment.[8] There is evidence of some bank failure at the Lafayette Creek crossing of the proposed Highland Reservoir Pipelines; however, any support structures for the pipeline would be located at a sufficient distance away from the edge of the stream bank. With implementation of Measure 3.4-1, the potential impact due to slope instability would be less than significant.

Lafayette Reclaimed Water Pipeline

Similar to the Highland Reservoir Pipelines, there is evidence of some bank failure at the Lafayette Creek crossing of the proposed Lafayette Reclaimed Water Pipeline; however, any support structures for the pipeline would be located sufficiently away from the creekbank edge[9]. As discussed above for the Highland Reservoir, there are known landslides in the upland areas of the pipeline alignment. With implementation of Measure 3.4-1, the potential impact due to slope instability would be less than significant.

Leland Isolation Pipeline and Bypass Valves

The Leland Isolation Pipeline alignment would be located in relatively level areas within existing roadways. Therefore, the potential impact due to slope instability at this site would be less than significant.

Moraga Reservoir

The topography at the Moraga Reservoir site consists of moderate slopes that have been altered by grading and fill associated with the original construction of the reservoir. Previous studies identified shallow landsliding to the northwest and east. The EBMUD *Seismic Stability Evaluation Report, Moraga Reservoir Dam* (2003) did not identify areas of slope instability in the immediate area, other than minor areas of soil cracking attributed to expansive clay soils. Two trenches excavated for the seismic evaluation did not indicate that landslides are affecting the immediate vicinity of the reservoir. The proposed replacement reservoir tank would be located

[8] Colluvial deposits refer to loose, heterogeneous, and incoherent masses of soil material deposited by rainwash, sheetwash, or slow continuous downslope creep at the base of gentle slopes or hillsides.

[9] The proposed pipeline would cross above Lafayette Creek from the WTP before entering a trench the remainder of the length to the Lafayette Reservoir.

entirely within the footprint of the existing open-cut reservoir, with a valve pit structure located on the hillside southwest of the proposed tank. With implementation of Measure 3.4-1, the potential impact due to slope instability would be less than significant.

Moraga Road Pipeline

The topography along the proposed Moraga Road Pipeline alignment consists of gentle slopes in the vicinity of the Lafayette WTP to the north and along Moraga Road to the south. The slopes become moderately steep in the central portion as the alignment passes through the Lafayette Reservoir Recreation Area. Previous studies have identified numerous areas of landslide deposits along the pipeline alignment between Lafayette Reservoir and Moraga Road (AGS, Inc., 2005). Numerous small landslide deposits along the upper narrow portion of Moraga Road have affected the adjacent slopes; however, the southern portion of the pipeline would be buried within the roadway and would not be affected by these shallow soil deposits. With implementation of Measure 3.4-1, the potential impact due to slope instability would be less than significant.

Sunnyside Pumping Plant

The proposed Sunnyside Pumping Plant site is located near the crest of a hillside that moderately slopes towards the southeast. The proposed location is currently used for grazing and has little established vegetation. Although there are no known landslides at the proposed pumping plant site, other slides have been mapped in the immediate area (URS, 1999). With implementation of Measure 3.4-1, the potential impact due to slope instability would be less than significant.

Tice Pumping Plant and Pipeline

The proposed Tice Pumping Plant site is located at the foot of a moderate- to steep-sloping hillside. There is evidence of soil instability along this hillside. With implementation of Measure 3.4-1, the potential impact due to slope instability would be less than significant.

Withers Pumping Plant

The topography at the Withers Pumping Plant site consists of a moderately sloping hillside adjacent to the existing Grayson Reservoir. Regional planning maps indicate that the site has a slope stability rating of generally stable, and no landslides were identified at the site (AGS, Inc., 2005). However, the proposed construction on this slope could potentially increase instability. With implementation of Measure 3.4-1, the potential impact due to slope instability would be less than significant.

Mitigation Measure

> **Measure 3.4-1:** During the design phase for all WTTIP project components that require ground-breaking activities (excluding pipelines), the District will perform site-specific design-level geotechnical evaluations to identify adverse slope instability conditions and provide recommendations to reduce and eliminate potential slope hazards in the final design and if necessary, throughout construction. For all pipelines located in landslide hazard areas, appropriate piping material with the ability to deform without rupture (e.g.

ductile steel) will be used. For large diameter pipes (greater than 12 inches diameter) located in high landslide hazard areas, a geotechnical evaluation will be conducted. The geotechnical evaluations will include detailed slope stability evaluations, which could include a review of aerial photographs, field reconnaissance, soil testing, and slope stability modeling. Slope stability evaluations would be completed for the Fay Hill Reservoir, Walnut Creek WTP, Sobrante WTP, Ardith Reservoir/Donald Pumping Plant, Happy Valley Pumping Plant, Highland Reservoir, Lafayette Reclaimed Water Pipeline, Moraga Reservoir, Moraga Road Pipeline, Sunnyside Pumping Plant, Tice Pumping Plant, and Withers Pumping Plant. Facilities design and construction will incorporate the slope stability recommendations contained in the geotechnical analysis. Slope stabilization measures may include the following:

- Appropriate slope inclination (not steeper than 2 horizontal to 1 vertical)
- Slope terracing
- Fill compaction
- Soil reinforcement
- Surface and subsurface drainage facilities
- Engineered retaining walls
- Buttresses
- Erosion control measures

Mitigation measures included in the geotechnical report will be incorporated into the project construction specifications and become part of the project.

Impact 3.4-2: Facility damage or service interruptions resulting from strong groundshaking.

Groundshaking is an unavoidable hazard for structures and associated infrastructure within the entire project region. Project-related improvements would likely experience at least one major earthquake (greater than M 6.7) sometime during the operational lifetime of the project components (USGS, 2003). Most structures, including buried pipelines, clearwells, pumping plants, and associated appurtenances, are subject to damage from earthquakes. In comparison to above-ground structures, underground pipelines and buried clearwells are generally less susceptible to damage from strong groundshaking because they are imbedded in compacted backfill that can tolerate more seismic wave motion. The degree of hazard depends on the geologic conditions of each site, construction materials, and construction quality. The intensity of such an event depends on the causative fault and the distance to the epicenter, the moment magnitude, and the duration of shaking. The 1989 Loma Prieta earthquake reportedly caused more than 60 water pipeline breaks in Santa Cruz, the nearest urbanized area to the epicenter (CDMG, 1990). As a result, EBMUD initiated a seismic evaluation program to identify seismic safety concerns of the water system and develop facility improvements throughout the system. As a result of the seismic evaluation program, EBMUD has reduced the overall susceptibility to significant damage from a major earthquake. According to the California Division of Mines and Geology (now the CGS), a major earthquake on the Hayward Fault would likely damage EBMUD facilities throughout the district, but it is unlikely that the entire system would be incapacitated (CDMG, 1987). Modern standard engineering and construction practices include design criteria to mitigate potential damage from an earthquake, and any potential interruption of service would likely be temporary in nature. With implementation of the measure identified below, this impact would be reduced to a less-than-significant level.

Mitigation Measure

> **Measure 3.4-2:** During the design phase for all WTTIP project components that require ground-breaking activities (excluding pipelines), the District will perform site-specific, design-level geotechnical evaluations to identify potential secondary ground failure hazards (i.e., seismically-induced settlement) associated with the expected level of seismic ground shaking. The geotechnical analysis would provide recommendations to mitigate those hazards in the final design and, if necessary during construction. The site-specific design-level geotechnical evaluations, based on the site conditions and location and professional opinion of the geotechnical engineer, could include subsurface drilling, soil testing, and analysis of site seismic response. The geotechnical engineer would review the seismic design criteria of facilities to ensure that facilities are designed to withstand the highest expected peak acceleration, set forth by the CBC for each site. Recommendations resulting from findings of the geotechnical study will be incorporated into the design and construction of proposed facilities. Design and construction for buildings will be performed in accordance with the District's seismic design standards, which meet and/or exceed design standards for Seismic Zone 4 of the Uniform Building Code.

Impact 3.4-3: Facility damage resulting from settlement or uplift caused by expansive or compressible soils.

Proposed project elements could be damaged due to settlement of weak or saturated subsurface soils. Underlying soils at the proposed project sites may also have a high potential for expansion. The "shrink-swell"[10] capacity of expansive soils can cause damage to foundations and pipelines. Many of the project sites have been previously studied and developed and the underlying soils replaced with engineered fill. However, whether a previous geotechnical evaluation needs minor updating or the site requires initial analysis, implementation of the measures identified below would reduce the potential hazard to a less-than-significant level.

Mitigation Measures

> **Measure 3.4-3a:** During the design phase for all WTTIP project components that require ground-breaking activities (excluding pipelines), the District will perform site-specific design-level geotechnical evaluations to identify geologic hazards and provide recommendations to mitigate those hazards in the final design and during construction. The geotechnical evaluations will include site-specific investigations, which may include, if necessary, soil sampling and testing to determine the presence and characteristics of potentially compressible soils, the engineering properties of the proposed foundation material, the depth and thickness of soil layers, and the depth to groundwater. The findings of the investigations would formulate adequate measures to correct adverse soil conditions

10 "Shrink-swell" refers to the cyclical expansion and contraction that occurs in fine-grained clay sediments from wetting and drying.

that result in ground settlement or uplift due to ground swelling. Feasible mitigation measures, as listed below, are standard engineering practice and are common engineering design strategies used to overcome problematic soil conditions.

- Removal and replacement of problematic topsoil
- Installation of deep foundations (i.e., piles, drilled piers)
- Deep mixing of compressible or expansive soils with stabilizing agents

Mitigation measures included in the geotechnical evaluations will be incorporated into the project design specifications and would become part of the project.

Measure 3.4-3b: The District will include in the contract specifications that any fill will be selected, placed, compacted, and inspected in accordance with plans and specifications prepared by a licensed professional engineer.

Impact 3.4-4: Potential facility damage resulting from a major earthquake in areas susceptible to liquefaction.

The following analysis of liquefaction potential relies on conclusions presented in the geotechnical impact assessment performed by AGS, Inc. (2005). AGS, Inc. based its assessment of liquefaction potential on a review of available geotechnical studies for various project sites as well as information from the Association of Bay Area Governments regarding liquefaction potential. In addition, this information was also compared to liquefaction susceptibility mapping that was compiled by the US Geological Survey in combination with the California Geological Survey (USGS, 2006)

Figures 3.4-2 through 3.4-5 identify a potential liquefaction hazard associated with proposed WTTIP project sites evaluated at a project-level of detail. The designations (L_1, L_2, L_3 and L_4) are based on resources from the Association of Bay Area Governments. Sites with the L_1 designation are considered to have the lowest potential for liquefaction hazards, and sites with the L_4 designation are considered to have the highest potential for liquefaction because of soil types and probable groundwater depths. Sites assigned the L_4 designation include the following:

- Happy Valley Pumping Plant
- Glen Pipeline Improvements
- Leland Isolation Pipeline
- Tice Pumping Plant

Lafayette WTP

Alternative 1

The Lafayette WTP is underlain by alluvium. Alluvial soils are considered to have a moderate liquefaction potential. The foundations of the proposed clearwells nos. 1 and 2 would be constructed in consolidated sedimentary rock, as would foundations for the new Leland and Bryant Pumping Plants; therefore, these structures are considered to have very low potential for liquefaction (AGS, Inc., 2005). For other structures with shallow foundations, implementation of Measures 3.4-4, identified below, would reduce this impact to a less-than-significant level.

Alternative 2

Under Alternative 2, the Lafayette WTP would receive improvements within an existing building constructed on soils with a moderate liquefaction potential. However, the building was designed and built according to standards that would minimize the potential damage from liquefaction.

Orinda WTP

Alternative 1

The Orinda WTP is underlain by alluvium; however, the foundations of the proposed clearwells, pumping plants, and sedimentation basins would be constructed in consolidated sedimentary rock, which has a very low potential for liquefaction (AGS, Inc., 2005). For other structures with shallow foundations, implementation of Measure 3.4-4, identified below, would reduce this impact to a less-than-significant level.

Alternative 2

As stated above, the Orinda WTP is underlain by alluvium which has a moderate liquefaction potential for structures with shallow foundations. With implementation of Measure 3.4-4, identified below, this impact would be reduced to a less-than-significant level.

Walnut Creek WTP – Alternative 1 or 2

The Walnut Creek WTP is underlain by bedrock, and the liquefaction potential is considered to be very low. Therefore, the potential impact related to liquefaction would be less than significant.

Sobrante WTP – Alternative 1 or 2

Consolidated sedimentary rocks underlie the Sobrante WTP. Based on site conditions, including the depth of groundwater, this site is considered to have a very low potential for liquefaction (AGS, Inc., 2005). Therefore, the potential impact would be less than significant.

Upper San Leandro WTP – Alternative 1 or 2

Crystalline volcanic rocks underlie the Upper San Leandro WTP. Based on site conditions, including the depth of groundwater, this site is considered to have a very low potential for liquefaction (AGS, Inc., 2005). Therefore, the potential impact would be less than significant.

Orinda-Lafayette Aqueduct – Alternative 2

The trenched segment of the Orinda-Lafayette Aqueduct alignment is partially underlain by alluvium and is considered to be potentially liquefiable (AGS, Inc., 2005). With implementation of Measure 3.4-4, this impact would be reduced to a less-than-significant level.

Ardith Reservoir and Donald Pumping Plant

Consolidated sedimentary rocks underlie the Ardith Reservoir and Donald Pumping Plant site. Based on geology and depth of groundwater, this site is considered to have a very low potential for liquefaction (AGS, Inc., 2005). Therefore, the potential impact would be less than significant.

Fay Hill Pumping Plant and Pipeline Improvements

Both the Fay Hill Pumping Plant site and the pipeline alignment are underlain by unconsolidated alluvium. However, the pipeline improvements would be located within the existing roadway. Based on the site conditions, including the depth of groundwater, these sites are considered to have a very low potential for liquefaction (AGS, Inc., 2005). Therefore, the potential impact would be less than significant.

Fay Hill Reservoir

Consolidated sedimentary rocks underlie the Fay Hill Reservoir site. Based on geology and depth of groundwater, this site is considered to have a very low potential for liquefaction (AGS, Inc., 2005). Therefore, the potential impact would be less than significant.

Glen Pipeline Improvements

Alluvium underlies the length of the Glen Pipeline Improvements, and the entire alignment is considered to have moderate to high liquefaction potential (AGS, Inc., 2005). With implementation of Measure 3.4-4, this impact would be reduced to a less-than-significant level.

Happy Valley Pumping Plant and Pipeline

Alluvium underlies the pumping plant site and the entire length of the pipeline alignment. Based on site conditions, including the depth of groundwater, the alignment is considered to have a moderate to high liquefaction potential (AGS, Inc., 2005). With implementation of Measure 3.4-4, this impact would be reduced to a less-than-significant level.

Highland Reservoir and Pipelines

Consolidated sedimentary rocks underlie the proposed reservoir site and the higher portion of the pipeline alignment (generally covering the alignment south of Mt. Diablo Boulevard). The lower portion of the pipeline alignment, extending from northeast of the proposed reservoir site to the Lafayette WTP, is underlain by unconsolidated alluvium and some shallow landslide deposits. Based on these site conditions, including the depth of groundwater, the portion of the pipeline alignment underlain by alluvium in the vicinity of the Lafayette WTP is considered to have a moderate liquefaction potential (AGS, Inc., 2005). With implementation of Measure 3.4-4, this impact would be reduced to a less-than-significant level.

Lafayette Reclaimed Water Pipeline

Consolidated sedimentary rocks underlie the proposed reservoir site and the higher portion of the pipeline alignment (generally covering the alignment south of Mt. Diablo Boulevard). The lower portion of the pipeline alignment is underlain by unconsolidated alluvium and some shallow landslide deposits. Based on these site conditions, including the depth of groundwater, the portion of the pipeline alignment underlain by alluvium in the vicinity of the Lafayette WTP is considered to have a moderate liquefaction potential (AGS, Inc., 2005). With implementation of Measure 3.4-4, this impact would be reduced to a less-than-significant level.

Leland Isolation Pipeline and Bypass Valves

The Leland Isolation Pipeline and Bypass Valve sites are underlain by unconsolidated alluvium and are considered to have a moderate to high liquefaction potential (AGS, Inc., 2005). With implementation of Measure 3.4-4, this impact would be reduced to a less-than-significant level.

Moraga Reservoir

Consolidated sedimentary rocks underlie the Moraga Reservoir site. Based on site conditions, the depth of groundwater, and the seismic stability evaluation performed at this site, there is a very low potential for liquefaction (AGS, Inc., 2005). Therefore, the potential impact would be less than significant.

Moraga Road Pipeline

Consolidated sedimentary rocks underlie a majority of the pipeline alignment, except in the immediate vicinity of the Lafayette WTP and along Moraga Road south of Campolindo Drive where the alignment is underlain by alluvium. Based on site conditions, including the depth of groundwater, the portions of the pipeline alignment underlain by alluvium are considered to have a moderate liquefaction potential (AGS, Inc., 2005). The central portion of the pipeline alignment is underlain by consolidated rocks that are considered to have a very low liquefaction potential (AGS, Inc., 2005). With implementation of Measure 3.4-4, this impact would be reduced to a less-than-significant level.

Sunnyside Pumping Plant

Consolidated sedimentary rocks underlie the Sunnyside Pumping Plant and pipeline site. Based on site conditions, including the depth of groundwater, this site is considered to have a very low potential for liquefaction (AGS, Inc., 2005). Therefore, the potential impact would be less than significant.

Tice Pumping Plant and Pipeline

The Tice Pumping Plant and Pipeline sites are underlain by alluvium between Olympic Boulevard and Las Trampas Creek; this area is considered to have a moderate to high liquefaction potential (AGS, Inc., 2005). With implementation of Measure 3.4-4, this impact would be reduced to a less-than-significant level.

Withers Pumping Plant

Consolidated sedimentary rocks underlie the Withers Pumping Plant site. Based on geology and depth of groundwater, this site is considered to have a very low potential for liquefaction (AGS, Inc., 2005). Therefore, the potential impact would be less than significant.

Mitigation Measure

Measure 3.4-4: During the design phase for all WTTIP project components that require ground-breaking activities (excluding pipelines), the District will perform site-specific design-level geotechnical evaluations to identify geologic hazards and provide recommendations to mitigate those hazards in the final design and during construction. The design-level geotechnical evaluations will include the collection of subsurface data for determining liquefaction potential. When site-specific testing indicates that conditions are present that could result in significant liquefaction and damage to project facilities, appropriate feasible measures will be developed and incorporated into the project design. For all pipelines located in liquefaction hazard areas, appropriate piping material with the ability to deform without rupture (e.g. ductile steel) will be used. For large diameter pipes (greater than 12 inches diameter) located in high liquefaction hazard areas, a geotechnical evaluation will be conducted. The performance standard to be used in the geotechnical evaluations for mitigating liquefaction hazards will be minimization of the hazards. Measures to minimize significant liquefaction hazards could include the following, unless the site-specific soils analyses dictate otherwise:

- Densification or dewatering of surface or subsurface soils
- Construction of pile or pier foundations to support pipelines and/or buildings
- Removal of material that could undergo liquefaction in the event of an earthquake, and replacement with stable material

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Impact 3.4-5: The effects of squeezing ground during tunnel construction, which could damage interior supports.

Orinda-Lafayette Tunnel – Alternative 2

Tunnel engineers confronted squeezing ground in the existing Lafayette Tunnels No. 1 and No. 2 as well as in two BART tunnels located in the Orinda/Berkeley region. Based on this previous experience of the geologic materials in the region, the onset of squeezing ground could occur days to years after excavation (Jacobs Associates, 2005). Repairs to Tunnel No. 1 were made 10 years after construction. Approximately 5 percent of the total length of Tunnel No. 2 is estimated to be affected by squeezing ground (Jacobs Associates, 2005).

Squeezing ground is a common construction challenge for tunnel projects, especially in heavily deformed materials such as those expected during the excavation of the proposed tunnel. Although the effects of squeezing ground can damage a tunnel's interior support structure and sometimes injure workers, there are remedies that can reduce the potential for this phenomenon to compromise the structural integrity of the tunnel structure. Although squeezing ground could become an issue during or after the construction of the tunnel, implementation of the following mitigation measure would reduce this impact to a less-than-significant level.

Mitigation Measure

> **Measure 3.4-5:** The contractor will monitor for squeezing ground through the use of tunnel convergence reference points. The tunnel excavation will be reinforced throughout by either steel rib-type supports and blocking or a precast concrete segmental lining system. For a steel rib-type support system, support spacing will decrease in less competent materials. Immediate face, roof, and sidewall support will likely be required for stability in squeezing ground. The need for immediate support will require the application of active support elements and/or the use of pre-excavation support, especially at the crown (top) of the tunnel. Shotcrete will be used to strengthen sidewalls and faces when the tunnel excavation is not advanced within about a day.

Table 3.10-6 provides a summary of the applicable mitigation measures discussed above.

Program-Level Elements

Lafayette WTP

As stated above, the Lafayette WTP is located on relatively level terrain within an alluvial valley that has a moderate potential for liquefaction. Under Alternative 1, several treatment improvements could be constructed at the WTP. As described above for the project-level elements, new structures at the Lafayette WTP could be susceptible to the effects of groundshaking, underlying soil properties (i.e., expansive soils), and liquefaction. With implementation of mitigation measures similar to Measures 3.4-2, 3.4-3a, 3.4-3b, and 3.4-4, the potential impacts from these geologic hazards would be less than significant.

Orinda WTP

Proposed program-level improvements at the Orinda WTP include construction of treatment facilities such as a large (350 feet in diameter) underground clearwell. The Orinda WTP is located on relatively level terrain within an alluvial valley that has a moderate potential for liquefaction. Therefore, future improvements at the Orinda WTP could be susceptible to the effects of liquefaction, groundshaking, and underlying soil properties (i.e., expansive soils). Facilities such as the underground clearwell would be less susceptible to the effects of liquefaction because its foundation would likely be located beneath liquefiable layers; however, other improvements with shallow foundations would be more susceptible. With implementation of mitigation measures similar to Measures 3.4-2, 3.4-3a, 3.4-3b, and 3.4-4, the potential impacts from these geologic hazards would be less than significant.

TABLE 3.4-6
SUMMARY OF APPLICABLE MITIGATION MEASURES – IMPACTS 3.4-1 THROUGH 3.4-5

Facility	Measure 3.4-1 Slope Stability Evaluations	Measure 3.4-2 Subsurface Exploration/ Review of Seismic Design Criteria	Measure 3.4-3a Reduce Settlement or Uplift	Measure 3.4-3b Fill will be in Accordance with Geotechnical Engineer Plans	Measure 3.4-4 Minimize Significant Liquefaction	Measure 3.4-5 Monitor for Squeezing
Lafayette WTP						
Alternative 1	–	✓	✓	✓	✓	–
Alternative 2	–	✓	✓	✓	–	–
Orinda WTP						
Alternative 1	–	✓	✓	✓	✓	–
Alternative 2	–	✓	✓	✓	✓	–
Orinda-Lafayette Aqueduct						
Alternative 2	–	✓	✓	✓	✓	✓
Walnut Creek WTP						
Alternative 1 or 2	✓	✓	✓	✓	–	–
Sobrante WTP						
Alternative 1 or 2	✓	✓	✓	✓	–	–
Upper San Leandro WTP						
Alternative 1 or 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	✓	✓	✓	–	–	–

✓ = Applicable Impact
– = No Impact

Walnut Creek WTP

The Walnut Creek WTP is located along the ridge top surrounded by relatively steep topography. Under both Alternative 1 and 2, several treatment improvements could be constructed at the WTP. As described above for the project-level elements, new structures at the Walnut Creek WTP could be susceptible to the effects of slope instability, groundshaking, and underlying soil properties (i.e., expansive soils). The potential for liquefaction, however, is very low at the Walnut Creek WTP. With implementation of mitigation measures similar to Measures 3.4-1, 3.4-2, 3.4-3a, and 3.4-3b, the potential impacts from these geologic hazards would be less than significant.

Leland Reservoir Replacement

With its hilltop location, the Leland Reservoir site is likely to have a low potential for liquefaction, but could be subject to slope instability. The DSOD has determined that the embankment could become unstable during an earthquake. Therefore, replacement of the reservoir with tanks engineered to current standards would be a beneficial impact. However, proposed facilities at this site could still be susceptible to the effects of slope instability and underlying soil properties (i.e., expansive soils). With implementation of mitigation measures similar to Measures 3.4-1, 3.4-3a, and 3.4-3b, the potential impacts from these geologic hazards would be less than significant.

New Leland Pressure Zone Reservoir and Pipeline

The topography at the New Leland Pressure Zone Reservoir consists of nearly level areas west of I-680, and moderate to steep slopes east of I-680 along the pipeline alignment approaching the reservoir site on Sugarloaf Hill. Adjacent slopes have been cut into the sandstone bedrock and benched at approximately 20-foot intervals. With implementation of Measure 3.4-1, the potential impact due to slope instability would be less than significant.

Consolidated sedimentary rocks underlie the New Leland Pressure Zone Reservoir site and a portion of the pipeline alignment. The remainder of the pipeline alignment is underlain by alluvium and is considered to have a moderate to high liquefaction potential (AGS, Inc., 2005). With implementation of Measure 3.4-4, this impact would be reduced to a less-than-significant level.

St. Mary's Road/Rohrer Drive Pipeline

Upgrading the size of the existing pipeline under this project would be an overall beneficial impact with regard to potential geologic hazards. The new pipeline would be designed, constructed, and engineered according to current standards and would provide an improvement in structural integrity. Although still susceptible to the effects of groundshaking, an unavoidable impact, the new pipeline would likely perform better than the existing pipeline. With implementation of a mitigation measure similar to Measures 3.4-2, the potential impacts from any identified geologic hazards would be less than significant.

San Pablo Pipeline

The proposed pipeline would be located along the shoreline of the San Pablo Reservoir up to the San Pablo Tunnel, where the existing tunnel would be converted for use to convey the treated water. Near the reservoir, the groundwater is likely to be relatively shallow, resulting in the potential for liquefaction along this route. In addition, the pipeline could be susceptible to the effects of slope instability (if located at the base of a steep slope) as well as underlying soil properties (i.e., expansive soils) throughout the alignment.

The pipeline would consist of a steel pipe placed within the existing tunnel. The existing tunnel, which crosses the active Hayward Fault, could potentially be damaged from fault rupture. However, the proposed pipeline would be used for backup purposes only. Consequently, failure of the pipeline due to fault rupture would not disrupt water service.

With implementation of mitigation measures similar to Measures 3.4-1, 3.4-2, 3.4-3a, 3.4-3b, and 3.4-4, the potential impacts from these geologic hazards would be less than significant.

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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

	Code Section		
Municipality	**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.

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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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3.6 Biological Resources

3.6.1 Approach to Analysis

This section describes the existing biological resources in and near WTTIP project sites and evaluates project-related impacts on those resources. Information used in the preparation of this section was obtained from the following resources:

- Reconnaissance-level surveys
- Records from the California Natural Diversity Database (CDFG, 2005)
- Biological literature of the region (EBMUD, 1994; CDFG, 2003; Hickman, 1993; Zeiner et al., 1990; Stebbins, 1985)
- Special-status species information from the U.S. Fish and Wildlife Service (USFWS, 2005a)
- Occurrence records on file at the University of California Berkeley Museum of Vertebrate Zoology (UCBMVZ, 2005)
- Vegetation and wildlife species occurrence information from EBMUD biologists (EBMUD, 2005; Skahill, 2005; Hartwell, 2005a, 2005b, 2005c; Lake, 2003; Loughman, 2002; Beeman, 2001; Swaim, 2000; Dunne, 1994)

Vegetation types and wildlife habitats were characterized on the basis of both records and field observations. ESA conducted surveys of project sites on October 12, 13, and 20 and November 3 and 8, 2005 to gather information on plant communities, wildlife habitats, and habitat use on and surrounding each site. All areas evaluated at a project-level were inspected for biological and wetland resources during the field visits. A general tree assessment was completed to estimate the number of protected trees that would be affected in accordance with each city's or county's tree ordinance.

3.6.2 Setting

Regional Setting

The WTTIP project sites are located in the Oakland-Berkeley Hills and in the western Contra Costa County cities of Orinda, Moraga, Lafayette, and Walnut Creek in the San Francisco Bay Area. The Bay Area region supports a Mediterranean climate and a broad range of habitats, including mosaics of oak and mixed evergreen forests, native and non-native grasslands, chaparral, upland scrubs, marsh and wetland communities, and riparian scrubs and forests. The majority of proposed projects are located within areas of residential development. However, the Highland Reservoir and Pipelines and northern portion of the Moraga Road Pipeline alignment traverse the Lafayette Reservoir Recreation Area open space. The San Pablo Pipeline alignment is located in the San Pablo Recreation Area. In addition, the Fay Hill Reservoir is surrounded by a large expanse of undeveloped grassland.

San Pablo, Lafayette, Lauterwasser, and Las Trampas Creeks serve as the primary drainage system in the WTTIP project area.[1] Lauterwasser Creek flows southwest into San Pablo Creek, which flows through the San Pablo Reservoir and on to San Pablo Bay. Lafayette Creek flows eastward to Las Trampas Creek. Las Trampas Creek joins with San Ramon Creek and becomes Walnut Creek, which flows north to Suisun Bay. Though these drainages are culverted at road and highway crossings and have underground reaches through developed urban areas, many portions of these drainages support native riparian and wetland vegetation and riffle structure within the streambed.

WTTIP Project Sites

Plant Communities and Associated Wildlife Habitats

The WTTIP project area supports 13 plant communities consisting of riparian and upland woodlands, shrublands, grasslands, and developed areas. The plant communities and associated wildlife habitats present at each project site are listed in Table 3.6-1 and described below. Sensitive plant communities, defined as communities of high priority by the California Department of Fish and Game (CDFG), are indicated below and in Table 3.6-1.

The plant community classification presented herein is based on field observations and the CDFG *List of California Terrestrial Natural Communities Recognized by the California Natural Diversity Database* (CDFG, 2003). Plant communities generally correlate with wildlife habitat types. Wildlife habitats were typically classified and evaluated using the CDFG's *A Guide to Wildlife Habitats of California* (Mayer and Laudenslayer, 1988).

Upland Woodlands

Mixed Oak Woodland and Valley Oak–Coast Live Oak Woodland. Mixed oak woodland consists of a dense to sparse cover of multi-stemmed coast live oak (*Quercus agrifolia*) and valley oak (*Quercus lobata*) trees, with a partial understory of shrubs and grasses similar to the non-native grassland in upland areas. Occasionally, other native and non-native species may be found, such as black oak (*Quercus kelloggii*), blue gum eucalyptus (*Euculyptus globulus*), madrone (*Arbutus menziesii*), and California bay (*Umbellularia californica*). Valley oak and coast live oak can occur as the sole dominant species or may intermix to form a valley oak–coast live oak woodland community. The understory of both types of woodland can include poison-oak, coyote brush (*Baccharis pilularis*), as well as herbaceous species such as vetch (*Vicia* sp.) and mustards (*Brassica* spp.). Mixed oak woodland occurs at the Orinda WTP, Leland Isolation Pipeline and Bypass Valves (near Danville Pumping Plant), and Withers Pumping Plant sites, and along the proposed Orinda-Lafayette Aqueduct, Glen Pipeline, Highland Pipeline, Lafayette Reclaimed Water Pipeline, Moraga Road Pipeline, and Tice Pumping Plant and Pipeline alignments. Valley oak–coast live oak woodland occurs at the Happy Valley Pumping Plant and Highland Reservoir sites, and along the proposed Moraga Road Pipeline alignment. Valley oak–coast live oak woodland is a sensitive community, which is defined as a community of high priority by CDFG.

[1] The project area consists of the WTTIP project sites and the surrounding habitat.

TABLE 3.6-1
PLANT COMMUNITIES AND WILDLIFE HABITATS WITHIN THE WTTIP PROJECT SITES

Project Site	Plant Communities and Wildlife Habitats Present
Projects Analyzed at a Project Level	
Lafayette WTP	Mixed Riparian Woodland Eucalyptus Woodland Coyote Brush Scrub Non-native Grassland Developed and Ornamental Landscaping
Orinda WTP	Mixed Riparian Woodland Mixed Oak Woodland Non-native Grassland Developed and Ornamental Landscaping
Walnut Creek WTP	Mixed Riparian Woodland Non-native Grassland Developed and Ornamental Landscaping
Sobrante WTP	Mixed Riparian Woodland Non-native Grassland Developed and Ornamental Landscaping
Upper San Leandro WTP	Developed and Ornamental Landscaping
Orinda-Lafayette Aqueduct	Mixed Riparian Woodland Mixed Oak Woodland Non-native Pine Woodland Coyote Brush Scrub Non-native Grassland Developed and Ornamental Landscaping
Ardith Reservoir	Non-native Pine Woodland Eucalyptus Woodland Developed and Ornamental Landscaping
Donald Pumping Plant	Eucalyptus Woodland Developed and Ornamental Landscaping
Fay Hill Pumping Plant and Pipeline Improvements	Non-native Pine Woodland (pipeline only) Developed and Ornamental Landscaping
Fay Hill Reservoir	Non-native Pine Woodland Non-native Grassland
Glen Pipeline Improvements	Mixed Riparian Woodland Mixed Oak Woodland Developed and Ornamental Landscaping
Happy Valley Pumping Plant and Pipeline	Mixed Riparian Woodland *Valley Oak–Coast Live Oak Woodland (pumping plant only) Non-native Annual Grassland Developed and Ornamental Landscaping (pipeline only)
Highland Reservoir and Pipelines	Mixed Riparian Woodland (pipeline only) Mixed Oak Woodland (pipelines, access roads only) *Valley Oak–Coast Live Oak Woodland (reservoir only) Non-native Pine Woodland (pipelines, access roads only) Coyote Brush Scrub Non-native Annual Grassland *Mixed Perennial Grassland *Cattail Wetland (pipeline only)

TABLE 3.6-1 (Continued)
PLANT COMMUNITIES AND WILDLIFE HABITATS WITHIN THE WTTIP PROJECT SITES

Project Site	Plant Communities and Wildlife Habitats Present
Projects Analyzed at a Project Level	
Lafayette Reclaimed Water Pipeline	Mixed Riparian Woodland Mixed Oak Woodland Non-native Pine Woodland Coyote Brush Scrub Non-native Annual Grassland *Mixed Perennial Grassland
Leland Isolation Pipeline and Bypass Valves	Developed and Ornamental Landscaping Mixed Oak Woodland (near Danville Pumping Plant) Non-native Grassland (near Danville Pumping Plant)
Moraga Reservoir	Developed and Ornamental Landscaping
Moraga Road Pipeline	Mixed Riparian Woodland *Arroyo Willow Riparian Woodland Mixed Oak Woodland *Valley Oak–Coast Live Oak Woodland Non-native Pine Woodland Coyote Brush Scrub Non-native Grassland *Creeping Ryegrass Grassland *Mixed Perennial Grassland *Cattail Wetland Orchard Developed and Ornamental Landscaping
Sunnyside Pumping Plant	Non-native Grassland Non-native Pine Woodland Developed and Ornamental Landscaping
Tice Pumping Plant and Pipeline	Mixed Riparian Woodland (pipeline only) Mixed Oak Woodland Non-native Grassland Developed and Ornamental Landscaping
Withers Pumping Plant	Mixed Oak Woodland Non-native Pine Woodland Non-native Grassland Developed and Ornamental Landscaping

NOTE: An asterisk (*) indicates a sensitive community, which is defined by the CDFG as a high priority community.

SOURCE: ESA

Oak woodland provides food and shelter for a variety of bird species, including insect eaters such as chestnut-backed chickadee (*Poecile rufescens*), white-breasted nuthatch (*Sitta carolinensis*), and warbling vireo (*Vireo gilvus*). Other species attracted to this habitat include song sparrow (*Melospiza melodia*), California quail (*Callipepla californica*), and California towhee (*Pipilo crissalis*), which glean insects from the foliage on the ground. Western scrub jay (*Aphelocoma californica*), Nuttall's woodpecker (*Picoides nuttallii*), and squirrels (*Sciurus* sp.) are dependent on the acorns during the winter. Raptors such as Cooper's hawk (*Accipiter cooperii)* and sharp-shinned hawk (*Accipiter striatus)* are known to nest in oak woodlands. Cavities within oak trees provide nesting sites for western screech owl (*Otus kennicottii*), western bluebird (*Sialia* *mexicana*), and ash-throated flycatcher (*Myiarchus cinerascens*), and roosting sites for bats. In addition, downed branches provide cover for various reptiles, amphibians, and small mammals. Oak woodland within the Lafayette Reservoir Recreation Area near the proposed alignments for the Highland Inlet/Outlet pipeline, Lafayette Reclaimed Water Pipeline, and Moraga Road Pipeline alignments is also known to support wild turkeys (*Meleagris gallopavo*) and feral pigs (*Sus scrofa*).

Eucalyptus Woodland. This community consists of a dense to sparse cover of blue gum eucalyptus (*Eucalyptus globulus*) trees. Red iron bark eucalyptus (*Eucalyptus sideroxylon*) is an occasional species observed in eucalyptus woodland. The understory is typically sparse or absent due to the alleopathic chemicals and high volumes of forest debris, such as bark, limbs, and branches, produced by the tree. Eucalyptus woodland occurs at the Lafayette WTP, Ardith Reservoir, and Donald Pumping Plant sites.

Eucalyptus stands provide nesting and roosting habitat for various common bird species, such as American crow (*Corvus brachyrhynchos*) and common raven (*Corvus corax*), as well as for red-tailed hawk (*Buteo jamaicensis*) and other raptors. Dark-eyed junco (*Junco hyemalis*), ruby-crowned kinglet (*Regulus calendula*), and brown creeper (*Certhia Americana*) may also use these areas. Eucalyptus groves near San Pablo Reservoir and Lafayette Reservoir are known to support wintering bald eagles (*Haliaeetus leucocephalus*) (EBMUD, 1994, 2005; Skahill, 2005). Common reptiles such as gopher snake (*Pituophis melanoleucus*) and northern alligator lizard (*Elgaria coerulea*) may also inhabit the understory of these stands.

Non-native Pine Woodland. Non-native pine woodland occurs in upland areas and can consist of several species of pine trees, including Monterey pine (*Pinus radiata*), jeffrey pine (*Pinus jeffreyi*), ponderosa pine (*Pinus ponderosa*), and Coulter pine (*Pinus coulteri*). Each of these trees can occur as the sole dominant species at a site or be intermixed with other species. The understory in this community is composed of non-native grassland or mulch. Non-native pine species have naturalized in undeveloped areas, such as along the Highland and Moraga Road Pipeline alignments. Non-native pine occurs along most roadways and at most reservoirs and pumping plants in the WTTIP project area. Non-native pine woodland is present at the Ardith Reservoir, Fay Hill Reservoir, Highland Reservoir, Sunnyside Pumping Plant, and Withers Pumping Plant sites, and along the proposed Orinda-Lafayette Aqueduct, Fay Hill Pipeline, Highland Pipeline, Lafayette Reclaimed Water Pipeline, and Moraga Road Pipeline alignments.

Non-native, large trees in non-native pine woodland can support nesting and roosting habitat for raptors such as Cooper's hawk, red-tailed hawk, and golden eagle (*Aquila chrysaetos*). Other wildlife species associated with this habitat type include black-tailed deer (*Odocoileus hemionus)*, Nuttall's woodpecker, chestnut-back chickadee, red-breasted nuthatch (*Sitta canadensis*), pygmy nuthatch (*Sitta pygmaea*), white-breasted nuthatch, common raven, and Stellar's jay (*Cyanocitta stelleri*).

Riparian Woodlands

Mixed Riparian Woodland. Mixed riparian woodland consists of dense to sparse cover of primarily arroyo willow (*Salix lasiolepis*), valley oak (*Quercus lobata*), and coast live oak (*Quercus agrifolia*). Associate overstory species in this community include Oregon ash (*Fraxinus latifolia*) and California buckeye (*Aesculus californica*). The understory in this riparian community is primarily composed of poison-oak (*Toxicodendron diversilobum*), mugwort (*Artemisia douglasiana*), Himalayan blackberry (*Rubus discolor*), and stinging nettle (*Urtica* sp.). This community type is also known as central coast riparian woodland or forest. Mixed riparian woodland occurs along streams at the Lafayette WTP, Orinda WTP, Walnut Creek WTP, Sobrante WTP, Happy Valley Pumping Plant and Pipeline, and along the Orinda-Lafayette Aqueduct, Glen Pipeline, Highland Pipeline, Lafayette Reclaimed Water Pipeline, Moraga Road Pipeline, and Tice Pipeline alignments.

Arroyo Willow Riparian Woodland. Arroyo willow riparian woodland is composed of a dense thicket of shrubs. This community consists of willows (*Salix* spp.), primarily with an understory of poison-oak (*Toxicodendron diversilobum*), mugwort (*Artemisia douglasiana*), and stinging nettle (*Urtica* sp.). Arroyo willow riparian occurs along the proposed Moraga Road Pipeline alignment at the intermittent drainage that flows to Lafayette Creek. Arroyo willow riparian woodland is a sensitive community, which is defined as a community of high priority by the CDFG.

Riparian areas provide nesting habitat and diverse insects that are attractive to many bird species. Foliage, bark, and ground substrates provide a variety of foraging areas. Birds that forage for insects in riparian habitats include Bewick's wren (*Thryomanes bewickii*), chestnut-backed chickadee, northern flicker (*Colaptes auratus*), dark-eyed junco, and black phoebe (*Sayornis nigricans*). Riparian forests provide important nesting and roosting habitat for great horned owl (*Bubo virginianus*), Cooper's hawk, sharp-shinned hawk, white-tailed kite (*Elanus leucurus*), and other raptors. Amphibians and mammals such as western toad (*Bufo boreas*), Pacific chorus frog (*Hyla regilla*), western harvest mouse (*Reithrodontomys megalotis*), deer mouse (*Peromyscus maniculatus*), raccoon (*Procyon lotor*), coyote (*Canis latrans*), and black-tailed deer may also use riparian habitat in the WTTIP project area.

Shrubland

Coyote Brush Scrub. This shrub-dominated community primarily occupies undeveloped natural areas. It consists of a dense to moderately open shrub canopy with a sparse herbaceous understory. Coyote brush scrub grows on steep, rocky slopes and intersperses with mixed oak woodland on deeper soils or moister sites. The dominant shrub in this community is coyote brush (*Baccharis pilularis*). Coyote brush can occur as the sole species or in association with other species, including poison oak, California coffeeberry (*Rhamnus californica*), sticky monkey flower (*Mimulus aurantiacus*), and bracken fern (*Pteridium aquilinum*). Coyote brush scrub occurs at the Lafayette WTP and Highland Reservoir, and along the proposed Orinda-Lafayette Aqueduct, Lafayette Reclaimed Water Pipeline, and Moraga Road Pipeline alignments.

Coyote brush scrub (also referred to as coastal scrub) habitat, often interspersed with other habitats, provides foraging and nesting habitat for species that are attracted to edges of plant communities. Bird species that use the scrub canopy for catching insects include bushtit (*Psaltriparus minimus*) and wrentit (*Chamaea fasciata*). Flowering scrub vegetation (e.g., *Ceanothus* sp.) attracts nectar drinkers such as Anna's hummingbird (*Calypte anna*). Mammals, including striped skunk (*Mephitis mephitis*), may use this habitat for protection and foraging grounds. Reptiles and small mammals that are expected to occur within scrub habitats include western fence lizard (*Sceloporus occidentalis*), brush rabbit (*Sylvilagus bachmani*), Botta's pocket gopher (*Thomomys bottae*), and deer mouse. Small mammals attract predators such as coyote and gray fox (*Urocyon cinereoargenteus*).

Grasslands

Creeping Ryegrass Grassland. Creeping ryegrass grassland is a remnant native grassland in moist areas. Creeping ryegrass (*Leymus triticoides*) mainly occurs as the sole species adjacent to mixed perennial grassland or non-native grassland. Creeping ryegrass grassland occurs along the undeveloped portion of the proposed Moraga Road Pipeline alignment. Creeping ryegrass grassland is a sensitive community, which is defined as a community of high priority by the CDFG.

Mixed Perennial Grassland. Mixed perennial grassland is composed of several native bunchgrasses, including blue wildrye (*Elymus glaucus*), purple needlegrass (*Nassella pulchra*), and California brome (*Bromus carinatus*). Associated herbaceous species can include California poppy (*Eschscholzia californica*), checkerbloom (*Sidalcea malvaeflora*), and soap root (*Chlorogalum pomeridianum*). Mixed perennial grassland occurs at the proposed Highland Reservoir as well as along undeveloped portions of the Highland Pipeline, Lafayette Reclaimed Water Pipeline, and Moraga Road Pipeline alignments. Mixed perennial grassland is a sensitive community, which is defined as a community of high priority by the CDFG.

Non-native Grassland. Non-native grassland is composed of a dense to sparse cover of non-native annual grasses often associated with numerous annual and perennial herbaceous herbs. Species in this community usually germinate in the late winter, grow actively during the winter and early spring, then produce numerous seeds that remain dormant during the summer and early fall. Species in this community include numerous common non-native annual grasses, including vulpia (*Vulpia myuros*), wild oat (*Avena barbata*), and bromes (*Bromus hordaceus, B. diandrus,* and *B. madritensis*). Associated herbs include a mix of native and non-native species, including black mustard (*Brassica nigra*), California poppy (*Eschscholzia californica*), California buttercup (*Ranunculus californica*), clovers (*Orthocarpus* and *Trifolium* spp.), filaree (*Erodium botrys, E. cicutarium*), and bluedick (*Dichelostemma capitatum* ssp. *capitatum*). Invasive non-native species can also be found in this community, including yellow star-thistle (*Centaurea solstitialis*), Italian thistle (*Carduus pycnocephalus*), and milk thistle (*Silybum marianum*). Non-native grassland occurs at the Lafayette WTP, Orinda WTP, Walnut Creek WTP, Sobrante WTP, Fay Hill Reservoir, Happy Valley Pumping Plant and Pipeline, Highland Reservoir and Pipelines, Leland Isolation Pipeline and Bypass Valves (near Danville Pumping Plant), Sunnyside Pumping Plant, Tice Pumping Plant and Pipeline, and Withers Pumping Plant sites, and along the proposed Orinda-Lafayette Aqueduct, Lafayette Reclaimed Water Pipeline, and Moraga Road Pipeline alignments.

Grasslands can provide refuge for reptiles and amphibians such as western fence lizard, northern alligator lizard, and Pacific slender salamander (*Batrachoseps attenuatus*), and birds including mourning dove (*Zenaida macroura*) and western meadowlark (*Sturnella neglecta*). Grasslands can also be important foraging grounds for aerial and ground-foraging insect eaters such as *Myotis* bat species and pallid bat (*Antrozous pallidus*). Mammals such as Botta's pocket gopher, California ground squirrel (*Spermophilus beecheyi*), black-tailed jackrabbit (*Lepus californicus*), and coyote may forage within annual grasslands in the WTTIP project area. Small rodents attract raptors (birds of prey), including red-tailed hawk, American kestrel (*Falco sparvarius*), and white-tailed kite. Grasslands with ground squirrel burrows of sufficient size have the potential to support burrowing owl (*Athene cunicularia*), a California species of special concern.

Cattail Wetland

The dominant species within cattail wetland is cattail (*Typha latifolia*). Other species observed include tall flatsedge (*Cyperus eragrostis*), sedge (*Carex* sp.), rush (*Juncus* sp.), and rabbitsfoot grass (*Polypogon monospeliensis*). Cattail wetland occurs along the proposed Moraga Road Pipeline alignment at Laguna Creek and at the intermittent drainage that flows to Lafayette Creek, as well as along the Highland overflow pipeline alignment at the edge of the existing Lafayette Reservoir. Cattail wetland is a sensitive community, which is defined as a community of high priority by the CDFG.

Wildlife that depend on free (open) water and visit marshes regularly include coyotes, foxes, raccoons, rodents, most rabbit species, and many species of birds. A number of species require standing or flowing water for breeding, including amphibians such as western toad, Pacific tree frog, western pond turtle (*Clemmys marmorata*), and the federal threatened and California species of special concern, California red-legged frog (*Rana aurora draytonii*), as well as western aquatic garter snake (*Thamnophis couchii*), red-winged blackbird (*Agelaius phoeniceus*), and marsh wren (*Cistothorus palustris*). Freshwater marsh vegetation along streams and lakes can also provide some nesting and seasonal foraging opportunities and cover for waterbird species such as mallards (*Anas platyrhynchos*), green-winged teals (*Anas crecca*), great blue herons (*Ardea herodius*), and great egrets (*Casmerodius albus*).

Developed Areas

Orchard. An orchard intermixed with non-native grassland is present along the proposed Moraga Road Pipeline alignment. Orchards may provide occasional habitat for transient mammals, reptiles, and amphibians and also have value to birds, including wintering sapsuckers. Small mammals, such as rabbits and rodents, forage on the leaves and grasses and, in turn, may attract small predators such as hawks or feral cats.

Developed and Ornamental Landscaping. This community type is designated for areas occupied by buildings, roads, parking lots, and other developed facilities, as well as adjacent landscaped or heavily disturbed areas. Vegetation in these areas (other than landscaping plants) consists mostly of non-native species such as bottlebrush (*Callistemon rigidus*), and cultivated native species such as Monterey pine, coast redwood (*Sequoia sempervirens*), coast live oak, and lemonadeberry (*Rhus integrifolia*). Urban and developed areas tend to be landscaped with non-native ornamental plant species, thus displacing native plants. Developed and ornamental landscaping occurs at most of the WTPs and proposed pumping plant sites and along the proposed pipeline alignments, except at the Happy Valley Pumping Plant and Highland Reservoir sites.

Residential developments and other areas with ornamental landscaping can provide some habitat for wildlife species adapted to human habitation, such as striped skunk, Virginia opossum (*Didelphis virginiana*), raccoon, European starling (*Sturnus vulgaris*), American robin (*Turdus migratorius*), and mourning dove. In addition, larger trees may provide roosting and nesting habitat for raptors and other birds.

Wetlands and Streams

Wetlands

Wetlands and associated wildlife species are described above under Cattail Wetlands. Cattail wetland typically qualifies as a wetland, as defined by the U.S. Army Corps of Engineer's (Corps), if associated with navigable streams. As such, cattail wetland is protected under Section 404 of the Clean Water Act and is subject to the Corps' jurisdiction. Cattail wetland occurs along the proposed Highland overflow pipeline/Lafayette Reclaimed Water Pipeline at the edge of the existing Lafayette Reservoir and along the Moraga Road Pipeline alignment at the intermittent drainage that flows to Lafayette Creek.

Streams

Major perennial streams on the WTTIP project sites include Lafayette Creek, Las Trampas Creek, Lauterwasser Creek, and San Pablo Creek. Many of the WTTIP project sites contain perennial and/or seasonal streams (see Table 3.6-2 for stream locations) that drain to the San Pablo Bay or Suisun Bay. The Lafayette WTP, Orinda WTP, and Sobrante WTP sites contain perennial and/or seasonal streams. In addition to these facilities, proposed pipeline alignments cross or parallel streams, including the Orinda-Lafayette Pipeline, Glen Pipeline, Happy Valley Pipeline, Highland Pipeline, Lafayette Reclaimed Water Pipeline, Leland Isolation Pipeline and Bypass Valves (Danville Pumping Plant), Moraga Road Pipeline, and Tice Pipeline. The Withers Pumping Plant and Happy Valley Pumping Plant sites also contain streams. Project activities at the Walnut Creek WTP would not occur in the portion of the site that supports a stream. The riparian corridors along most of the streams are dense and consist of mixed riparian woodland vegetation (see Table 3.6-2 for a list of streams associated with each project site).

Project-area streams are potentially subject to Corps and Regional Water Quality Control Board (RWQCB) jurisdiction under Sections 404 and 401 of the Clean Water Act, respectively, and CDFG jurisdiction under Sections 1600–1616 of the California Fish and Game Code. Riparian corridors associated with these streams are also protected under Sections 1600–1616 of the California Fish and Game Code.

TABLE 3.6-2
STREAMS AND WETLANDS AT THE WTTIP PROJECT SITES

Project Sites	Maps B, C, and D	Stream/Wetland Type
Lafayette WTP	B2 C-LWTP-1 C-LWTP-2 C-OLA-5	▪ Lafayette Creek – perennial ▪ Intermittent stream that crosses Mt. Diablo Boulevard to Lafayette Creek
Orinda WTP	B1 C-OWTP-1 C-OWTP-2	▪ San Pablo Creek – perennial ▪ 2 seasonal streams to San Pablo Creek
Walnut Creek WTP	C-WCWTP-1	▪ Seasonal tributary to Grayson Creek
Sobrante WTP	B4 C-SOBWTP-1	▪ San Pablo Creek – perennial
Orinda-Lafayette Aqueduct	B1 C-OLA-1 C-OLA-3 C-OLA-4 C-OLA-5	▪ Hidden Valley Creek (underground tributary to Lafayette Creek) ▪ Lafayette Creek – perennial ▪ Intermittent stream that crosses Mt. Diablo Boulevard to Lafayette Creek ▪ 3 seasonal drainages towards Highway 24 ▪ 2 seasonal streams to San Pablo Creek near Orinda Sports Field ▪ San Pablo Creek – perennial ▪ Lauterwasser Creek – perennial
Glen Pipeline Improvements	B2 C-GLENPL-3	▪ Concrete-lined intermittent stream; tributary to Happy Valley Creek
Happy Valley Pumping Plant and Pipeline	B1 C-HVPP-1 C-HVPP-2 C-HVPP-3	▪ Lauterwasser Creek – perennial ▪ 3 tributaries to Lauterwasser Creek
Highland Reservoir and Pipelines	B2 C-HIGHRES-1	▪ Lafayette Creek – perennial ▪ Lafayette Reservoir ▪ Cattail wetland
Lafayette Reclaimed Water Pipeline	C-HIGHRES-1	▪ Lafayette Creek – perennial
Leland Isolation Pipeline and Bypass Valves (Danville Pumping Plant)	C-LELPL-2	▪ San Ramon Creek ▪ Seasonal drainage to San Ramon Creek
Moraga Road Pipeline	B2 C-MORPL-1 C-MORPL-2 C-MORPL-3 C-MORPL-4 C-MORPL-5 C-MORPL-6 C-MORPL-7	▪ Cattail wetland ▪ 2 intermittent tributaries to Lafayette Creek near Highland Reservoir ▪ 2 seasonal streams in Lafayette Reservoir Recreation Area ▪ 1 intermittent tributary to Las Trampas Creek crossing Moraga Road ▪ Laguna Creek – seasonal ▪ 1 seasonal drainage (potential storm drain) parallel to Moraga Road
Tice Pumping Plant and Pipeline	B3 C-TICEPP-1	▪ Las Trampas Creek – perennial
Withers Pumping Plant	D-WITHPP-1	▪ Seasonal drainage in 12-inch corrugated-metal pipe to Grayson Creek

Wildlife Movement Corridors

Wildlife movement corridors link areas of suitable wildlife habitat that are otherwise separated by rugged terrain, changes in vegetation, or by areas of human disturbance or urban development. Topography and other environmental conditions in combination with urbanization have fragmented or separated large open space areas. The fragmentation of natural habitat creates isolated "islands" of vegetation that may not provide sufficient area to accommodate sustainable populations and can adversely affect genetic and species diversity. Movement corridors mitigate the effects of this fragmentation by allowing animals to move between remaining habitats, which in turn allows depleted populations to be replenished and promotes genetic exchange with separate populations. Within the WTTIP project area, streams and drainages such as San Pablo Creek, Lauterwasser Creek, Lafayette Creek, and Las Trampas Creek serve as primary corridors for wildlife moving through residential areas and other developed habitats. In addition, undeveloped open space habitat within the Lafayette Reservoir Recreation Area and San Pablo Recreation Area provides contiguous habitat for resident and migratory wildlife.

Special-Status Species

Several species known to occur in the project vicinity are protected pursuant to federal and/or state endangered species laws, or have been designated as species of concern by the U.S. Fish and Wildlife Service (USFWS) or species of special concern by the CDFG. In addition, Section 15380(b) of the CEQA Guidelines provides a definition of rare, endangered, or threatened species that are not included in any listing.[2] Species recognized under these terms are collectively referred to as "special-status species." For purposes of this EIR, special-status species include:

- Plant and wildlife species listed as rare, threatened, or endangered under the federal or state endangered species acts
- Species that are candidates for listing under either federal or state law
- Species formerly designated by the USFWS as species of concern[3] or by the CDFG as species of special concern
- Species protected by the federal Migratory Bird Treaty Act (16 United States Code [USC] Sections 703–711)
- Bald and golden eagles protected by the federal Bald Eagle Protection Act (16 USC 668)
- Species such as candidate and California Native Plant Society (CNPS) List 1 and 2 species that may be considered rare or endangered pursuant to the criteria in Section 15380(b) of the CEQA Guidelines

2 For example, vascular plants listed as rare or endangered or as List 1 or 2 by the CNPS are considered to meet Section 15380(b) requirements.

3 Federal Species of Concern is an informal term not defined in the federal Endangered Species Act. The Sacramento Fish and Wildlife Office no longer uses this designation and recently stopped maintaining Species of Concern lists. However, the October 10, 2005 USFWS species list for this project included Federal Species of Concern (USFWS, 2005a). Thus, these species are considered in this EIR.

Table E-1 in Appendix E lists special-status plant species and special-status wildlife species reported to occur in the WTTIP project area based on data in the sources listed above: California Natural Diversity Database (CDFG, 2005), CNPS Electronic Inventory (CNPS, 2005), special-status species information from the USFWS (USFWS, 2005a), biological literature of the region, existing EBMUD biological resource data, and information from EBMUD biologists. Special-status plants and animals are evaluated for this EIR based on a plausible likelihood of habitat loss or construction-related disturbance.

Of the 21 special-status plants presented in Table E-1, the following species have a moderate potential to occur and are considered in the impact analysis: bent-flowered fiddleneck, big-scale balsamroot, Mt. Diablo fairy-lantern, Franciscan thistle, western leatherwood, Diablo rock-rose, Kellog's horkelia, Northern California black walnut, and Oregon meconella. These species are not protected under the federal or state endangered species acts, but are considered former federal species of concern and/or are listed by the CNPS.

Of the 61 special-status wildlife species presented in Table E-1, the following species are considered in the impact analysis: central California coast steelhead (*Oncorhynchus tshawytscha)*, California red-legged frog, foothill yellow-legged frog (*Rana boylii)*, Alameda whipsnake (*Mastcophis lateralis euryxanthus)*, western pond turtle, bald eagle, Cooper's hawk, sharp-shinned hawk, Bell's sage sparrow (*Amphispiza belli belli)*, golden eagle, burrowing owl, oak titmouse (*Baeolophus inornatus)*, northern harrier (*Circus cyaneus)*, yellow warbler (*Dendroica petechia)*, white-tailed kite, Pacific-slope flycatcher (*Empidonax difficilis)*, California horned lark (*Eremophila alpestris actia)*, merlin (*Falco columbarius)*, yellow-breasted chat (*Icteria virens)*, loggerhead shrike (*Lanius ludovicianus)*, osprey (*Pandion haliaetus)*, rufous hummingbird (*Selasphorus rufus)*, Allen's hummingbird (*Selasphorus sasin)*, Bewick's wren, California thrasher (*Toxostoma redivivum)*, mountain lion (*Felis concolor)*, San Francisco dusky-footed woodrat (*Neotoma fuscipes annectens)*, and six species of bats.

Special-Status Plants

Habitat for bent-flowered fiddleneck (*Amsinckia lunaris*), big-scale balsamroot (*Balsamorhiza macrolepis* var. *macrolepis*), Mt. Diablo fairy-lantern (*Calochortus pulchellus*), Franciscan thistle (*Cirsium andrewsii*), Diablo rock-rose (*Helianthella castanea*), Kellog's horkelia (*Horkelia cuneata ssp. sericea*), and Oregon meconella (*Meconella oregana*) occurs along the undeveloped portion of the Moraga Road Pipeline alignment within coyote brush scrub, grassland, and/or openings in mixed oak woodland. Habitat for Northern California black walnut and western leatherwood occurs within riparian corridors along most streams identified in Table 3.6-2 at the following project sites: Lafayette WTP, Orinda WTP, Sobrante WTP, Orinda-Lafayette Aqueduct, Glen Pipeline Improvements, Happy Valley Pumping Plant and Pipeline, Highland Reservoir and Pipelines, Lafayette Reclaimed Water Pipeline, Moraga Road Pipeline, and Tice Pumping Plant and Pipeline. No suitable habitat for riparian special-status species is present at the Withers Pumping Plant site or at the three drainages that flow toward Highway 24 and across the Orinda-Lafayette Aqueduct alignment along El Nido Ranch Road.

Central California Coast Steelhead

Aquatic habitat within WTTIP project area drainages, such as San Pablo Creek, Lafayette Creek, Lauterwasser Creek, and Las Trampas Creek, has the potential to support common fish species such as California roach (*Lavinia symmetricus*), Sacramento sucker (*Catostomus occidentalis*), and threespine stickleback (*Gasterosteus aculeatus*). Potential habitat for central California coast steelhead, a federal threatened species and California species of special concern, is located within San Pablo Creek, downstream of the San Pablo Reservoir and adjacent to the Sobrante WTP. However, a 6-foot passage barrier lacking jump pools on San Pablo Creek (near Grant Road below Interstate 80) effectively prevents steelhead migration during flows released from San Pablo Reservoir that measure from 0 to 150 cubic feet per second. Nonlisted hatchery-released rainbow trout occur within San Pablo Reservoir and may move upstream into San Pablo Creek adjacent to the Orinda WTP, and potentially into Lauterwasser Creek near the Happy Valley Pumping Plant and Pipeline project site. Anadromous *Oncorhynchus mykiss* (steelhead) are not expected to occur within Lafayette Creek, Las Trampas Creek, or other WTTIP project area drainages due to the presence of downstream drop structures and other barriers to migration (Hartwell, 2005a).

Critical Habitat

Critical habitat for central California coast steelhead was designated by the National Marine Fisheries Service (NMFS) in September 2005 and became effective on January 2, 2006 (NMFS, 2005). However, project site drainages are not included in this critical habitat designation.

California Red-Legged Frog

Known occurrence locations of California red-legged frog, a federal threatened species and California species of special concern, within the WTTIP project area include ponds east of Moraga Road within Laguna Creek along the Moraga Road Pipeline alignment (CDFG, 2005) and Dutra Creek, a tributary to San Pablo Creek, approximately one mile northwest of the Orinda WTP (Dunne, 1994). Protocol surveys of Lafayette Creek in the WTTIP project area did not identify California red-legged frogs or suitable habitat for this species (Beeman, 2001). This reach of the creek is shallow, lacks substantial emergent vegetation, and is shaded by dense riparian vegetation. Though California red-legged frogs are known to occur in Dutra Creek, a tributary to San Pablo Creek downstream from the project site, San Pablo Creek adjacent to the Orinda WTP is very swift and has variable water levels due to urban runoff and water release from the WTP. California red-legged frogs are not likely to occur in this drainage or in the two small intermittent tributaries to San Pablo Creek that flow through oak woodland between the Orinda Sports Field (ballfields) and the Orinda WTP. Potential habitat for California red-legged frog is located within Lauterwasser Creek and its tributaries in the Happy Valley Pumping Plant and Pipeline project area, within Las Trampas Creek along the Tice Valley Pipeline alignment, within Laguna Creek and other drainages that cross the Moraga Road Pipeline alignment, within San Pablo Creek adjacent to the Sobrante WTP, in the New Leland Pressure Zone Reservoir and Pipeline area, in the St. Mary’s Road/Rohrer Road Pipeline area, and in the San Pablo Pipeline project area.

Critical Habitat

Critical habitat for California red-legged frog was proposed by the USFWS in November 2005 (USFWS, 2005c). However, the project sites are not located within this critical habitat designation.

Foothill Yellow-Legged Frog

Foothill yellow-legged frogs historically occurred in Lafayette Creek and San Pablo Creek. However, this former federal species of concern and California species of special concern is currently presumed extirpated within EBMUD watershed lands (EBMUD, 1994). Las Trampas Creek along the Tice Pipeline alignment, Lauterwasser Creek and its tributaries in the Happy Valley Pumping Plant and Pipeline project area, San Pablo Creek near the Sobrante WTP, and potentially the St. Mary's Road/Rohrer Road Pipeline area support perennial water, rocky substrate, and partial riparian shading, thus providing potential habitat for this species.

Alameda Whipsnake

Alameda whipsnake is a federal and state threatened species that occurs within coastal scrub, woodland, and grassland habitat in the East Bay area. Home ranges are typically centered on areas of scrub habitats with open to partially open canopy, on slopes that face south, southeast, east, and southwest. Rock outcrops are important for protection from predators and as habitat for prey species. Much of the coastal scrub in the WTTIP project area is limited in size and/or surrounded by various types of development. In the southeastern portion of the Lafayette Reservoir Recreation Area, the terrain surrounding the Moraga Road Pipeline alignment supports an area of relatively level, dense coyote brush that lacks rock outcrops. This habitat would be considered marginal for Alameda whipsnake. Other portions of the Lafayette Reservoir Recreation Area provide coastal scrub habitat that is potentially suitable for this species. However, protocol trapping surveys within these areas did not identify this species (Swaim, 2000). In addition, it is the professional opinion of Alameda whipsnake expert Karen Swaim that this species is unlikely to be found within the Lafayette Reservoir watershed due to heavy residential development surrounding the reservoir and high recreational use in this area (Swaim, 2000). The San Pablo Pipeline area and St. Mary's Road/Rohrer Road Pipeline area provide suitable habitat for this species.

Critical Habitat

The Orinda WTP is adjacent to Unit 1 of recently proposed critical habitat for Alameda whipsnake (USFWS, 2005b). However, scrub habitat within the project site is restricted to a very small patch of disturbed coyote brush scrub and ruderal vegetation between the ballfields and adjacent oak woodland outside of the project disturbance area. This area does not support any of the primary habitat elements for this species and would not be considered habitat for Alameda whipsnake. The San Pablo Pipeline area and the St. Mary's Road/Rohrer Road Pipeline areas are located within or adjacent to Units 1 and 2 of proposed critical habitat for Alameda whipsnake (USFWS, 2005b). These project sites provide potential habitat for this species.

Western Pond Turtle

Western pond turtles, a former federal species of concern and California species of special concern, are known to occur in the Lafayette Reservoir (Skahill, 2005). A survey of Lafayette Creek between Bentley School and the Lafayette WTP did not identify this species (Beeman, 2001). Potential habitat is located in Lafayette Creek near the Lafayette WTP, Lafayette Reclaimed Water Pipeline and Orinda-Lafayette Aqueduct alignments, in Lauterwasser Creek in the Happy Valley Pumping Plant and Pipeline project area, in Las Trampas Creek along the Tice Valley Pipeline alignment, in Laguna Creek along the Moraga Road Pipeline alignment, within San Pablo Creek adjacent to the Sobrante WTP, within Lafayette Reservoir at the terminus of Highland Pipeline, and in the New Leland Pressure Zone Reservoir and Pipeline, St. Mary's Road/Rohrer Road Pipeline and San Pablo Pipeline project areas. As discussed above, San Pablo Creek adjacent to the Orinda WTP is very swift and has variable water levels, which likely make this habitat unsuitable for western pond turtles.

Special-Status Birds

Trees and shrubs in woodland, riparian and scrub habitats, grassland, orchard, and developed and ornamental landscaped areas on and surrounding project sites may provide nesting habitat for birds such as Cooper's hawk, sharp-shinned hawk, red-tailed hawk, red-shouldered hawk (*Buteo lineatus*), white-tailed kite, osprey, northern harrier, golden eagle, burrowing owl and other raptors, as well as Bell's sage sparrow, oak titmouse, yellow warbler, Pacific-slope flycatcher, California horned lark, yellow-breasted chat, loggerhead shrike, Allen's hummingbird, Bewick's wren, and California thrasher. In addition, bald eagle, merlin, and other raptors are known to winter within portions of Lafayette Reservoir outside the project site and near the San Pablo Reservoir and may occasionally roost near the WTTIP project area. Rufous hummingbird may also utilize project site habitats in the nonbreeding season. The above-mentioned species are protected as former federal species of concern, California species of special concern, and/or by the California Fish and Game Code. Bald eagles are protected under the Federal Endangered Species Act as a threatened species and by the Bald Eagle Protection Act.

Special-Status Mammals

Woodland and riparian habitats in the WTTIP project area may also support roosting special-status bats such as pallid bat. Pacific western big-eared bat (*Corynorhinus townsendii townsendii*), fringed myotis (*Myotis thysanodes*), long-eared myotis (*Myotis evotis*), long-legged myotis (*Myotis volans*), and Yuma myotis (*Myotis yumanensis*). These species are former federal species of concern and/or California species of special concern. The San Francisco dusky-footed woodrat, also a former federal species of concern and California species of special concern, is locally abundant (Hartwell, 2005b) within oak woodland and riparian habitats. Woodrat nests were observed along the Moraga Road Pipeline alignment and near the Orinda WTP and Happy Valley Pumping Plant and Pipeline project area. In addition, woodland and scrubland habitats suitable for mountain lions, a state fully protected species, and other migratory wildlife occur within the Lafayette Reservoir Recreation Area along the Lafayette Reclaimed Water Pipeline, Highland Reservoir and Pipelines, and Moraga Road Pipeline alignments and within the San Pablo Recreation Area along the San Pablo Pipeline alignment.

Regulatory Framework

Special-Status Species

Special-status species potentially occurring within or adjacent to the WTTIP project area are discussed above. This section describes the federal and state regulations, policies, and codes that afford certain species this status.

Federal Endangered Species Act

Under the Federal Endangered Species Act (FESA), the Secretary of the Interior and the Secretary of Commerce jointly have the authority to list a species as threatened or endangered (16 USC 1533[c]). Pursuant to the requirements of FESA, an agency reviewing a proposed project within its jurisdiction must determine whether any federally listed threatened or endangered species may be present in the project area and determine whether the proposed project will have a potentially significant impact on such species. In addition, the agency is required to determine whether the project is likely to jeopardize the continued existence of any species proposed to be listed under FESA or result in the destruction or adverse modification of critical habitat proposed to be designated for such species (16 USC 1536[3], [4]). Project-related impacts to these species or their habitats would be considered significant in this EIR.

The USFWS also publishes a list of candidate species. Species on this list receive special attention from federal agencies during environmental review, although they are not protected otherwise under FESA. The candidate species are taxa for which the USFWS has sufficient biological information to support a proposal to list as endangered or threatened. Project impacts to such species would be considered significant in this EIR.

California Endangered Species Act

Under the California Endangered Species Act (CESA), the CDFG has the responsibility for maintaining a list of threatened species and endangered species (California Fish and Game Code Section 2070). The CDFG also maintains a list of candidate species, which are species that the CDFG has formally noticed as under review for addition to the threatened or endangered species lists. The CDFG also maintains lists of species of special concern that serve as watch lists. Pursuant to the requirements of CESA, an agency reviewing a proposed project within its jurisdiction must determine whether any state-listed endangered or threatened species may be present in the project area and determine whether the proposed project will have a potentially significant impact on such species. In addition, the CDFG encourages informal consultation on any proposed project that may affect a candidate species. Project-related impacts to species on the CESA endangered list and threatened list would be considered significant in this EIR. Impacts to species of concern would be considered significant under certain circumstances, discussed below.

CEQA Guidelines Section 15380

Although threatened and endangered species are protected by specific federal and state statutes, CEQA Guidelines Section 15380(b) provides that a species not listed on the federal or state list of protected species may be considered rare or endangered if the species can be shown to meet certain specified criteria. These criteria have been modeled after the definition in FESA and the section of the California Fish and Game Code dealing with rare or endangered plants or animals. This section was included in the Guidelines primarily to deal with a situation in which a project may have a significant effect on a species that has not yet been listed by either the USFWS or CDFG. Thus, CEQA provides the ability to protect a species from potential project impacts until the respective government agencies have an opportunity to designate the species as protected, if warranted.

CEQA also calls for the protection of other locally or regionally significant resources, including natural communities. Although natural communities do not at present have legal protection, CEQA calls for an assessment of whether any such resources would be affected, and requires a finding of significance if there would be substantial losses. Natural communities listed in the California Natural Diversity Database as “high priority for inventory” are considered by CDFG to be significant resources and fall under the CEQA Guidelines for addressing impacts. Local planning documents such as General Plans often identify these resources as well.

Other Statutes, Codes, and Policies Affording Limited Species Protection

Migratory Bird Treaty Act / California Fish and Game Code. The federal Migratory Bird Treaty Act (16 USC, Section 703, Supp. I, 1989) prohibits killing, possessing, or trading in migratory birds, except in accordance with regulations prescribed by the Secretary of the Interior. This act encompasses whole birds, parts of birds, and bird nests and eggs. Birds of prey are protected in California under the Fish and Game Code (Section 3503.5, 1992). Section 3503.5 states that it is “unlawful to take, possess, or destroy any birds in the order Falconiformes or Strigiformes (birds of prey) or to take, possess, or destroy the nest or eggs of any such bird except as otherwise provided by this code or any regulation adopted pursuant thereto.” Construction disturbance during the breeding season could result in the incidental loss of fertile eggs or nestlings, or otherwise lead to nest abandonment. Disturbance that causes nest abandonment and/or loss of reproductive effort is considered “taking” by the CDFG. Any loss of fertile eggs, nesting raptors, or any activities resulting in nest abandonment would constitute a significant impact. Non-raptor native birds receive similar protection under California Fish and Game Code Section 3503. Project impacts to these species would not be considered significant unless the species are known to, or have a high potential to, nest in the WTTIP project area or rely on it for primary foraging.

Plants. The legal framework and authority for the state’s program to conserve plants are woven from various legislative sources, including CESA, the California Native Plant Protection Act (Fish and Game Code Sections 1900–1913), the CEQA Guidelines, and the Natural Communities Conservation Planning Act.

The Native Plant Protection Act of 1977 (Fish and Game Code Sections 1900 et seq.) gives the CDFG authority to designate state endangered, threatened, and rare plants and provides specific protection measures for identified populations. Sensitive plant and wildlife species that are not currently listed but would qualify for listing are afforded protection under CEQA. CEQA Guidelines Section 15065 (“Mandatory Findings of Significance”) requires that a reduction in numbers of a rare or endangered species be considered a significant effect. CEQA Guidelines Section 15380 (“Rare or Endangered Species”) provides for the assessment of unlisted species as rare or endangered under CEQA if the species can be shown to meet the criteria for listing.

The CNPS maintains a list of special-status plant species based on collected scientific information. Designation of these species by the CNPS has no legal status or protection under federal or state endangered species legislation. CNPS designations are defined as follows: List 1A (plants presumed extinct); List 1B (plants rare, threatened, or endangered in California and elsewhere); List 2 (plants rare, threatened, or endangered in California, but more numerous elsewhere); List 3 (plants about which more information is needed – a review list); and List 4 (plants of limited distribution – a watch list). In general, plants appearing on CNPS List 1A, 1B, or 2 meet the criteria of Section 15380 of the CEQA Guidelines; thus, substantial adverse effects to these species would be considered significant in this EIR.

Wetlands

U.S. Army Corps of Engineers

Wetlands and other waters (e.g., rivers, streams, and natural ponds) are a subset of “waters of the U.S.”[4] and receive protection under Section 404 of the Clean Water Act. The Corps has primary federal responsibility for administering regulations that concern waters of the U.S. In this regard, the Corps acts under two statutory authorities: the Rivers and Harbors Act (Sections 9 and 10), which governs specified activities in “navigable waters,”[5] and the Clean Water Act (Section 404), which governs specified activities in waters of the U.S., including wetlands. The U.S. Environmental Protection Agency (U.S. EPA) has the ultimate authority for designating dredge and fill material disposal sites and can veto the Corp’s issuance of a permit to fill jurisdictional waters of the U.S. The Corps requires a permit if a project proposes placement of structures within navigable waters and/or alteration of waters of the U.S.[6]

4 The term “waters of the U.S.,” as defined in Code of Federal Regulations (33 CFR 328.3[a]; 40 CFR 230.3[s]), includes: (1) all waters that are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters that are subject to the ebb and flow of the tide; (2) all interstate waters, including interstate wetlands; (3) all other waters, such as intrastate lakes, rivers, streams (including intermittent streams), mud flats, sand flats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation, or destruction of which could affect interstate or foreign commerce, including any such waters that are or could be used by interstate or foreign travelers for recreational or other purposes; or from which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or which are used or could be used for industrial purposes by industries in interstate commerce; (4) all impoundments of waters otherwise defined as waters of the U.S. under the definition; (5) tributaries of waters identified in numbers (1) through (4); (6) territorial seas; and (7) wetlands adjacent to waters (other than waters that are themselves wetlands) identified in numbers (1) through (6).

5 Navigable waters are defined as those waters that are subject to the ebb and flow of the tide or that are presently used, have been used in the past, or may be susceptible for use to transport interstate or foreign commerce.

6 Based on a Supreme Court ruling concerning the Clean Water Act jurisdiction over isolated waters (January 9, 2001), nonnavigable, isolated, intrastate waters, based solely on the use of such waters by migratory birds, are no longer defined as waters of the U.S. Jurisdiction over nonnavigable, isolated, intrastate waters may be possible if their use, degradation, or destruction could affect other waters of the U.S., or interstate or foreign commerce. Jurisdiction over such other waters is analyzed on a case-by-case basis. Impoundments of waters, tributaries of waters, and wetlands adjacent to waters is also analyzed on a case-by-case basis.

Regional Water Quality Control Board

The RWQCB regulates waters of the state under the Porter-Cologne Water Quality Control Act. Under Section 401 of the Clean Water Act, the RWQCB has review authority of Section 404 permits. The RWQCB has a policy of no-net-loss of wetlands and typically requires mitigation for impacts to wetlands before it will issue a water quality certification. Dredging, filling, or excavation of isolated waters constitutes a discharge of waste to waters of the state, and prospective dischargers are required to submit a report of waste discharge to the RWQCB and comply with other requirements of the Porter-Cologne Water Quality Control Act.

California Department of Fish and Game

Under Sections 1600–1616 of the California Fish and Game Code, the CDFG regulates activities that substantially divert, obstruct the natural flow of, or substantially change rivers, streams, and lakes. The jurisdictional limits of the CDFG are defined in Section 1602 of the California Fish and Game Code as the bed, channel, or bank of any river, stream, or lake. The CDFG regulates activities that would result in the deposit or disposal of debris, waste, or other materials into any river, stream, or lake and requires a Streambed Alteration Agreement for such activities. Impacts to the jurisdictional area of the CDFG would be considered significant in this EIR.

Local Plans and Policies

Appendix D lists policies related to the preservation and protection of biological resources from the General Plans for Contra Costa County, Lafayette, Orinda, Moraga, Walnut Creek, and Oakland. Section 3.2 discusses project consistency with plans and policies.

Oak Woodlands Conservation Act

California Senate Bill 1334, the Oak Woodlands Conservation Act, became law on January 1, 2005 and was added to the CEQA statutes as Section 21083.4. This new law, applicable to counties but not to cities or other public agencies, protects oak woodlands that are not protected under the State Forest Practice Act. This statute requires that a county determine whether or not a project would result in a significant impact on oak woodlands; if the project would result in a significant impact on oak woodlands, the county must implement one or more of the following mitigation measures:

- Conserve oak woodlands through the use of conservation easements
- Plant an appropriate number of trees, including maintenance of plantings and replacement of failed plantings
- Contribute funds to the Oak Woodlands Conservation Fund for the purpose of purchasing oak woodlands conservation easements
- Implement other mitigation measures developed by the county

Contra Costa County has not developed any additional measures, except as defined in the County Code (“Tree Protection and Preservation”, Title 8, Chapters 816-4, 816-6).

Tree Ordinances

Pursuant to California Government Code Section 53091, EBMUD, as a local agency and utility district serving a broad regional area, is not subject to building and land use zoning ordinances (such as tree ordinances) for projects involving facilities for the production, generation, storage or transmission of water. It is, however, the practice of EBMUD to work with host jurisdictions and neighboring communities during project planning and to conform to local environmental protection policies to the extent possible. The tree ordinances of cities and counties within the WTTIP project area are described below.

City of Lafayette

The Lafayette General Plan contains goals and policies for the preservation of the community's biological resources, including its trees. The policies of the City of Lafayette are to:

- Protect existing woodlands and their associated vegetation, protect native trees, preserve riparian habitat, encourage the planting of native species, and avoid cutting of mature trees
- Protect existing trees and require the replacement of trees that have been destroyed or removed
- Require compensation when a protected tree is destroyed or removed in a manner that is not in compliance with the tree ordinance

A protected tree is defined in the City of Lafayette Municipal Code (Title 6, Part 4, Chapters 6-17) as a tree on public or private property meeting one or more of the following standards:

- Located on a developed property, that has a trunk diameter of 12 inches or more at standard height, and that is one of the following species: coast live oak (*Quercus agrifolia*), canyon oak (*Quercus chrysolepis*), blue oak (*Quercus douglasii*), white oak (*Quercus garryana*), black oak (*Quercus kelloggii*), valley oak (*Quercus lobata*), interior live oak (*Quercus wislizenii*), California bay (*Umbellularia californica*), California buckeye (*Aesculus californica*), or madrone (*Arbutus menziesii*)
- Of any size or species and designated to be protected and preserved as part of an approved development application
- Is a native riparian tree with a trunk diameter of 6 inches or more or has a multi-trunk with a diameter of 4 inches or more and that is one of the following species: bigleaf maple (*Acer macrophyllum*), boxelder (*A. negundo*), California buckeye, white alder (*Alnus rhombifolia*), black walnut (*Juglans hindsii*), cottonwood (*Populus fremontii*), red willow (*Salix laevigata*), arroyo willow (*S. lasiolepis*), coast live oak, valley oak, or California bay
- Of any species with a diameter of 6 inches or more and located on an undeveloped property
- Is a replacement tree planted as restitution for a violation of the tree ordinance
- Is a native tree of any size or species within a restricted ridgeline area

Town of Moraga

The Town of Moraga considers native tree species to be particularly valuable. The Town of Moraga Municipal Code (Title 12, Chapter 12.12) protects trees with a single trunk diameter of 5 inches or more measured 3 feet above the natural grade or, if having multiple trunks, a total perimeter of 40 inches or more measured 3 feet above the natural grade. Protected trees include: (1) general trees (a tree other than a native tree, an orchard tree, or tree of historic significance); (2) native trees indigenous to the area, including California bay, oak, redwood (*Sequoia sempervirens*), toyon (*Heteromeles arbutifolia*), and knobcone pine (*Pinus attenuata*); (3) orchard trees (fruit or nut trees planted for commercial agricultural purposes); and (4) trees of historic significance (having historic value related to the heritage of the town and designated by action of the Town Council).

City of Oakland

Title 12, Chapter 12.36 of the City of Oakland Municipal code identifies protected trees, including coast live oaks measuring 4 inches in diameter at standard height; any other tree measuring 9 inches at standard height or greater, except eucalyptus and Monterey pine trees; and an area of more than five Monterey pine trees per acre, measuring at least 9 inches in diameter at breast height. The removal of five or fewer Monterey pines per acre is not regulated by the ordinance.

City of Orinda

The City of Orinda designates and protects heritage trees, and identifies them on a map as well as with an approved permanent marker. The City of Orinda Municipal Code (Title 17, Chapters 17.21 and 17.24) protects the following types of trees:

- A tree located on an assessor’s parcel, upon which there is an existing structure, which is of the following species and has a trunk diameter equal to or greater than 12 inches at 4.5 feet above its existing grade: valley oak, coast live oak, black oak, white oak, canyon oak, blue oak, and interior live oak.

- A tree of any size designated to be protected and preserved on an approved development plan or as a condition of approval of a tentative map, a tentative parcel map, or other development approval or land use entitlement or permit issued by the City.

- A native riparian tree with a trunk diameter of 4 inches at 4.5 feet above its existing grade or a multi-trunk native riparian tree with a cross-sectional area of all trunks equal to a cross-sectional area of a single stem of 4 inches at 4.5 feet above its existing grade. “Riparian tree” is a tree within 30 feet of the edge of a creek bank, or a tree beyond 30 feet but in such proximity to a creek bank that it requires or tolerates soil moisture levels in excess of that available in adjacent uplands.

- A tree with a trunk diameter equal to or greater than 6 inches at 4.5 feet above its existing grade on a vacant or undeveloped assessor’s parcel.

City of Walnut Creek

The City of Walnut Creek defines protected trees with a circumference of 28 inches or more at standard height as: (1) oak, madrone, buckeye, black walnut, or locust tree; (2) a rare example of a species native to Walnut Creek; or (3) an exceptional specimen in regard to size, age, health, location, or visual prominence.

Contra Costa County

Contra Costa County protects two types of trees, as defined below:

- *Heritage trees* are classified as trees with a circumference of 72 inches or more, equal to a diameter at breast height of 22.9 inches. Heritage trees also include any tree or grove of trees worthy of protection due to historical or ecological interest or significance, any tree specifically designated by the Board of Supervisors, trees that are dependent on each other for health or survival, or any tree considered an outstanding specimen (Contra Costa County Ordinance, Chapter 816-4).

- *Protected trees* include (1) on all properties within unincorporated areas of the county:

    (a) indigenous trees, including oaks, pines, buckeye, black walnut, willows, redwood, maple, elderberry, toyon, alder, cottonwood, and madrone that have a circumference of 20 inches or more—equal to a diameter at breast height of 6.5 inches and are located adjacent to or are a part of a riparian, foothill woodland, or oak savanna area or are part of a stand of four or more trees; (b) any tree designated for preservation on an approved tract map, development or site plan, or required to be retained as a condition of approval; (c) any tree required to be planted as a replacement for an unlawfully removed tree

  (2) on any developed property within any commercial, professional office, or industrial district, on any undeveloped property within any district, in any designated open space or recreation area, or any area designated as visually significant:

    (a) any tree with a diameter at breast height of 6.5 inches or greater; (b) any multi-stemmed tree having an aggregate circumference of 40 inches or more; or (c) any significant grouping of trees

3.6.3 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 result in:

- Substantial adverse effects to any species identified as a threatened, endangered, candidate, sensitive, or special-status species in local or regional plans, policies, regulations or by lists of species of concern from the CDFG, USFWS, or as defined by Section 15380 of the CEQA Guidelines;

- Substantial adverse effects to habitat (including habitats for rare and endangered species, as defined by Fish and Game Code 903) or other sensitive natural community identified in local or regional plans, policies, regulations, or by lists compiled by the CDFG or USFWS;
- Substantial adverse effects to federally protected wetlands (including but not limited to marshes and riparian areas), as defined by Section 404 of the Clean Water Act, or riparian and marsh areas under the jurisdiction of the CDFG, as defined by Fish and Game Codes 1601–1603;
- Substantial interference with movement of any native resident or migratory fish or wildlife species or with established migration or dispersal corridors;
- Removal or damage to trees considered protected; or
- Conflicts with any applicable habitat conservation plan.

As discussed above, it is the practice of the District to work with host jurisdictions and neighboring communities during project planning and to conform to local environmental protection policies to the extent possible. For the purpose of this EIR, tree ordinance policies that define protected trees, including heritage trees, are used herein as guidelines for determining significance criteria.

There are no approved habitat conservation plans in the project vicinity. Therefore, no further discussion of this topic is provided.

The proposed project would not result in significant impacts to common plant and wildlife species, in part because these species are, by definition, commonly occurring. Notwithstanding this significance determination, potential losses to common wildlife and plants could result from implementation of the WTTIP. Direct impacts to common plant species and communities, such as nonnative grassland and coyote brush scrub, include temporary habitat loss and fragmentation and mortality of plant species. Direct impacts to common wildlife species include both mortality of resident species, temporary habitat loss and degradation, and possibly reduced value for local wildlife movement during and immediately after construction activities. Though project sites would continue to facilitate wildlife movement through the WTTIP project area, construction of facilities and pipelines would result in some temporary displacement of wildlife. In addition, common wildlife populations could be temporarily reduced slightly due to habitat modification and mortality of individuals. Habitat for common aquatic species could be temporarily affected through construction activities within Lafayette Creek and adjacent to San Pablo Creek, Las Trampas Creek, and Lauterwasser Creek. However, implementation of best management practices, including sedimentation and erosion control, water quality protection measures, and revegetation of disturbed area, would avoid or minimize significant impacts to aquatic habitat and species in downstream habitats.

Impacts and Mitigation Measures

Project-Level Elements

Table 3.6-3 indicates biological resource impacts by project facility.

Map C-HIGHRES-1 shows the Highland Reservoir and Pipelines project and the Lafayette Reclaimed Water Pipeline project. With the exception of the Lafayette Creek crossing, the Lafayette Reclaimed Water Pipeline would be constructed concurrently with and would be 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). Therefore, the Lafayette Reclaimed Water Pipeline impacts included throughout this section are for the Lafayette Creek crossing and discharge of reclaimed water to Lafayette Reservoir only. Impacts resulting from installation of the remaining portions of the Lafayette Reclaimed Water Pipeline are included within the Lafayette WTP Alternative 1, Orinda-Lafayette Aqueduct, and Highland pipeline discussions.

Impact 3.6-1: Loss of or damage to protected trees.

Table 3.6-4 indicates the estimated number of trees that would be removed or potentially damaged at each WTTIP project site as well as the estimated number of protected trees. Refer to the Tree Ordinances section on page 3.6-20 for a definition of a protected tree for each city or county. Table 3.6-4 also references maps (see the C Maps (aerial photographs) following Chapter 2) that identify the locations of tree removal or potential damage.

Proposed facilities at the Walnut Creek WTP (Alternative 1 or 2) and at the Lafayette WTP (Alternative 2) would not affect any trees, since there are no trees present in the areas proposed for development at these sites. Proposed facilities at the remaining WTTIP project sites would result in impacts on protected and nonprotected trees, as identified in Table 3.6-4 and generally described below.[7]

Construction activities at most WTTIP project sites would result in removal of or damage to the root zone of protected trees that are adjacent to or within the construction zone. Numerous multi-stemmed, large-diameter native and non-native trees overhang proposed facility sites and pipeline alignments and likely have supporting root structures beneath the roads or proposed facilities. Many of these trees meet the criteria for protected trees in the pertinent tree ordinances described above. Trees that occur within, or immediately adjacent to, construction zones could be damaged by excavation, grading, and soil compaction; extensive damage could result in mortality. The closer the construction activity is to the trunk of a tree, the greater the damage. Each root that is damaged reduces the tree’s capacity to supply water and nutrients to the leaves.

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[7] The nearest location of sudden oak death infestation is in Orinda approximately 1.5 miles north of Orinda Village (UCB, 2005). No sudden oak death infestation is known to occur at any of the WTTIP project sites.

TABLE 3.6-3
SUMMARY OF POTENTIAL PROJECT-LEVEL BIOLOGICAL RESOURCES IMPACTS

Facility	Impact 3.6-1 Loss of or Damage to Protected Trees	Impact 3.6-2 Degradation to Streams, Wetlands, and Riparian Habitats	Impact 3.6-3 Loss of or Damage to Special-Status Plants	Impact 3.6-4 Disturbance to Special-Status Birds	Impact 3.6-5 Disturbance to Special-Status Bats	Impact 3.6-6 Disturbance to San Francisco Dusky-Footed Woodrat	Impact 3.6-7 Degradation of Special-Status Aquatic Species Habitat	Impact 3.6-8 Disruption to Wildlife Corridors
Lafayette WTP								
Alternative 1	SM	SM	SM	SM	SM	SM	SM	LTS
Alternative 2	–	–	–	SM	SM	–	–	–
Orinda WTP								
Alternative 1	LTS	–	–	SM	–	–	–	–
Alternative 2	SM	SM	–	SM	SM	SM	SM	LTS
Walnut Creek WTP								
Alternative 1 or 2	–	SM	–	SM	SM	–	–	–
Sobrante WTP								
Alternative 1 or 2	SM	SM	–	SM	SM	LTS	SM	LTS
Upper San Leandro WTP								
Alternative 1 or 2	SM	–	–	SM	–	–	–	–
Orinda-Lafayette Aqueduct								
Alternative 2 only	SM	SM	–	SM	SM	SM	SM	LTS
Ardith Reservoir and Donald Pumping Plant	LTS	–	–	SM	–	–	–	–
Fay Hill Pumping Plant and Pipeline Improvements	LTS	–	–	SM	–	–	–	–
Fay Hill Reservoir	SM	–	–	SM	SM	–	–	LTS
Glen Pipeline Improvements	SM	SM	SM	SM	SM	SM	SM	LTS
Happy Valley Pumping Plant and Pipeline	SM	SM	SM	SM	SM	SM	SM	LTS
Highland Reservoir and Pipelines	SU	SM	SM	SM	SM	SM	SM	LTS
Lafayette Reclaimed Water Pipeline	SM	SM	SM	SM	SM	SM	SM	LTS
Leland Isolation Pipeline and Bypass Valves	SM	SM	–	SM	SM	–	–	–
Moraga Reservoir	SM	–	–	SM	–	–	–	–
Moraga Road Pipeline	SM	SM	SM	SM	SM	SM	SM	LTS
Sunnyside Pumping Plant	SM	–	–	SM	SM	–	–	LTS
Tice Pumping Plant and Pipeline	SM	SM	SM	SM	SM	LTS	SM	LTS
Withers Pumping Plant	SM	LTS	–	SM	–	–	–	–

SM = Significant Impact, Can Be Mitigated
SU = Significant Impact, Unavoidable
LTS = Less-Than-Significant Impact
– = No Impact
Note: With the exception of the Lafayette Creek crossing shown in Map C-HIGHRES-1, the Lafayette Reclaimed Water Pipeline would be constructed concurrently with and would be co-located with the Bryant and Leland Pipelines or the Orinda-Lafayette Aqueduct (depending on whether Alternative 1 or Alternative 2 is selected), as well as with the Highland Reservoir pipeline. Therefore, the Lafayette Reclaimed Water Pipeline impacts included in this table and throughout this section are for the Lafayette Creek crossing and discharge of reclaimed water to Lafayette Reservoir only. Impacts resulting from installation of the remaining portions of the Lafayette Reclaimed Water Pipeline are included within the Lafayette WTP Alternative 1, Orinda-Lafayette Aqueduct, and Highland Pipeline discussions.

TABLE 3.6-4
TREE IMPACTS AT THE WTTIP PROJECT SITES[a]

Project Sites	City or County	Map	Approximate Number of Trees to be Removed	Approximate Number of Trees Potentially Damaged	Approximate Number of Protected Trees to be Removed	Approximate Number of Protected Trees Potentially Damaged
Lafayette WTP	Lafayette					
Alternative 1		C-LWTP-1	40–45 eucalyptus, ornamental, oak, pine, riparian	7–10 oak, riparian	15–25 oak with 12-inch dbh or greater and riparian with 4-inch dbh or greater	7–12 riparian with 4-inch dbh or greater
Alternative 2		C-LWTP-2	None	None	None	None
Orinda WTP	Orinda					
Alternative 1		C-OWTP-4	None	3–5 ornamental, oak (backwash water recycle system)	None	None
Alternative 2		C-OWTP-4	45–55 oak, fir (substation, pumping plant, clearwell)	3–5 ornamental, oak (backwash water recycle system)	5–6 oak with 12-inch dbh or greater (substation, pumping plant, clearwell)	None
Walnut Creek WTP Alternative 1 or 2	Walnut Creek	None	None (no trees present at proposed areas)	None (no trees present at proposed areas)	None (no trees present at proposed areas)	None (no trees present at proposed areas)
Sobrante WTP Alternative 1 or 2	Contra Costa	C-SOBWTP-1	10–15 oak, pine, and ornamental shrubs, (equalization basins and pipeline)	35–40 pine, eucalyptus, oak (equalization basins, pipeline)	9 oak with 6.5-inch dbh or greater (equalization basins and pipeline)	2 oak with 6.5-inch dbh or greater (equalization basins)
Upper San Leandro WTP Alternative 1 or 2	Oakland	C-USLWTP-1	15–25 ornamental redwood, 2 oak (tank and pumping plant)	None	7–12 redwood with 12 inch dbh or greater, 2 oak with 6-inch dbh or greater (tank and pumping plant)	None
Orinda-Lafayette Aqueduct Alternative 2	Lafayette Orinda	D-OLA-1	2 (riparian)	75–95 pine, oak, riparian, cottonwood	2 (riparian)	30–45 oak and pine with 12-inch dbh or greater and riparian with 4-inch dbh or greater

TABLE 3.6-4 (Continued)[a]
TREE IMPACTS AT THE WTTIP PROJECT SITES

Project Sites	City or County	Map	Approximate Number of Trees to be Removed	Approximate Number of Trees Potentially Damaged	Approximate Number of Protected Trees to be Removed	Approximate Number of Protected Trees Potentially Damaged
Ardith Reservoir and Donald Pumping Plant	Orinda	C-ARRES-1	30–35 eucalyptus, pine, and oak (facilities)	5–10 eucalyptus and non-native pine (facilities)	None	None
Fay Hill Pumping Plant and Pipeline Improvements	Moraga	C-FHPP-1	1–2 Monterey pine and redwood (pumping plant)	10 Monterey pine (pipeline)	None	None
Fay Hill Reservoir	Moraga	C-FHPP-1	1–2 Monterey pine	35–45 Monterey pine	1–2 general Monterey pine with 5-inch dbh or greater	35–45 general Monterey pine with 5-inch dbh or greater
Glen Pipeline Improvements	Lafayette	C-GLENPL-3 C-GLENPL-4 C-GLENPL-5	None	25-30 oak, ornamental	None	10-15 oak with 12-inch dbh or greater and riparian with 4-inch dbh or greater
Happy Valley Pumping Plant and Pipeline	Orinda	C-HVPP-2 C-HVPP-3 C-HVPP-4	2 oak (pumping plant)	10 oak/riparian (pumping plant) 50–60 oak, 60–70 riparian trees (pipeline)	2 oak with 12-inch dbh or greater (pumping plant) None (pipeline)	10 oak/riparian with 4-inch dbh or greater (pumping plant) 25–30 oak with 12-inch dbh or greater and 60–70 riparian trees with 4-inch dbh or greater (pipeline)
Highland Reservoir and Pipelines	Lafayette	C-LWTP-4	80–95 oak and pine (pipelines, access roads, and reservoir)	50–65 oak and pine (pipelines and reservoir)	65–75 oak and pine with 12-inch dbh or greater (pipelines and access roads) and 30–35 oak with 18-inch dbh or greater (reservoir)	35–50 oak and pine with 12-inch dbh or greater (pipelines and access roads) and 5–10 oak with 12-inch dbh or greater (reservoir)
Lafayette Reclaimed Water Pipeline[b]	Lafayette	C-LWTP-1 C-LWTP-2	15 oak and riparian	None	8 oak, alder, riparian with 4-inch dbh or greater	None

TABLE 3.6-4 (Continued)[a]
TREE IMPACTS AT THE WTTIP PROJECT SITES

Project Sites	City or County	Map	Approximate Number of Trees to be Removed	Approximate Number of Trees Potentially Damaged	Approximate Number of Protected Trees to be Removed	Approximate Number of Protected Trees Potentially Damaged
Leland Isolation Pipeline and Bypass Valves	Walnut Creek	C-LELPL-1	None at Lacassie Avenue (8 pepper and 3 pittosporum street trees present; work would occur in road) 2–3 oak (Danville Pumping Plant)	None at Lacassie Avenue (8 pepper and 3 pittosporum street trees present; work would occur in road) None (Danville Pumping Plant)	None at Lacassie Avenue (8 pepper and 3 pittosporum street trees present; work would occur in road) 2–3 oak (Danville Pumping Plant)	None at Lacassie Avenue (8 pepper and 3 pittosporum street trees present; work would occur in road) None (Danville Pumping Plant)
Moraga Reservoir	Moraga	C-MORRES-1	4–6 oak, pine	7–10 oak, liquidambar	2–3 oak with 5-inch dbh or greater	4–5 oak with 5-inch dbh or greater
Moraga Road Pipeline	Moraga Lafayette	C-MORPL-1	55–70 oak, pine, riparian (at Lafayette Reservoir Recreation Area)	50–60 oak (at Lafayette Reservoir Recreation Area)	25–40 oak, pine with 12-inch dbh or greater (at Lafayette Reservoir Recreation Area)	25–30 oak with 12-inch dbh or greater (at Lafayette Reservoir Recreation Area)
		C- MORPL-2	35–40 oak (Lafayette Reservoir Recreation Area)	20–25 oak (Lafayette Reservoir Recreation Area)	15–20 oak with 12-inch dbh or greater (Lafayette Reservoir Recreation Area)	10–15 oak with 12-inch dbh or greater (Lafayette Reservoir Recreation Area)
		C-MORPL-3	60–80 oak (Lafayette Reservoir Recreation Area; north of Nemea Court)	20–40 oak (Lafayette Reservoir Recreation Area; north of Nemea Court)	10–15 oak with 12-inch dbh or greater (Lafayette Reservoir Recreation Area; north of Nemea Court)	5–10 oak with 12-inch dbh or greater (Lafayette Reservoir Recreation Area; north of Nemea Court)
		C-MORPL-3 C-MORPL-4	None (south of Nemea Court to Via Granada Road)	90–150 (south of Nemea Court to Via Granada Road)	None (south of Nemea Court to Via Granada Road)	50–60 oak with 12-inch dbh or greater and 40–90 native trees with 5-inch dbh or greater (south of Nemea Court to Via Granada Road)
		C-MORPL-4 C-MORPL-5 C-MORPL-6 C-MORPL-7	None (south of Sky Ranch Road)	None (south of Sky Ranch Road)	None (south of Sky Ranch Road)	None (south of Sky Ranch Road)

TABLE 3.6-4 (Continued)[a]
TREE IMPACTS AT THE WTTIP PROJECT SITES

Project Sites	City or County	Map	Approximate Number of Trees to be Removed	Approximate Number of Trees Potentially Damaged	Approximate Number of Protected Trees to be Removed	Approximate Number of Protected Trees Potentially Damaged
Sunnyside Pumping Plant	Lafayette/ Orinda	C-SUNPP-1	13 redwood and pine	17 redwood and pine	3 pine with 6-inch dbh or greater	2 redwood with 6-inch dbh or greater
Tice Pumping Plant and Pipeline	Contra Costa County	C-TICEPP-2	7–10 oak (pumping plant)	42 oak, 5–10 riparian (pipeline)	7–10 oak with 6.5-inch dbh or greater (pumping plant)	42 oak, 5–10 riparian with 6.5-inch dbh or greater (pipeline)
Withers Pumping Plant	Contra Costa County	C-WITHPP-1	35–40 pine, eucalyptus, oak	None	5–10 oak with 6.5-inch dbh or greater	None

Notes:
dbh = diameter at breast (standard) height
All pines indicated are non-native.
[a] Excludes program-level facilities.
[b] With the exception of the Lafayette Creek crossing shown in Map D-LWTP-1 or Map D-LWTP-2, the Lafayette Reclaimed Water Pipeline would be constructed concurrently with and would be co-located with the Bryant and Leland Pipelines or the Orinda-Lafayette Aqueduct, as well as the Highland Reservoir pipelines. Therefore, the Lafayette Reclaimed Water Pipeline tree impacts included in this table and throughout this section are for the Lafayette Creek crossing only. Impacts resulting from installation of the remaining portions of the Lafayette Reclaimed Water Pipeline are included within the Lafayette WTP Alternative 1, Orinda-Lafayette Aqueduct, and Highland Pipeline discussions.

Most proposed pipeline alignments are in roads or disturbed developed areas. Tree removal is not anticipated along pipeline alignments that follow roads. However, trees with canopies overhanging roads likely have roots extending beneath the roadbed that might be damaged by trenching activities.

The removal of or potential damage to protected trees is considered a significant impact. Implementation of Measures 3.6-1a through 3.6-1e would reduce these impacts to a less-than-significant level at all WTTIP projects sites, with the exception of the proposed Highland Reservoir and Pipelines (see the discussion below and Table 3.6-3 for the level of significance at each project site). Measures applicable to proposed projects are listed in Tables 3.6-5 and 3.6-6.

Lafayette WTP, Orinda WTP, Sobrante WTP, and Upper San Leandro WTP

Under Alternative 1 for facilities at the Lafayette WTP, and under either Alternative 1 or 2 for facilities at the Orinda, Sobrante, and Upper San Leandro WTPs, construction activities would result in removal of or damage to trees that meet the criteria for protection in the applicable tree ordinances. Most trees that would be removed or potentially damaged due to proposed construction at the Orinda, Sobrante, and Upper San Leandro WTPs were planted as ornamental landscape. Some trees that would be removed or potentially damaged at the Sobrante and Lafayette WTPs are native riparian trees or naturally occurring native trees, such as trees in riparian habitat along Lafayette Creek and naturally occurring oak trees along Mt. Diablo Boulevard.

Proposed Pumping Plants and Reservoirs

The following proposed sites have been previously developed: the Ardith Reservoir/Donald Pumping Plant, Fay Hill Pumping Plant and Pipeline Improvements, Fay Hill Reservoir, Moraga Reservoir, and Withers Pumping Plant. Proposed development at these sites would remove and/or potentially damage planted native and non-native trees, of which some are protected (see Table 3.6-4). The proposed sites for the Happy Valley Pumping Plant, Sunnyside Pumping Plant, and Tice Pumping Plant are undeveloped natural areas. The Happy Valley Pumping Plant site supports non-native grassland, as well as a large area of mixed oak woodland in which most trees would be protected. The Sunnyside Pumping Plant supports primarily non-native grassland but a number of planted pine, redwood, pepper tree, and oak also occur there. While most of these trees are not large enough to qualify as protected, a few pine and redwood at this site would be considered protected. The Tice Pumping Plant site primarily supports non-native grassland, but has a few protected trees.

Vegetation along the proposed pipeline alignments and permanent and temporary access roads associated with the Highland Reservoir project consists of planted pines that are not locally native, as well as naturally occurring mixed oak woodland. Many of these trees would be considered protected under the City of Lafayette tree ordinance. Vegetation at the proposed site of the Highland Reservoir consists of non-native grassland, coyote brush, and numerous large-diameter (mostly 30 inches at standard height and greater), multi-stemmed oak trees within mixed oak woodland. Approximately 30 to 35 oak trees are proposed for removal at the reservoir site.

TABLE 3.6-5
SUMMARY OF APPLICABLE MITIGATION MEASURES – IMPACTS 3.6-1, 3.6-2

Facility	Measure 3.6-1a Tree Protection Measures During Construction	Measure 3.6-1b Protected Tree Pruning and Replacement	Measure 3.6-1c Protected Tree Monitoring	Measure 3.6-1d Replacement Tree Monitoring Program	Measure 3.6-1e Protected Tree Avoidance / Minimization Measures	Measure 3.6-2a Wetland and Stream Avoidance / Minimization Measures	Measure 3.6-2b Construction Exclusion Zone (Wetland and Riparian Habitat)	Measure 3.6-2c Complete Wetland Delineation, Acquire and Comply with Applicable Permits / Agreements	Measure 3.6-2d Install Energy Dissipaters	Measure 3.6-2e Special Construction Techniques near Riparian Habitat	Measure 3.6-2f Water Quality Protection Measures
Lafayette WTP											
Alternative 1	✓	✓	✓	✓	–	✓	✓	✓	✓	✓	✓
Alternative 2											
Orinda WTP											
Alternative 1	✓	✓	✓	✓	–	–	–	–	–	–	–
Alternative 2	✓	✓	✓	✓	–	–	✓	✓	✓	✓	✓
Walnut Creek WTP *Alternatives 1 and 2*	–	–	–	–	–	–	✓	✓	–	–	✓
Sobrante WTP *Alternatives 1and 2*	✓	✓	✓	✓	–	–	✓	✓	–	✓	✓
Upper San Leandro WTP *Alternatives 1 and 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	✓	✓	✓	✓	–	–	–	–	–	–	–

✓ = Applicable Impact
– = No Impact

TABLE 3.6-6
SUMMARY OF APPLICABLE MITIGATION MEASURES – IMPACTS 3.6-3. 3.6-4, 3.6-5, 3.6-6, 3.6-7

Facility	Measure 3.6-3a Special-Status Plant Surveys	Measure 3.6-3b Special-Status Plant Avoidance, Restoration, and Monitoring Measures	Measure 3.6-3c Revegetation of Disturbed Areas	Measure 3.6-4a Nesting Bird Avoidance Measures	Measure 3.6-4b Burrowing Owl Avoidance Measures	Measure 3.6-4c Bald Eagle Avoidance Measures	Measure 3.6-5 Special-Status Bats Avoidance Measures	Measure 3.6-6 San Francisco Dusky-Footed Woodrat Avoidance Measures	Measure 3.6-7a Special-Status Aquatic Species Avoidance Measures	Measure 3.6-7b California Red-Legged Frog Avoidance Measures	Measure 3.6-7c Western Pond Turtle / Foothill Yellow-Legged Frog Avoidance Measures
Lafayette WTP											
Alternative 1	✓	✓	✓	✓	–	–	✓	✓	✓	✓	✓
Alternative 2	–	–	✓	✓	–	–	✓	–	✓	–	–
Orinda WTP											
Alternative 1	–	–	✓	✓	–	–	–	–	–	–	–
Alternative 2	–	–	✓	✓	–	–	✓	✓	✓	–	–
Walnut Creek WTP *Alternatives 1 and 2*	–	–	✓	✓	–	–	✓	–	–	–	–
Sobrante WTP *Alternatives 1and 2*	–	–	✓	✓	–	–	✓	–	✓	✓	✓
Upper San Leandro WTP *Alternatives 1 and 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	–	–	✓	✓	–	–	–	–	–	–	–

✓ = Applicable Impact
– = No Impact

All of these trees would be protected by the City of Lafayette's tree ordinance. On the basis of the number of multi-stemmed, large-diameter native oak trees, this analysis concludes that no measures can fully mitigate this loss. Impacts to trees at the proposed reservoir site would be considered significant and unavoidable.

Pipelines

Construction along the proposed pipeline alignments for the Fay Hill Pumping Plant and Pipeline Improvements, Happy Valley Pumping Plant, Tice Pumping Plant, Lafayette Reclaimed Water Pipeline, Moraga Road Pipeline, and Glen Pipeline projects would potentially damage trees that meet the criteria for protection in the applicable tree ordinance. Construction of the new pipeline components of the Orinda Lafayette Aqueduct as well as the Leland Isolation Pipeline and Bypass Valves project near the Danville Pumping Plant may result in removal of protected trees.

Mitigation Measures

Measure 3.6-1a: For each project site (except for the Walnut Creek WTP and the Lafayette WTP under Alternative 2), EBMUD will prepare a map indicating the trees to be removed and retained (preserved). Prior to the start of any clearing, stockpiling, excavation, grading, compaction, paving, change in ground elevation, or construction, retained trees that are adjacent to or within project construction areas will be identified and clearly delineated by protective fencing (e.g., short post and plank walls), which will be installed at the dripline of each tree to hold back fill. The delineation markers will remain in place for the duration of all construction work. Where proposed development or other site work must encroach upon the dripline of a preserved tree, special construction techniques will be required to allow the roots of remaining trees within the project site to breathe and obtain water (examples include, but are not limited to, using hand equipment for trenching and/or allowing only one pass through a tree's dripline). Tree wells or other techniques may be used where advisable by a certified arborist. Excavation adjacent to any trees will be performed in a manner that causes only minimal root damage. The following will not occur within the dripline of any retained tree: parking; storage of vehicles, equipment, machinery, stockpiles of excavated soils, or construction materials; or dumping of oils or chemicals.

Measure 3.6-1b: For each project site (except for the Walnut Creek WTP and the Lafayette WTP under Alternative 2), all pruning of preserved trees will be performed by a certified arborist. No more than 25 percent of a tree's canopy will be removed during the pruning of retained trees. If any protected tree native to the local area, such as valley oak and coast live oak, is removed, the District will replace the tree on a 3:1 basis. All removed non-native protected trees will be replaced at a 1:1 ratio with a non-invasive tree species. Non-native trees removed from a natural environment will be replaced with a native species that occurs locally in the area.

Measure 3.6-1c: For each project site (except for the Walnut Creek WTP and the Lafayette WTP under Alternative 2), the District will guarantee the health of all trees to be preserved within and adjacent to the construction corridor of project-related pipeline and facility sites for three years. The guarantee period for a tree will be five years if the District constructs or installs improvements or performs approved mechanical excavation within the dripline of any tree. The District will replace any tree that is to be retained but that dies as a result of project construction activities during the guarantee period with a tree of the same species.

The replaced trees would be subject to the same monitoring protocols as those protected trees removed due to construction.

Measure 3.6-1d: For each project site (except for the Walnut Creek WTP and the Lafayette WTP under Alternative 2), the District will develop and implement a five-year tree monitoring program. Appropriate performance standards may include, but are not limited to: a 75 percent survival rate of tree plantings and the ability to be self-sustaining at the end of five years.

Measure 3.6-1e: The alignments for the Highland Reservoir pipelines and Moraga Road Pipeline will be refined in the field, to the extent feasible and within hydraulic constraints, to avoid removal of protected trees. Refined alignments will be flagged in the field, then surveyed and mapped in accordance with Measure 3.6-1a. District Biologists will review pipeline alignments, supervise delineation of construction work areas, and monitor initial vegetation removal for construction activities within the Lafayette Reservoir Recreation Area. Where removal of protected trees cannot be avoided, trees will be replaced in accordance with Measure 3.6-1b.

Impact 3.6-2: Degradation to streams, wetlands, and riparian habitats potentially subject to state and federal protection during construction.

No construction activities for project-level improvements would occur at or near (within 100 feet) streams, wetlands, or riparian habitat at the following WTTIP project sites: Upper San Leandro WTP (Alternative 1 or 2), Ardith Reservoir/Donald Pumping Plant, Fay Hill Pumping Plant and Pipeline Improvements, Fay Hill Reservoir, Moraga Reservoir, and Sunnyside Pumping Plant. Therefore, there would be no impacts on features potentially subject to Section 401 and 404 of the Clean Water Act and Sections 1600–1616 of the California Fish and Game Code from construction of these facilities.

Construction activities for the Withers Pumping Plant would involve paving a portion of an underground seasonal drainage that is contained within a corrugated-metal pipe (see Map D-WITHPP-1 following Chapter 2). The drainage flows east toward a storm drain at Reliez Valley Road and on to Grayson Creek. Impacts to this drainage would be minimal or nonexistent, as there is no riparian habitat associated with this drainage. No mitigation is required, unless the flow is redirected. If the flow is redirected, then implementation of Measures 3.6-2a through 3.6-2f, below, would reduce impacts to a less-than-significant level.

At the remaining WTTIP project sites, if grading and excavation occur during the rainy season, some creeks could be temporarily, indirectly affected by soil runoff. These activities, as well as dewatering into creeks during construction (see Section 3.5, Hydrology and Water Quality, for a full discussion of the potential for dewatering at each project site), could increase sediments and construction fluids in creeks, causing turbidity and reduced water quality. These conditions could cause clogged air passages and suffocation for aquatic species as well as the smothering of eggs. Open-trench construction across drainages (streams) and removal or disturbance of riparian habitat would result in significant effects. Trenching activities would expose these water features to temporary disturbance, such as excavation, soil erosion, and undercutting, which could result in habitat degradation. The loss of riparian vegetation would reduce nutrients, organic matter, and shade and could result in habitat fragmentation. Construction and operation of the Lafayette Reclaimed Water Pipeline could have water quality effects on Lafayette Reservoir through discharges of chloraminated water (see below and Section 3.5, Hydrology and Water Quality, for more information). Affected streams, wetlands, and riparian habitat at the remaining WTTIP project sites are described below.

Impacts to streams, wetlands, and riparian habitat would be significant. Implementation of Measures 3.6-2a through 3.6-2f (as well as erosion control measures described in Section 3.5, Hydrology and Water Quality) would reduce these significant impacts to a less-than-significant level.

Lafayette WTP

Alternative 1

Construction activities at the Lafayette WTP under Alternative 1 would require two crossings of Lafayette Creek, one crossing of a tributary to Lafayette Creek, and the removal of riparian habitat along Mt. Diablo Boulevard (see Map C-LWTP-1). Riparian habitat removal and creek bed and bank disturbance also could occur during construction of the clearwell No. 2 overflow discharge, relocation of the existing trail, and construction of several structures. Open-trench construction activities at the Lafayette WTP for the Leland and Bryant Pipelines and the clearwell overflow discharge pipe would adversely affect less than 0.10 acre of Lafayette Creek and an intermittent drainage that crosses Mt. Diablo Boulevard (based on a construction width of 40 feet). Pipeline construction along Mt. Diablo Boulevard would occur within the road and/or grassland habitat to avoid riparian habitat removal. Construction activities for these pipelines as well as for the chlorine contact basin pipeline and backwash water recycle system facilities would disturb the root zone or require removal of approximately 0.50 acre of riparian vegetation along Lafayette Creek and the intermittent drainage. The loss of riparian vegetation would reduce nutrients, organic matter, and shade and could result in habitat fragmentation. Operation of the overflow discharge for the clearwells would result in erosion and increased sedimentation in Lafayette Creek. Direct impacts to the eastern portion of Lafayette Creek, where the creek crosses Mt. Diablo Boulevard, would be avoided, since pipeline construction activities would be confined to the concrete box above the drainage. However, approximately 0.05 acre of riparian habitat could be damaged during construction at this location.

Alternative 2

No construction activities for project-level improvements would occur at or near (within 100 feet) streams, wetlands, or riparian habitat at the Lafayette WTP under Alternative 2. Therefore, there would be no impacts on features potentially subject to Section 401 and 404 of the Clean Water Act and Sections 1600–1616 of the California Fish and Game Code from construction of this facility.

Orinda WTP

Alternative 1

No construction activities for project-level improvements would occur at or near (within 100 feet) streams, wetlands, or riparian habitat at the Orinda WTP under Alternative 1. Therefore, there would be no impacts on features potentially subject to Section 401 and 404 of the Clean Water Act and Sections 1600–1616 of the California Fish and Game Code from construction of this facility.

Alternative 2

Construction activities at the Orinda WTP under Alternative 2 would result in indirect effects on San Pablo Creek due to construction of the new Los Altos Pumping Plant No. 2 and electrical substations (see Maps C-OWTP-2 and D-OWTP-2). San Pablo Creek is situated downhill of the Orinda WTP. Construction activities would be confined to an area approximately 75 feet uphill of San Pablo Creek. San Pablo Creek could be temporarily affected by dewatering during construction and by soil runoff, particularly if grading and excavation occur in the rainy season. As a result, aquatic species could be adversely affected due to the smothering of eggs, clogged air passages, and suffocation.

Walnut Creek WTP – Alternative 1 or 2

Construction of facilities under Alternative 1 or 2 would result in indirect effects on a tributary to Grayson Creek. Construction activities would be confined to an area approximately 300 feet uphill of this tributary (see Map C-WCWTP-1). Grayson Creek could be temporarily, indirectly affected by soil runoff, particularly if grading and excavation occur in the rainy season.

Sobrante WTP – Alternative 1 or 2

Construction activities on the western side of the WTP would result in indirect effects on San Pablo Creek. San Pablo Creek is situated downhill and to the southwest of the proposed filter-to-waste equalization basin and high rate sedimentation units (see Map C-SOBWTP-1). A fence separates the proposed construction area from the creek; construction activities would be confined within the fence. However, San Pablo Creek could be temporarily, indirectly affected by soil runoff if grading and excavation occur during the rainy season.

Orinda-Lafayette Aqueduct – Alternative 2

The pipeline alignment of the proposed Orinda-Lafayette Aqueduct along El Nido Road would cross three seasonal drainages that flow toward Highway 24 (see Maps C-OLA-3 and C-OLA-4). Trenching activities would expose these features to temporary disturbance, as described above. Construction activities for this pipeline could result in minimal disturbance to the root zone of riparian vegetation along the road. EBMUD would implement jack-and-bore construction methods under Highway 24 to avoid impacts to Hidden Valley Creek. Open-trench construction activities at the Lafayette WTP for the Orinda-Lafayette Aqueduct would adversely affect the intermittent tributary (see Map C-LWTP-2) that crosses Mt. Diablo Boulevard and associated riparian habitat. This water feature would be exposed to temporary disturbance, such as excavation, soil erosion, and undercutting, during trenching activities. Pipeline construction activities along Mt. Diablo Boulevard would occur within the road and/or grassland habitat to avoid riparian habitat removal. However, this construction could disturb the root zone and damage approximately 0.10 acre of riparian vegetation at the intermittent drainage. Direct impacts to the eastern portion of Lafayette Creek, where the creek crosses under Mt. Diablo Boulevard at the Lafayette WTP, would be avoided because pipeline construction activities would be confined to the concrete box above the drainage. However, approximately 0.05 acre of riparian habitat could be damaged and two trees could be removed during construction.

Construction activities for the tunnel portion of the Orinda-Lafayette Aqueduct would avoid San Pablo Creek and Lauterwasser Creek. The crown of the proposed tunnel would be 50 to 100 feet below these creeks (see Map D-OLA-4). Microtunnel construction for the pipeline from the proposed Los Altos Pumping Plant No. 2 to the tunnel entry shaft would not cause impacts to San Pablo Creek and the two intermittent tributaries to San Pablo Creek. Microtunnel methods would avoid the drainages and upland vegetation (oak woodland, coyote brush, and grassland) that lie between the ballfields and the Orinda WTP.

Glen Pipeline Improvements

Construction activities for the eastern alignment of the Glen Pipeline project would cross a small intermittent drainage tributary to Happy Valley Creek (see Map C-GLENPL-3). Trenching activities would expose these features to temporary disturbance, as described above. Construction activities for this pipeline could result in minimal disturbance to the root zone or removal of riparian vegetation along the road.

Happy Valley Pumping Plant and Pipeline

The proposed site of the Happy Valley Pumping Plant is undeveloped and is situated within a residential area. The northern portion of the site supports three multi-stemmed, large-diameter oak trees, one two-stemmed, smaller-diameter oak tree, and non-native grassland; the southern portion of the site is oak woodland. Lauterwasser Creek parallels the southern boundary of the site. A tributary to Lauterwasser Creek parallels the western and southwestern boundaries of the site. Riparian habitat forms a dense canopy along both creeks. Construction of the proposed Happy Valley Pumping Plant would result in the removal of one valley oak and one coast live oak in the northern portion of the site. In addition, construction activities could result in potential damage to the root zones or canopies of additional oaks and adjacent riparian habitat.

Construction activities for the Happy Valley Pipeline along the road would cross Lauterwasser Creek and three intermittent tributaries to Lauterwasser Creek (see Maps C-HVPP-1, C-HVPP-2, and C-HVPP-3). Trenching activities would expose these features to temporary disturbance, as described above. Construction activities for this pipeline would result in minimal disturbance to the root zone and would require pruning of overhanging riparian vegetation along the road.

Highland Reservoir and Pipelines

Open-trench construction activities for the proposed pipeline alignments for the Highland Reservoir would adversely affect Lafayette Creek south of Mt. Diablo Boulevard (see Map C-HIGHRES-1) and a cattail wetland in Lafayette Reservoir. The proposed Highland Reservoir inlet/outlet Pipeline alignment crosses Lafayette Creek south of Mt. Diablo Boulevard. Construction activities for the pipeline would result in disturbance to the root zone or removal of riparian vegetation along Lafayette Creek. No riparian vegetation along the intermittent drainage would be damaged or removed. In addition, trenching for the overflow pipe would disturb the cattail wetland in Lafayette Reservoir.

The overflow pipeline would be extended into Lafayette Reservoir by floating it on top of the water and then sinking it to the bottom, where it would likely need to be anchored in place. This process would result in the filling of potentially jurisdictional waters and would be considered a significant impact. Trenching, grading, and other activities associated with construction of this pipeline adjacent to Lafayette Reservoir could also result in impacts to jurisdictional areas, including Lafayette Reservoir.

Lafayette Reclaimed Water Pipeline

The Lafayette Reclaimed Water Pipeline would carry water from the existing Lafayette WTP backwash water processing system to Lafayette Reservoir. Most segments of this pipeline would follow the alignments of, and/or be placed in the same trenches as, other proposed pipelines (the Leland/Bryant, Orinda-Lafayette Aqueduct, and Highland Pipeline) along Mt. Diablo Boulevard and through the Lafayette Reservoir Recreation Area to the reservoir. No additional wetlands impacts would result from installation of these portions of the pipeline other than those discussed above under the Highland Reservoir and Pipelines. Impacts resulting from installation of the pipeline segment extending from the WTP to Mt Diablo Boulevard are discussed in this section. The pipeline would be suspended across Lafayette Creek between two concrete abutments. Assuming a 20-foot-wide construction corridor, this process would result in the removal of approximately 0.46 acre of riparian habitat. Should it be necessary to trench across the creek, approximately 0.01 acre of perennial stream would be disturbed. With implementation of Measures 3.6-2a, 3.6-2b, 3.6-2c, 3.6-2e, and 3.6-2f, this potential impact would be reduced to a less-than-significant level.

Operation of the Lafayette Reclaimed Water Pipeline, including discharge of the Lafayette WTP filter backwash treatment system, could result in adverse water quality effects on Lafayette Reservoir through the introduction of chlorine, ammonia, nitrogen, and other materials. This impact is discussed fully in Section 3.5, Hydrology and Water Quality. Given compliance with effluent and receiving water limitations as well as monitoring requirements specified in applicable National Pollutant Discharge Elimination System (NPDES) permits the impacts to aquatic resources in the Reservoir would be less than significant.

Leland Isolation Pipeline and Bypass Valves

Construction activities for the new pipeline component of the Leland Isolation Pipeline and Bypass Valves project near the Danville Pumping Plant would avoid potentially jurisdictional areas. Construction activities for the pipeline in Danville Boulevard would avoid San Ramon Creek. However, pipeline construction activities would occur in the vicinity of a small drainage fed by a culvert under the recreational trail. This drainage flows through the adjacent residential area east of the Danville Pumping Plant and potentially to San Ramon Creek. The project could result in erosion, sedimentation, and other indirect effects to the drainage and potentially San Ramon Creek, particularly if grading and excavation occur in the rainy season.

Moraga Road Pipeline

The Moraga Road Pipeline area within the Lafayette Reservoir Recreation Area supports large valley oaks, coast live oaks, pines, riparian habitats, and coyote brush scrub interspersed with grassland. Along Moraga Road, adjacent habitats include ornamental vegetation associated with residential development as well as some grassland and oak woodland. Construction activities for the proposed Moraga Road Pipeline at the Lafayette Reservoir would cross two intermittent tributaries to Lafayette Creek south of Mt. Diablo Boulevard (see Map C-MORPL-1). The Moraga Road Pipeline would also cross two seasonal drainages near the Lafayette Reservoir Recreation Area (see Maps C-MORPL-2 and C-MORPL-3), one intermittent tributary to Las Trampas Creek near Nemea Court, and Laguna Creek at Buckingham Drive (see Maps C-MORPL-3 and C-MORPL-5). One drainage parallels Moraga Road near Nemea Court (Map C-MORPL-3). Laguna Creek parallels Moraga Road near Campolindo Drive (Map C-MORPL-4) and Devin Drive (Map C-MORPL-7). These drainages parallel Moraga Road within about 50 to 75 feet. Trenching activities would expose these water features to temporary disturbance, as described above. Construction activities for the pipeline would result in disturbance to the root zone or removal of riparian vegetation along these drainages. An intermittent drainage, supporting a cattail wetland, parallels the proposed pipeline alignment at Lafayette Reservoir. Cattail wetland is also present along Laguna Creek and would be avoided by construction activities.

Tice Pumping Plant and Pipeline

The proposed pipeline alignment crosses Las Trampas Creek, a tributary to Walnut Creek (see Map C-TICEPP-1). Open trenching activities would expose this water feature to temporary disturbance, as described above. Construction activities for this pipeline could result in minimal disturbance to the root zone or removal of riparian vegetation along the road.

Mitigation Measures

> **Measure 3.6-2a:** The District will avoid or minimize effects on streams and riparian habitat by confining construction activities to areas above or below the stream crossing, or by using jack-and-bore construction where feasible as determined by EBMUD and where no other sensitive habitat (e.g., stream, riparian habitat, or protected trees) or sensitive receptors would be affected by this construction technique.

Measure 3.6-2b: In coordination with a qualified biologist, the District will, to the extent feasible, establish a minimum 25-foot construction exclusion zone (from the edge of wetland, riparian habitat, or the creek banks, whichever is greater), using protective fencing, where features will be avoided by direct impacts.

Measure 3.6-2c: If impacts to potentially jurisdictional features and associated riparian vegetation cannot be avoided or minimized, then the District will obtain a qualified biologist to complete a wetland delineation in accordance with Corps guidelines and will obtain the appropriate permits/agreements, including a Section 401 water quality certification from the RWQCB, a Section 404 wetland permit from the Corps, and/or a Section 1602 Streambed Alteration Agreement from the CDFG. The District will implement all conditions contained in these permits. The District will recontour and revegetate temporarily disturbed portions of the creek at a ratio of 1:1 (or at a ratio agreed on by the wetland permitting agencies). The District will compensate for permanent wetland and stream impacts onsite at a ratio of 2:1 (or at a ratio agreed on by the wetland permitting agencies) with the same type of feature as the feature affected. If the District determines that onsite restoration is not feasible, the District will compensate for permanent impacts at a 3:1 ratio (or at a ratio agreed on by the permitting agencies). The District will develop and implement a five-year wetland mitigation and monitoring program. Appropriate performance standards may include, but are not limited to: a 75 percent survival rate or plant cover of restoration plantings; absence of non-native, invasive plant species; and a functioning, self-sustaining creek or wetland system at the end of five years.

As warranted following construction, the District will recontour and revegetate temporarily disturbed portions of creeks. Creek banks will be recontoured to a more stable condition if necessary. Revegetation will include a palette of species native to the watershed area. Following removal, woody trees would be replanted at a 1:1 ratio at minimum, or as determined and agreed on by the appropriate wetland permitting agencies. Interim measures to protect the unvegetated creek from erosion may be required. Interim measures may include replanting banks using native or sterile non-native seeds or seedlings following construction within the creek, removing non-native vegetation from stream banks, and employing biotechnical bank stabilization methods, such as willow wattles and biodegradable erosion control mats, where appropriate.

Measure 3.6-2d: Where applicable for overflow discharges into a creek or reservoir, the District will install energy dissipaters, such as riprap, in the creek to minimize erosion and water quality effects.

Measure 3.6-2e: Where construction activities occur adjacent to or within the dripline of riparian habitat, the District will implement special construction techniques to allow the roots of riparian trees to breathe and obtain water (examples include, but are not limited to, using hand equipment for tunnels and trenching, and allowing only one pass through a riparian tree's dripline). Excavation adjacent to or within the dripline of any riparian tree will occur in a manner that causes only minimal root damage.

Measure 3.6-2f: The District will implement the following measures:

- Ensure that work activities at creeks are completed during the low-flow period (between April 1 and October 15), unless otherwise approved by appropriate regulatory agencies (e.g., RWQCB, Corps, CDFG).

- Store equipment and materials away from waterways to the extent feasible as determined by the District. No debris will be deposited within 60 feet of creeks for most WTTIP projects.

- Provide proper and timely maintenance for vehicles and equipment used during construction to reduce the potential for mechanical breakdowns leading to a spill of materials into or around the creeks. Maintenance and fueling will be conducted away from the creek.

- To control erosion, install silt fencing material at the edge of established buffer zones for riparian habitat, or at the edge of the creek where no riparian habitat is present (see Measure 3.6-2b).

- Minimize the removal of riparian and wetland vegetation.

Impact 3.6-3: Loss or damage to special-status plants and sensitive natural communities.

No suitable habitat for special-status plants occurs at the following WTTIP project sites: Orinda WTP (Alternative 1 or 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, Ardith Reservoir and Donald Pumping Plant, Fay Hill Pumping Plant and Pipeline Improvements, Fay Hill Reservoir, Leland Isolation Pipeline and Bypass Valves, Moraga Reservoir, Sunnyside Pumping Plant, and Withers Pumping Plant. The remaining WTTIP project sites contain potential habitat for special-status plants, as described below.

Lafayette WTP, Glen Pipeline Improvements, Happy Valley Pumping Plant and Pipeline, Highland Reservoir and Pipelines, Lafayette Reclaimed Water Pipeline, Moraga Road Pipeline, and Tice Pumping Plant and Pipeline

Impacts on potential habitat for nonlisted species[8], including bent-flowered fiddleneck (*Amsinckia lunaris*), big-scale balsamroot (*Balsamorhiza macrolepis* var. *macrolepis*), Mt. Diablo fairy-lantern (*Calochortus pulchellus*), Franciscan thistle (*Cirsium andrewsii*), Diablo rock-rose (*Helianthella castanea*), Kellog’s horkelia (*Horkelia cuneata* ssp. *sericea*), and Oregon meconella (*Meconella oregana*), would occur along the undeveloped portion of the Moraga Road Pipeline alignment within coyote brush scrub, grassland, and/or openings in mixed oak woodland. Impacts on potential habitat for nonlisted Northern California black walnut and western leatherwood would occur within riparian corridors along streams at the following project sites: Lafayette WTP (Alternative 1), Glen Pipeline Improvements, Happy Valley Pumping Plant and Pipeline, Highland Reservoir and Pipelines, Lafayette Reclaimed Water Pipeline, Moraga Road Pipeline, and Tice Pumping Plant and Pipeline.

Construction activities, such as trenching for pipelines, within habitat for special-status plants could result in direct and indirect disturbance or morality. Potential construction effects include

[8] Nonlisted species are special-status species (as defined in this report) that are not protected under FESA or CESA.

removal of or damage to special-status plants or roots, soil compaction, trampling, and dust, which would eliminate light and reduce gas exchange.

Implementation of Measures 3.6-3a through 3.6-3c (as well as measures in Section 3.9, Air Quality, and implementation of erosion control measures described in Measure 3.6-2f, above, and Section 3.5, Hydrology and Water Quality) would reduce the effects on special-status plants to a less-than-significant level.

Sensitive natural communities occur at the following WTTIP project sites: Highland Reservoir and Pipelines (mixed perennial grassland, valley oak–coast live oak woodland, cattail wetland), Moraga Road Pipeline (mixed perennial grassland, creeping ryegrass grassland, arroyo willow riparian scrub), and Happy Valley Pumping Plant (valley oak-coast live oak woodland). Construction at these sites would result in temporary and permanent impacts to sensitive plant communities. Impacts on cattail wetland and arroyo willow riparian scrub are addressed under Impact 3.6-2 and would be reduced to a less-than-significant level through the implementation of Measures 3.6-2a through 3.6-2f. Impacts on mixed perennial grassland, creeping ryegrass grassland and valley oak–coast live oak woodland would be reduced to less-than-significant levels through the implementation of Measures 3.6-3a through 3.6-3c.

Mitigation Measures

Measure 3.6-3a: The District will require that a presence/absence survey for special-status plant species be conducted within the limits of construction by a qualified botanist during the year prior to construction. Surveys will be conducted using CDFG or USFWS survey guidelines. All surveys will be conducted during the period when the species are identifiable and will be repeated seasonally, as needed, to provide a complete species list. The results of the surveys will be filed as part of the project administrative record; if the presence of any of these species is confirmed, a copy of the survey results will be forwarded to the CDFG and/or USFWS. In the event that special-status species are proven absent, then no additional mitigation is necessary.

In addition, the sensitive plant communities that are located within the project site footprints will be mapped and quantified prior to construction to aid in later avoidance, revegetation, and replacement efforts.

Measure 3.6-3b: In the event that nonlisted special-status plant species or sensitive plant communities are present or assumed present within or immediately adjacent to the limits of construction, the District will avoid these species or sensitive plant communities and establish a visible buffer zone (25 feet at minimum) prior to construction, in coordination with a qualified biologist, or will redesign or relocate the proposed structure and/or staging area. If the District determines that it is not feasible to avoid disturbance or mortality, then special-status plant habitat and/or sensitive plant communities will be restored at a 1:1 ratio. If feasible, special-status plants will be salvaged. A five-year restoration mitigation and monitoring program will be developed and implemented. Appropriate performance standards may include, but are not limited to: a 75 percent survival rate of restoration plantings or plant cover; absence of invasive plant species; and a functioning, self-sustainable plant community at the end of five years.

Measure 3.6-3c: At all WTTIP project sites, the District will revegetate all natural areas temporarily disturbed due to project activities. Areas supporting sensitive plant communities will be restored using locally collected plant materials specific to that community. For all sites, revegetation criteria will include general restoration concepts and methods, including use of locally native plant material, protection and restoration of soil conditions, irrigation, and control of aggressive non-native species. The planting effort will commence in the fall following construction at the project site. Sites disturbed prior to the planting effort will be treated immediately with a (1) seed mixture and mulch using broadcast methods, or (2) hydroseed. The plant palette will include native plants found locally, such as coffeeberry, sticky monkeyflower, miniature lupine, California poppy, purple needlegrass, California brome, and blue wild rye. All revegetated sites will be monitored for five years. Success criteria to be met at the end of five years may include: at least 80 percent survival of plantings, 75 percent vegetative cover by desirable species, and a viable, self-sustaining plant community.

Impact 3.6-4: Disturbance to nesting raptors, other special-status nesting birds, or bald eagle.

Cooper’s hawk, sharp-shinned hawk, red-tailed hawk, red-shouldered hawk, white-tailed kite, osprey, northern harrier, golden eagle, burrowing owl (and other raptors), as well as Bell’s sage sparrow, oak titmouse, yellow warbler, Pacific-slope flycatcher, California horned lark, yellow-breasted chat, loggerhead shrike, Allen’s hummingbird, Bewick’s wren, and California thrasher may forage and nest in the vicinity of WTTIP project sites. Rufous hummingbird may occur in the WTTIP project area during the nonbreeding season. In addition, bald eagle, merlin, and other raptors are known to winter at the Lafayette Reservoir outside WTTIP project sites and in portions of San Pablo Reservoir Recreation Area. These species may occasionally roost near the WTTIP project area. The above-mentioned species are protected as former federal species of concern, California species of special concern, and/or under the California Fish and Game Code. Bald eagle is protected under FESA as a threatened species. Other native birds, including nests and eggs, are protected during nesting under the California Fish and Game Code.

Construction activities during the breeding season (including clearing, grading, trimming, and removal of trees, shrubs, and other nesting habitat for pipelines, bore-and-jack pits, and project facilities) could result in direct mortality of special-status birds. Human disturbance and construction noise could cause nest abandonment, death of young, or loss of reproductive potential at active nests located near project activities. Construction activities within or adjacent to suitable grassland habitat for burrowing owls could result in direct mortality, nest destruction, and noise disturbance. Tree removal and other construction activities could result in adverse impacts to wintering bald eagles through direct and indirect disturbance and habitat removal. These impacts would be significant. Implementation of Measures 3.6-4a through 3.6-4c would reduce these impacts to special-status bird species to a less-than-significant level.

At the Lafayette Reservoir, the proposed project would not remove any trees or habitat known to be utilized by bald eagle. Bald eagle use of the WTTIP project area is likely restricted to occasional roosting and foraging. Construction disturbance to native habitats that potentially support other special-status birds would be temporary and primarily linear. The majority of native habitat disturbed during project construction would occur at the following project sites: Highland Reservoir and Pipelines, Moraga Road Pipeline, pipeline crossings at Lafayette Creek, Orinda WTP, and Orinda-Lafayette Aqueduct. Most riparian habitats would be avoided by performing construction within paved roads above or below drainage culverts. As discussed above in Measures 3.6-1a through 3.6-1d, Measures 3.6-2a through 3.6-2f, and Measure 3.6-3c, riparian habitats, protected trees, and other sensitive areas, such as native grasslands, would be revegetated or replaced upon completion of construction. In addition, these impact areas represent a small portion of the available nesting, foraging, and wintering habitat for special-status birds in the project region. The above-mentioned pipelines are located within and adjacent to the Lafayette Reservoir Recreation Area, which provides 925 acres of contiguous grassland, woodland, and scrub habitat. Water treatment plants and other developed WTTIP project sites, such as Ardith Reservoir and Donald Pumping Plant, support ornamental vegetation that would be removed to accommodate proposed activities. The majority of these sites are located within residential developments with ornamental vegetation that provide similar habitat values for nesting, foraging, and wintering birds. Removal of ornamental vegetation would not substantially reduce the available habitat in the WTTIP project area or affect local populations of special-status birds. With implementation of Measures 3.6-1a through 3.6-1d and Measure 3.6-4c, the proposed project would not result in significant impacts to the nesting, foraging, and wintering habitat of special-status birds or bald eagles.

Lafayette WTP

Oaks, eucalyptus, and other trees and shrubs at the existing Lafayette WTP and riparian habitat in the adjacent Lafayette Creek may provide nesting habitat for Cooper's hawk, sharp-shinned hawk, red-tailed hawk (and other raptors), oak titmouse, Pacific-slope flycatcher, Allen's hummingbird, and other special-status birds protected under the California Fish and Game Code.

Alternative 1

As discussed in Impacts 3.6-1 and 3.6-2, construction of clearwells, the Leland and Bryant Pipelines, and other facilities would require the removal of or construction adjacent to: oaks, eucalyptus, and other trees and shrubs surrounding the Lafayette WTP; riparian habitat along Lafayette Creek; and other habitats that potentially support nesting birds.

Alternative 2

As discussed in Impacts 3.6-1 and 3.6-2, no trees or riparian habitat would be removed under Alternative 2. Impacts to special-status birds due to indirect disturbance in adjacent habitat are discussed above.

Orinda WTP

Oaks, eucalyptus, pines, and other ornamental trees and shrubs surrounding facilities at the Orinda WTP may provide nesting and foraging habitat for special-status birds. In addition, the well-developed riparian corridor of San Pablo Creek adjacent to the north side of the Orinda WTP and the dense oak woodland between the ballfields and the Orinda WTP provide large trees and a dense understory for nesting raptors and other birds. Special-status bird species that may nest within and surrounding the Orinda WTP site include Cooper's hawk, sharp-shinned hawk, red-tailed hawk (and other raptors), oak titmouse, Pacific-slope flycatcher, Allen's hummingbird, and Bewick's wren.

Alternative 1

Under Alternative 1, new facilities would be constructed primarily within mowed grassland at the Orinda WTP. However, construction activities could result in disturbance to adjacent ornamental vegetation.

Alternative 2

Project facilities under Alternative 2 would be constructed primarily within mowed grassland and developed areas and would result in limited tree and shrub removal. Some oak woodland would be disturbed or removed during construction of the clearwell and substations. Construction would also occur adjacent to the San Pablo Creek riparian corridor, which provides habitat for breeding birds.

Walnut Creek WTP – Alternative 1 or 2

Ornamental vegetation on the Walnut Creek WTP site as well as grassland, riparian habitat, and oak woodland surrounding the site provide nesting habitat for special-status birds such as Cooper's hawk, sharp-shinned hawk (and other raptors), oak titmouse, Pacific-slope flycatcher, loggerhead shrike, and Allen's hummingbird. Project facilities would be constructed within previously disturbed areas that do not support vegetation. Thus, the potential for direct disturbance to special-status bird nesting habitat is very low, and potential impacts would primarily include indirect disturbance.

Sobrante WTP – Alternative 1 or 2

Grassland and ornamental oaks, pines, and other trees and shrubs within the Sobrante WTP provide potential nesting habitat for special-status birds. In addition, the dense riparian corridor of San Pablo Creek adjacent to the settling basins on the western side of the plant provides suitable nesting habitat. Special-status birds potentially nesting within the Sobrante WTP site and/or adjacent riparian habitat include Cooper's hawk, sharp-shinned hawk (and other raptors), oak titmouse, Pacific-slope flycatcher, and Allen's hummingbird. Construction activities would occur within ornamental vegetation on the Sobrante WTP site. Though some ornamental vegetation would be removed to accommodate the proposed project, construction activities would avoid riparian habitat for breeding birds along San Pablo Creek.

Upper San Leandro WTP – Alternative 1 or 2

Ornamental redwoods, pines, and other trees and shrubs within and surrounding the Upper San Leandro WTP site provide potential nesting habitat for special-status birds such as Allen's hummingbird, Cooper's hawk, sharp-shinned hawk, and other raptors. Activities associated with the construction of proposed facilities would result in the removal of ornamental trees and shrubs.

Orinda-Lafayette Aqueduct – Alternative 2

The Orinda-Lafayette Aqueduct site and vicinity contains pines and other ornamental trees and shrubs, grassland, oak woodland, as well as riparian habitat associated with Lafayette Creek and San Pablo Creek. The dense oak woodland between the ballfields and the Orinda WTP provides large trees and a dense understory for nesting raptors and other birds. Special-status bird species with the potential to nest in and around the project site include Cooper's hawk, sharp-shinned hawk, red-tailed hawk (and other raptors), oak titmouse, Pacific-slope flycatcher, Allen's hummingbird, and Bewick's wren. Removal of and construction adjacent to potential habitat for special-status nesting birds (i.e., grassland, coastal scrub, oak woodland, ornamental, and riparian habitats) would occur during construction of the pipeline along El Nido Ranch Road and Mt. Diablo Boulevard, microtunneling of the pipeline between the ballfields and the Orinda WTP, and other activities near San Pablo Creek, Lafayette Creek, and several small drainages, as discussed in Impacts 3.6-1 and 3.6-2.

Ardith Reservoir and Donald Pumping Plant

Ornamental oaks, pines, eucalyptus, and other trees and shrubs within and surrounding the Ardith Reservoir and Donald Pumping Plant site provide potential nesting habitat for special-status birds such as Cooper's hawk, sharp-shinned hawk (and other raptors), oak titmouse, Pacific-slope flycatcher, and Allen's hummingbird. Activities associated with construction of these facilities would result in the removal of ornamental trees and shrubs.

Fay Hill Pumping Plant and Pipeline Improvements

Monterey pines, redwoods, and other ornamental vegetation adjacent to the Fay Hill Pumping Plant and Pipeline Improvements site have the potential to support nesting raptors, such as Cooper's hawk and sharp-shinned hawk, and other special-status birds. A large expanse of grassland habitat located across Rheem Boulevard provides potential raptor foraging habitat and increases the value of these ornamental trees as nesting and roosting habitat. Red-tailed hawks were observed foraging uphill from this area near the Fay Hill Reservoir. Activities associated with construction of the Fay Hill Pumping Plant and Pipeline Improvements could result in the removal of ornamental trees and shrubs.

Fay Hill Reservoir

The existing Fay Hill Reservoir is located atop an undeveloped hill and surrounded by potential grassland foraging and/or nesting habitat for burrowing owls, northern harriers, and other raptors. Two red-tailed hawks were observed foraging near the reservoir during the site survey. Monterey pines around the reservoir provide potential nesting habitat for raptors such as Cooper's hawk, sharp-shinned hawk, red-tailed hawk, golden eagle, and white-tailed kite. Other special-status birds, such as California horned lark and loggerhead shrike, may also nest and/or forage in the surrounding grasslands. Construction activities associated with the new Fay Hill Reservoir would result in some removal of Monterey pine and grassland. Following construction, the area would be revegetated (see Measures 3.6-1a through 3.6-1d).

Glen Pipeline Improvements

The Glen Pipeline Improvements site is surrounded primarily by residential development with plantings of oaks, eucalyptus, and other ornamental trees and shrubs. In addition, the pipeline alignment crosses a small drainage supporting riparian habitat at the road culvert. These habitats have the potential to support Cooper's hawk, sharp-shinned hawk (and other raptors), oak titmouse, Pacific-slope flycatcher, Allen's hummingbird, and other special-status nesting birds. Activities associated with construction of the Glen Pipeline could result in the disturbance of ornamental trees and shrubs and the trimming or disturbance of riparian vegetation.

Happy Valley Pumping Plant and Pipeline

Woodland, ornamental, and riparian habitats along the pipeline alignment and pumping plant site may support special-status birds such as Cooper's hawk, sharp-shinned hawk, red-tailed hawk (and other raptors), oak titmouse, Pacific-slope flycatcher, and Allen's hummingbird. Activities associated with construction of the pipeline and pumping plant would result in the removal and disturbance of oaks and ornamental trees and shrubs and the trimming or disturbance of riparian vegetation.

Highland Reservoir and Pipelines

The Highland Reservoir and Pipelines site within the Lafayette Reservoir Recreation Area contains large valley oaks, coast live oaks, and pines interspersed with grassland and some coyote brush, as well as cattail wetland and the Lafayette Creek riparian corridor (see Impact 3.6-1, above). These habitats may support nesting birds such as Cooper's hawk, sharp-shinned hawk, golden eagle, red-tailed hawk, white-tailed kite, osprey (and other raptors), oak titmouse, Bewick's wren, and California thrasher, which are known to occur within the Lafayette Reservoir Recreation Area. The Highland Reservoir and Pipelines project area may also support Pacific-slope flycatcher and Allen's hummingbird. There are no known occurrences of bald eagle in the vicinity of this project site. Bald eagle use of this area is restricted to occasional foraging by wintering bald eagles using other portions of the Lafayette Reservoir.

Activities associated with construction of the Highland Reservoir and Pipelines would result in the removal of native and non-native trees and shrubs, as discussed in Impacts 3.6-1 and 3.6-2. Although the proposed Highland Reservoir inlet/outlet pipeline would cross Lafayette Creek at the culvert, some trimming or disturbance of riparian vegetation would likely occur.

Lafayette Reclaimed Water Pipeline

Riparian habitat along Lafayette Creek may provide nesting habitat for Cooper's hawk, sharp-shinned hawk, red-tailed hawk (and other raptors), oak titmouse, Pacific-slope flycatcher, Allen's hummingbird, and other special-status species protected under the California Fish and Game Code. As discussed in Impacts 3.6-1 and 3.6-2, construction of the Lafayette Reclaimed Water

Pipeline would result in the removal and disturbance of riparian habitat along Lafayette Creek. Potential impacts to special-status birds from construction activities are discussed above.

Operation of the Lafayette Reclaimed Water Pipeline, including discharge of the Lafayette WTP filter backwash treatment system, could result in adverse water quality effects on Lafayette Reservoir through increased water temperature and the introduction of chlorine, ammonia, nitrogen, and other materials. This impact is discussed fully in Section 3.5, Hydrology and Water Quality. Given compliance with effluent and receiving water limitations as well as monitoring requirements specified in applicable NPDES permits, potential impacts to aquatic habitat within Lafayette Reservoir and to bald eagle and other associated special-status species would be less than significant.

Leland Isolation Pipeline and Bypass Valves

The Leland Isolation Pipeline and Bypass Valves area along Lacassie Avenue is surrounded by commercial development. Ornamental street trees provide the only vegetation along the alignment and may be used by mourning dove, rock dove, and other species found in urbanized habitats. Tree removal is not proposed along Lacassie Avenue. Thus, potential impacts to special-status birds would result from indirect construction disturbance, as discussed above. Oaks and other trees along the new pipeline alignment near the Danville Pumping Plant may support special-status birds such as Cooper's hawk, sharp-shinned hawk, red-tailed hawk (and other raptors), oak titmouse, Pacific-slope flycatcher, and Allen's hummingbird.

Moraga Reservoir

Ornamental oaks, pines, and other trees and shrubs within and surrounding the Moraga Reservoir site and surrounding residential development provide potential nesting habitat for special-status birds such as Cooper's hawk, sharp-shinned hawk (and other raptors), oak titmouse, Pacific-slope flycatcher, and Allen's hummingbird. Activities associated with construction of these facilities would result in the removal of ornamental trees and shrubs, as discussed in Impacts 3.6-1 and 3.6-2.

Moraga Road Pipeline

Large valley oaks, coast live oaks, and pines in woodland and riparian habitats as well as grassland, scrub, and cattail marsh along the Moraga Road Pipeline alignment may support nesting birds such as Cooper's hawk, sharp-shinned hawk, golden eagle, red-tailed hawk, white-tailed kite, northern harrier, osprey (and other raptors), oak titmouse, Bewick's wren, and California thrasher, which are known to occur within the Lafayette Reservoir Recreation Area (EBMUD, 1994; Skahill, 2005). The area surrounding the Moraga Road Pipeline alignment may also support burrowing owl, Pacific-slope flycatcher, Bell's sage sparrow, yellow warbler, California horned lark, yellow-breasted chat, loggerhead shrike, Allen's hummingbird, and other special-status birds. There are no known occurrences of bald eagle in the vicinity of this project site. Bald eagles roosting and foraging near the Lafayette Reservoir have a low potential to occasionally use the Moraga Road Pipeline area.

Activities associated with construction of the Moraga Road Pipeline would result in the removal of native and non-native grasslands, native and non-native trees and shrubs, and riparian habitat. Though Lafayette Creek and other drainages would be crossed at the road culvert locations, some trimming and/or disturbance of riparian vegetation would likely occur.

Sunnyside Pumping Plant

Residential ornamental vegetation, non-native pine woodland, and grassland within and surrounding the Sunnyside Pumping Plant site may provide nesting and/or foraging habitat for special-status birds such as Cooper's hawk, sharp-shinned hawk (and other raptors), oak titmouse, Pacific-slope flycatcher, California horned lark, loggerhead shrike, and Allen's hummingbird. Activities associated with construction of the Sunnyside Pumping Plant would result in the removal of pines and other ornamental vegetation and grassland.

Tice Pumping Plant and Pipeline

The Tice Pumping Plant site is located within grassland and oak woodland habitat. The Tice Pipeline area is surrounded primarily by residential development with plantings of oaks, black locusts, and other ornamental trees and shrubs. In addition, the pipeline alignment crosses Las Trampas Creek, which supports a well-developed riparian habitat. The pipeline would be installed under or above the culvert within the road. These habitats have the potential to support Cooper's hawk, sharp-shinned hawk, red-tailed hawk (and other raptors), oak titmouse, Pacific-slope flycatcher, Allen's hummingbird, and other special-status nesting birds. Activities associated with construction of the Tice Pumping Plant and Pipeline could result in the removal of grassland and oak woodland, and the disturbance or trimming of riparian vegetation and ornamental trees and shrubs.

Withers Pumping Plant

Ornamental oaks, pines, eucalyptus, and other trees and shrubs within and surrounding the Withers Pumping Plant site provide potential nesting habitat for special-status birds such as Cooper's hawk, sharp-shinned hawk, red-tailed hawk (and other raptors), oak titmouse, Pacific-slope flycatcher, and Allen's hummingbird. Activities associated with construction of this facility would result in the removal of ornamental trees and shrubs.

Mitigation Measures

> **Measure 3.6-4a:** At all WTTIP project sites, EBMUD will avoid disturbing active nests of raptors and other special-status nesting birds by performing preconstruction surveys and creating no-disturbance buffers.
>
> If construction activities (i.e., ground clearing and grading, including removal of trees or shrubs) are scheduled to occur during the nonbreeding season (September 1 through January 31), no mitigation is required.

If construction activities are scheduled to occur during the breeding season (February 1 through August 31), EBMUD will implement the following measures to avoid potential adverse effects on nesting raptors and other special-status birds:

- EBMUD will retain a qualified wildlife biologist to conduct preconstruction surveys of all potential nesting habitat within 500 feet of construction activities where access is available.

- If active nests are found during preconstruction surveys, EBMUD will create a no-disturbance buffer (acceptable in size to the CDFG) around active raptor nests and nests of other special-status birds during the breeding season, or until it is determined that all young have fledged. Typical buffers include 500 feet for raptors and 250 feet for other nesting birds. The size of these buffer zones and types of construction activities restricted in these areas may be further modified during coordination with the CDFG and will be based on existing noise and human disturbance levels at each WTTIP project site. Nests initiated during construction are presumed to be unaffected, and no buffer would be necessary. However, the "take"[9] of any individuals will be prohibited.

- If preconstruction surveys indicate that nests are inactive or potential habitat is unoccupied during the construction period, no further mitigation is required. Trees and shrubs within the construction footprint that have been determined to be unoccupied by special-status birds or that are located outside the no-disturbance buffer for active nests may be removed.

Measure 3.6-4b: For the Fay Hill Reservoir and Moraga Road Pipeline projects, EBMUD will retain a qualified wildlife biologist to conduct preconstruction burrowing owl surveys in all areas that may provide suitable habitat for this species. EBMUD will avoid disturbing active burrowing owl nests during the breeding season and implement standard CDFG guidelines during the nonbreeding season.

No more than two weeks before construction, EBMUD will retain a qualified biologist to survey for burrows and burrowing owls within 500 feet of the construction corridor where access is available. The survey will conform to the protocol described by the California Burrowing Owl Consortium (1997), which includes up to four surveys on different dates if there are suitable burrows present. If occupied owl burrows are found during preconstruction surveys, a qualified burrowing owl biologist will make a determination as to whether or not construction activities would affect the occupied burrows or disrupt reproductive behavior. If the biologist determines that construction would not adversely affect occupied burrows or disrupt breeding behavior, construction may proceed without restriction or mitigation measures.

If the biologist determines that construction could adversely affect occupied burrows during the nonbreeding season (August 31 through February 1), EBMUD may passively relocate the subject owls from the occupied burrow(s) using one-way doors. There must be at least two unoccupied burrows suitable for burrowing owls within 300 feet of the occupied burrow before one-way doors are installed. The unoccupied burrows must be located 160 feet from construction activities and can be natural burrows or artificial

[9] "Take" is defined as harassing, harming, pursuing, hunting, shooting, wounding, killing, trapping, capturing, collecting, or attempting to engage in any such conduct.

burrows constructed according to current design specifications. Artificial burrows must be in place at least one-week before one-way doors are installed on occupied burrows. One-way doors must be in place for a minimum of 48 hours before burrows are excavated.

If the biologist determines that construction would physically affect occupied burrows or disrupt reproductive behavior during the nesting season (February 1 through August 31), then avoidance is the only mitigation available (California Burrowing Owl Consortium, 1997; CDFG, 1995). Construction would be delayed within 250 feet of occupied burrows until it is determined that the subject owls are not nesting or until a qualified biologist determines that juvenile owls are self-sufficient or are no longer using the natal burrow as their primary source of shelter.

Measure 3.6-4c: For the Highland Reservoir and Pipelines, the Lafayette Reclaimed Water Pipeline, and Moraga Road Pipeline projects, EBMUD will avoid disturbing winter roosts of bald eagles by performing preconstruction surveys, avoiding known wintering habitat, and creating no-disturbance buffers.

EBMUD will design construction activities to avoid disturbance or removal of trees and habitat areas known to support wintering bald eagles.

If construction activities are scheduled to occur during the wintering season (October 15 through March 15), EBMUD will implement the following measures, and any additional measures determined during informal consultation with the USFWS, to avoid potential adverse effects on bald eagles near the project alignment:

- EBMUD will retain a qualified wildlife biologist to conduct preconstruction surveys of all potential roosting habitat within one-quarter mile of construction activities where access is available.
- If active roosts are found during preconstruction surveys, EBMUD will establish a no-disturbance buffer (acceptable in size to the USFWS and CDFG) around active roosts until the end of the wintering season, or until it is determined that the roosts are no longer occupied. The size of these buffer zones and types of construction activities restricted in these areas may be further modified during coordination with the USFWS and CDFG and will be based on existing noise and human disturbance levels at each WTTIP project site.
- If preconstruction surveys indicate that roosts are inactive or potential habitat is unoccupied during the construction period, no further mitigation is required. However, habitat within known bald eagle roosting areas will not be removed.

Impact 3.6-5: Disturbance to special-status bat species.

There is no woodland and/or riparian habitat with large trees suitable for special-status bats within or adjacent to the following WTTIP project sites: Upper San Leandro WTP, Ardith Reservoir/Donald Pumping Plant, Fay Hill Pumping Plant and Pipeline Improvements, Moraga Reservoir, and Withers Pumping Plant. Therefore, these projects would not affect special-status bats.

Trees and shrubs (in woodland, riparian, and scrub habitats), grasslands, orchards, and developed and ornamental landscaped areas on and surrounding the remaining WTTIP project sites may provide suitable foraging and roosting habitat for special-status bat species, including Pacific western big-eared bat, pallid bat, long-eared myotis, fringed myotis, long-legged myotis, and Yuma myotis. These bats are protected as former federal species of concern and/or California species of special concern.

Construction activities associated with the proposed project (including clearing, grading, trimming, and removal of trees, shrubs, and other nesting habitat for pipelines, bore-and-jack pits, and project facilities) could result in direct mortality of special-status bats. In addition, construction noise and human disturbance within and adjacent to large trees and other potential roosting habitat could cause roost abandonment and death of young. These impacts would be significant. Implementation of Measure 3.6-5, below, would reduce impacts to special-status bats to a less-than-significant level. As discussed in Impact 3.6-4, construction disturbance to native habitats would be temporary and primarily linear. As discussed above in Measures 3.6-1a through 3.6-1d and Measures 3.6-2a through 3.6-2f, riparian habitats, protected trees and other sensitive areas would be revegetated or replaced upon the completion of construction. In addition, these impact areas represent a small portion of the available roosting and foraging habitat for special-status bats in the project region. Therefore, the proposed WTTIP would not result in significant impacts to nesting and foraging habitat for special-status bats that may occur in the project area.

Lafayette WTP

Oaks and other trees and riparian habitat in the adjacent Lafayette Creek may provide roosting and foraging habitat for fringed myotis bat and other special-status bats.

Alternative 1

As discussed in Impacts 3.6-1 and 3.6-2, construction of clearwells, the Leland and Bryant Pipelines, and other facilities would result in the removal of or construction adjacent to: oaks, eucalyptus, and other trees surrounding the existing Lafayette WTP; riparian habitat along Lafayette Creek; and other habitats that potentially support special-status bats.

Alternative 2

As discussed in Impacts 3.6-1 and 3.6-2**,** no trees or riparian habitat would be removed under Alternative 2.

Orinda WTP

Alternative 1

There is no woodland and/or riparian habitat with large trees suitable for special-status bats within or adjacent to areas proposed for disturbance at the Orinda WTP under Alternative 1. Therefore, this project would not affect special-status bats.

Alternative 2

Oaks surrounding facilities at the Orinda WTP, the well-developed riparian corridor of San Pablo Creek adjacent to the north side of the Orinda WTP, and the dense oak woodland between the ballfields and the Orinda WTP provide large trees for roosting special-status bats. Special-status bat species with the potential to roost on and surrounding the Orinda WTP include Pacific western big-eared bat, long-eared myotis, long-legged myotis, and fringed myotis.

Under Alternative 2, project facilities in the eastern portion of the Orinda WTP would be constructed primarily within mowed grassland and developed areas and would require the removal of trees and shrubs that are not suitable for use by special-status bats. However, some oak woodland would be disturbed or removed during construction of the clearwell and substations. Construction would also occur adjacent to the San Pablo Creek riparian corridor, which provides habitat for bats.

Walnut Creek WTP – Alternative 1 or 2

Grassland, riparian habitat, and oak woodland surrounding the Walnut Creek WTP provide roosting and foraging habitat for special-status bats such as Pacific western big-eared bat, long-eared myotis, long-legged myotis, and fringed myotis. Under Alternatives 1 and 2, project facilities would be constructed within previously disturbed areas that do not support vegetation. Thus, the potential for direct disturbance to special-status bats is very low.

Sobrante WTP – Alternative 1 or 2

The dense riparian corridor of San Pablo Creek adjacent to the existing basins at the western portion of the plant provides potential foraging and roosting habitat for fringed myotis and other special-status bats. Ornamental vegetation adjacent to San Pablo Creek may provide incidental habitat for bats utilizing San Pablo Creek riparian habitat. Construction activities on the Sobrante WTP would primarily be located within ornamental vegetation that is not likely to support special-status bats.

Orinda-Lafayette Aqueduct – Alternative 2

The Orinda-Lafayette Aqueduct site and vicinity contains pines and other ornamental trees and shrubs, grassland, and oak woodland as well as riparian habitat associated with Lafayette Creek and San Pablo Creek. Large trees within the oak woodland between the ballfields and the Orinda WTP as well as riparian habitat in the adjacent Lafayette Creek and San Pablo Creek may provide roosting and/or foraging habitat for Pacific western big-eared bat, pallid bat, long-eared myotis, long-legged myotis, fringed myotis, and other special-status bats. Removal of and construction adjacent to potential habitat for special-status bats (i.e., oak woodland, ornamental, and riparian habitats) would occur during construction of the pipeline along El Nido Ranch Road and Mt. Diablo Boulevard, microtunneling of the pipeline between the ballfields and the Orinda WTP, and other activities near San Pablo Creek, Lafayette Creek, and several small drainages, as discussed in Impact 3.6-1 and 3.6-2.

Fay Hill Reservoir

Monterey pines proposed for removal around the reservoir provide potential roosting and foraging habitat for fringed myotis and other special-status bats.

Glen Pipeline Improvements

The Glen Pipeline Improvements alignment is surrounded primarily by residential development with plantings of oaks, eucalyptus, and other ornamental trees and shrubs that are not likely to support special-status bats. Riparian habitat along a small drainage crossed by the pipeline at a road culvert may provide some foraging and roosting habitat for fringed myotis and other special-status bats. Activities associated with the construction of the Glen Pipeline could result in the trimming or disturbance of riparian vegetation.

Happy Valley Pumping Plant and Pipeline

Woodland and riparian habitats along the pipeline alignment and pumping plant site may support fringed myotis and other special-status bats. Activities associated with construction of the pipeline and pumping plant would result in the removal or disturbance of valley oaks and coast live oaks and the trimming or disturbance of riparian vegetation.

Highland Reservoir and Pipelines

The Highland Reservoir and Pipelines project site within the Lafayette Reservoir Recreation Area contains large valley oaks, coast live oaks, and pines interspersed with grassland and some coyote brush. The disturbance area includes some freshwater marsh and trees along the edge of Lafayette Reservoir and riparian habitat along Lafayette Creek. These habitats may support Pacific western big-eared bat, pallid bat, fringed myotis, long-eared myotis, long-legged myotis, and other special-status bats. Lafayette Reservoir provides good foraging habitat for Yuma myotis and other special-status bat species that forage over open water.

Activities associated with construction of the Highland Reservoir and Pipelines would result in the removal of oaks and other large native and non-native trees. Though Lafayette Creek would be crossed at the culvert location, some trimming or disturbance of riparian vegetation would likely occur.

Lafayette Reclaimed Water Pipeline

Riparian habitat along Lafayette Creek may provide roosting habitat for fringed myotis and other special-status bats. As discussed in Impacts 3.6-1 and 3.6-2, construction of the Lafayette Reclaimed Water Pipeline would result in the removal and disturbance of riparian habitat along Lafayette Creek.

Operation of the Lafayette Reclaimed Water Pipeline, including discharge of the Lafayette WTP filter backwash treatment system, could result in adverse water quality effects on Lafayette Reservoir through increased water temperatures and the introduction of chlorine, ammonia, nitrogen, and other materials. This impact is discussed fully in Section 3.5, Hydrology and Water

Quality. Given compliance with effluent and receiving water limitations as well as monitoring requirements specified in applicable NPDES permits, potential impacts to aquatic habitat within Lafayette Reservoir and to bats and other associated special-status species would be less than significant.

Leland Isolation Pipeline and Bypass Valves

Large oaks and other trees along the Leland Isolation Pipeline and Bypass Valves alignment near the Danville Pumping Plant may provide roosting habitat for fringed myotis and other special-status bats. Activities associated with construction of the pipeline could result in the removal of several trees.

Moraga Road Pipeline

Large valley oaks, coast live oaks, and pines in woodland and riparian habitats along the Moraga Road Pipeline alignment may support special-status bats such as Pacific western big-eared bat, fringed myotis, long-eared myotis, long-legged myotis, and Yuma myotis. Activities associated with construction of the Moraga Road Pipeline would result in the removal of oaks and other native and non-native trees. Though Lafayette Creek and other drainages would be crossed at the road culvert locations, some trimming and/or disturbance of riparian vegetation would likely occur.

Sunnyside Pumping Plant

Residential ornamental vegetation and non-native pine woodland within and surrounding the Sunnyside Pumping Plant site may provide roosting habitat for fringed myotis and other special-status bats. Activities associated with construction of the Sunnyside Pumping Plant would result in the removal of pines and other ornamental vegetation.

Tice Pumping Plant and Pipeline

The Tice Pumping Plant site is located within grassland and oak woodland habitat that has the potential to support roosting and foraging special-status bats such as Pacific western big-eared bat, long-eared myotis, pallid bat, long-legged myotis, and fringed myotis. In addition, riparian habitat along Las Trampas Creek may support special-status bats. The pipeline would likely be installed under or above the culvert within the road to minimize disturbance to Las Trampas Creek and riparian habitat. However, activities associated with construction of the Tice Pumping Plant and Pipeline could result in the removal of grassland and oak woodland, and the disturbance and trimming of riparian vegetation.

Mitigation Measure

> **Measure 3.6-5:** EBMUD will avoid disturbance of the roosts of special-status bats by performing preconstruction surveys and creating no-disturbance buffers.
>
> Prior to construction activities (i.e., ground clearing and grading, including removal of trees or shrubs) within 200 feet of trees that potential support special-status bats, EBMUD will

retain a qualified bat biologist to survey for special-status bats. If no evidence of bats (i.e., direct observation, guano, staining, strong odors) is present, no further mitigation is required.

If evidence of bats is observed, EBMUD will carry out the following measures to avoid potential adverse effects special-status bats:

- EBMUD will create a no-disturbance buffer (acceptable in size to the CDFG) around active bat roosts during the breeding season (April 15 through August 15). Bat roosts initiated during construction are presumed to be unaffected, and no buffer would be necessary. However, the take of individuals will be prohibited.

- Removal of trees showing evidence of bat activity will occur during the period least likely to affect bats, as determined by a qualified bat biologist (generally between February 15 and October 15 for winter hibernacula, and between August 15 and April 15 for maternity roosts). If exclusion is necessary to prevent indirect impacts to bats due to construction noise and human activity adjacent to trees showing evidence of bat activity, these activities will also be conducted during these periods.

Impact 3.6-6: Disturbance to San Francisco dusky-footed woodrat.

There is no oak woodland and/or riparian habitat with a dense understory suitable for San Francisco dusky-footed woodrat within or adjacent to the following WTTIP project sites: Walnut Creek WTP, Upper San Leandro WTP, Ardith Reservoir/Donald Pumping Plant, Fay Hill Pumping Plant and Pipeline Improvements, Fay Hill Reservoir, Leland Isolation Pipeline and Bypass Valves, Moraga Reservoir, Sunnyside Pumping Plant, and Withers Pumping Plant. Therefore, these projects would not affect this species.

Suitable oak woodland and riparian habitats for San Francisco dusky-footed woodrat occur within the remaining WTTIP project sites. This species is locally abundant (Hartwell, 2005b), and woodrat nests were observed along the Moraga Road Pipeline alignment and near the Orinda WTP (Alternative 2) and Happy Valley Pumping Plant and Pipeline sites. This species is protected as a former federal species of concern and California species of special concern. Vegetation removal, grading, and other facility and pipeline construction activities within San Francisco dusky-footed woodrat habitat could cause destruction of nests and mortality of individuals. These impacts would be significant. Implementation of Measure 3.6-6, below, would reduce impacts to San Francisco dusky-footed woodrat to a less-than-significant level for the projects discussed below. As discussed in Impact 3.6-4, construction disturbance to native habitats would be temporary and primarily linear. As discussed above in Measures 3.6-1a through 3.6-1d and Measures 3.6-2a through 3.6-2f, riparian habitats, protected trees, and other sensitive areas would be revegetated or replaced upon the completion of construction. In addition, these impact areas represent a small portion of the available habitat for this species in the project region. Therefore, the proposed WTTIP would not result in significant impacts to nesting and foraging habitat for San Francisco dusky-footed woodrat potentially occurring in the project area.

Lafayette WTP – Alternative 1

Alternative 1

Riparian habitat within Lafayette Creek may support San Francisco dusky-footed woodrat. As discussed in Impacts 3.6-1 and 3.6-2, construction of clearwells, the Leland and Bryant Pipelines, and other facilities under Alternative 1would result in the removal of riparian habitat along Lafayette Creek.

Alternative 2

There is no oak woodland and/or riparian habitat with a dense understory suitable for San Francisco dusky-footed woodrat within or adjacent to construction disturbance areas at the Lafayette WTP under Alternative 2. Therefore, this project would not affect this species.

Orinda WTP – Alternative 2

Alternative 1

There is no oak woodland and/or riparian habitat with a dense understory suitable for San Francisco dusky-footed woodrat within or adjacent to construction disturbance areas at the Orinda WTP under Alternative 1. Therefore, this project would not affect this species.

Alternative 2

Numerous woodrat nests were observed within the dense oak woodland between the Orinda WTP and the ballfields. The well-developed riparian corridor of San Pablo Creek adjacent to the north side of the Orinda WTP also provides potential habitat for San Francisco dusky-footed woodrat. Some oak woodland habitat adjacent to the Orinda WTP would be removed to accommodate the clearwell, substations, and other facilities.

Sobrante WTP – Alternative 1 or 2

The dense riparian corridor of San Pablo Creek adjacent to the settling basins on the western side of the WTP provides potential habitat for San Francisco dusky-footed woodrat. However, this habitat is located outside of the construction disturbance area for the proposed project. Because riparian habitat would be avoided, impacts to San Francisco dusky-footed woodrat would be less than significant.

Orinda-Lafayette Aqueduct – Alternative 2

Riparian habitat along Lafayette Creek and San Pablo Creek may provide habitat for San Francisco dusky-footed woodrat. Numerous woodrat nests were observed within the dense oak woodland between the Orinda WTP and the ballfields. As discussed in Impacts 3.6-1 and 3.6-2, the Orinda-Lafayette tunnel shaft, pipeline, microtunnel disturbance areas, and other facilities in the eastern portion of the Orinda WTP would be located within and adjacent to oak woodland known to support San Francisco dusky-footed woodrat.

Glen Pipeline Improvements

Oak woodland and the riparian corridor of an unnamed drainage provide potential habitat for San Francisco dusky-footed woodrat.

Happy Valley Pumping Plant and Pipeline

Numerous San Francisco dusky-footed woodrat nests were observed within riparian habitat adjacent to the proposed pumping plant location. Woodland and riparian habitats along the pipeline alignment may also support this species.

Highland Reservoir and Pipelines

Woodland habitats within and surrounding the Highland Reservoir and Pipelines site provide potential habitat for San Francisco dusky-footed woodrat. This species is known to occur within the Lafayette Reservoir Recreation Area (Skahill, 2005).

Lafayette Reclaimed Water Pipeline

As discussed in Impacts 3.6-1 and 3.6-2, construction of the pipeline crossing of Lafayette Creek would result in the removal of riparian habitat along Lafayette Creek.

Moraga Road Pipeline

Woodland and riparian habitat along the Moraga Road Pipeline alignment within the Lafayette Reservoir Recreation Area provides potential habitat for San Francisco dusky-footed woodrat. This species is known to occur within the recreation area (Skahill, 2005) and was observed along the pipeline alignment. In addition, woodland and riparian habitat adjacent to the Moraga Road portion of the alignment has potential to support San Francisco dusky-footed woodrat. The pipeline would be installed under or above the culvert within Moraga Road to minimize disturbance to drainages and associated riparian habitat. Minimal trimming of riparian trees may be required.

Tice Pumping Plant and Pipeline

The riparian corridor of Las Trampas Creek provides potential habitat for San Francisco dusky-footed woodrat. The pipeline would be installed under or above the culvert within the road to minimize disturbance to Las Trampas Creek and associated riparian habitat. Minimal trimming of riparian trees may be required. However, removal of riparian habitat would be avoided, and therefore impacts to San Francisco dusky-footed woodrat would be less than significant.

Mitigation Measure

> **Measure 3.6-6:** EBMUD will avoid disturbance to San Francisco dusky-footed woodrat by performing preconstruction surveys and by avoiding or relocating nests at the following project sites: Lafayette WTP (Alternative 1), Orinda WTP (Alternative 2), Orinda-Lafayette Aqueduct, Glen Pipeline Improvements, Happy Valley Pipeline, Highland Reservoir and Pipelines, Lafayette Reclaimed Water Pipeline, and Moraga Road Pipeline.

Not more than two weeks prior to construction, a qualified wildlife biologist will conduct a preconstruction survey to identify woodrat nests within 10 feet of proposed ground disturbance. A qualified wildlife biologist will conduct additional surveys periodically throughout the duration of construction activities to identify newly constructed woodrat nests. If woodrat nests can be avoided by project activities, the qualified biologist would demarcate suitable buffer areas for avoidance. If woodrat nests are located within areas proposed for construction, nest relocation would be implemented.

Active woodrat nests found within 10 feet of proposed disturbance areas that cannot be avoided will be relocated offsite to adjacent suitable woodland habitat under the supervision of a qualified wildlife biologist. Understory vegetation would first be cleared from around the nest. Next, the wildlife biologist would disturb the nest and allow all woodrats to leave the nest. Finally, the biologist would remove the nest sticks offsite to the base of an adjacent suitable oak, bay, or other tree. Sticks would be placed at a suitable distance determined by the qualified wildlife biologist.

Impact 3.6-7: Degradation of special-status aquatic species habitat.

Aquatic habitat does not occur within the vicinity of the following WTTIP project sites: Walnut Creek WTP, Upper San Leandro WTP, Ardith Reservoir/Donald Pumping Plant, Fay Hill Pumping Plant and Pipeline Improvements, Fay Hill Reservoir, Leland Isolation Pipeline and Bypass Valves, Moraga Reservoir, Sunnyside Pumping Plant, and Withers Pumping Plant. Therefore, these projects would not affect special-status aquatic species. Potential impacts to aquatic species at the remaining WTTIP sites are discussed below.

As discussed in the Setting, several unnamed drainages along the Moraga Road Pipeline alignment as well as Lafayette Creek, Lauterwasser Creek, San Pablo Creek, Las Trampas Creek, and Lafayette Reservoir have the potential to support one or more of the following special-status aquatic species: California red-legged frog, western pond turtle, and/or foothill yellow-legged frog. Reaches of San Pablo Creek downstream from San Pablo Dam and other migration barriers provide potential habitat for steelhead. Most construction activities within and adjacent to habitat for these species would be confined to roads and other disturbed rights-of-way. With the exception of the Lafayette Creek crossing, most creek crossings for projects analyzed at a project level would be confined to culverts within roads at locations that potentially support special-status aquatic species.

Construction activities within or adjacent to aquatic, riparian, and wetland habitats have the potential to adversely affect special-status aquatic species through temporary removal of vegetation during trenching of stream crossings, alteration of the hydrologic regime, accidental direct mortality from mechanical equipment, entrapment in open trenches, and harassment due to noise or vibration. Accidental release of deleterious construction fluids, such as gasoline and hydraulic fluids, as well as increased levels of soil erosion, sedimentation, and pollutant discharges during dewatering, could result in mortality of individuals, destruction of breeding habitat, and reduced instream water quality for amphibians and fish within the WTTIP project sites and in downstream areas. Operation of the Lafayette Reclaimed Water Pipeline and other project facilities could also cause mortality and reduce water quality through discharge of chloraminated water and the introduction of organic materials and increased water temperature within Lafayette Reservoir and other aquatic habitats (see below and Section 3.5, Hydrology and Water Quality, for more information). Removal of riparian and adjacent upland vegetation, including woodrat nests, could eliminate foraging and nesting habitat and cover, disrupt essential migratory corridors, and result in higher water temperatures that could be inhospitable to native species. These impacts would be significant. Implementation of Measures 3.6-7a through 3.6-7c would reduce impacts to special-status aquatic species to a less-than-significant level.

Lafayette WTP

Alternative 1

Protocol surveys of Lafayette Creek have not identified California red-legged frogs or suitable habitat within this drainage (Beeman, 2001). However, aquatic habitat within this drainage may support western pond turtles, which are known to occur within the Lafayette Reservoir. No other special-status aquatic species are expected to occur within Lafayette Creek or its tributary. Aquatic habitats below migration barriers downstream from this project site in the Walnut Creek watershed may support steelhead.

As discussed in Impacts 3.6-1 and 3.6-2, construction of the Leland and Bryant Pipelines and other project activities under Alternative 1 would result in removal of riparian habitat and disturbance to the bed and bank of Lafayette Creek, which provides potential habitat for western pond turtle. The western Lafayette Creek pipeline crossing would be installed using open-trench construction methods and would result in temporary removal of aquatic habitat for western pond turtle.

Alternative 2

Aquatic habitat does not occur within the vicinity of construction disturbance areas at the Lafayette WTP under Alternative 2. Therefore, this project would not affect special-status aquatic species.

Orinda WTP

Alternative 1

Aquatic habitat does not occur within the vicinity of construction disturbance areas at the Orinda WTP under Alternative 1. Therefore, this project would not affect special-status aquatic species.

Alternative 2

As discussed above, the reach of San Pablo Creek adjacent to the Orinda WTP and its tributaries are not likely to provide habitat for special-status aquatic species. California red-legged frog and western pond turtle downstream of the WTTIP project site have a low potential to move into habitat within San Pablo Creek. Reaches of San Pablo Creek downstream of San Pablo Reservoir and Dam provide potential habitat for steelhead.

Under Alternative 2, oak woodland habitat adjacent to San Pablo Creek would be removed to accommodate the clearwell, substations, and other facilities. These activities would not disturb habitat for special-status aquatic species. Impacts to California red-legged frog, western pond turtle, and other aquatic species in downstream areas could result from construction activities near and dewatering into San Pablo Creek.

Sobrante WTP – Alternative 1 or 2

San Pablo Creek adjacent to the settling basins on the western side of the WTP provides potential habitat for steelhead, California red-legged frog, foothill yellow-legged frog, and western pond turtle. Aquatic and riparian habitat associated within this drainage is located outside of the proposed construction disturbance area for the proposed project. Impacts to these and other aquatic species in downstream areas could result from construction activities near San Pablo Creek.

Orinda-Lafayette Aqueduct – Alternative 2

As discussed above, protocol surveys of Lafayette Creek have not identified California red-legged frogs or suitable habitat within this drainage (Beeman, 2001). However, aquatic habitat within this drainage may support western pond turtles, which are known to occur within the Lafayette Reservoir. The reach of San Pablo Creek adjacent to the Orinda WTP and its tributaries are not likely to provide habitat for special-status aquatic species. California red-legged frog and western pond turtle downstream of the WTTIP project site have a low potential to move into habitat within San Pablo Creek.

Removal of and construction adjacent to potential riparian habitat for western pond turtle would occur during construction of the pipeline alignment along El Nido Ranch Road and Mt. Diablo Boulevard, microtunneling near the Orinda WTP, and other activities near San Pablo Creek, Lafayette Creek, and several small drainages, as discussed in Impacts 3.6-1 and 3.6-2. Impacts to western pond turtle, steelhead, California red-legged frog, and other species in downstream areas could result from construction activities near Lafayette Creek or San Pablo Creek.

Glen Pipeline Improvements

The Glen Pipeline Improvements alignment is located in a residential area that mainly contains plantings of ornamental vegetation. The concrete-lined intermittent drainage crossed by the pipeline does not provide suitable habitat for special-status aquatic species. Impacts to steelhead and other aquatic species in downstream areas could result from construction activities within and adjacent to aquatic habitat.

Happy Valley Pumping Plant and Pipeline

Lauterwasser Creek and its tributaries provide potential habitat for California red-legged frog, foothill yellow-legged frog, and western pond turtle. The pipeline alignment would be installed under or above the culverts within the road to minimize disturbance to Lauterwasser Creek and associated riparian habitat. The pumping plant would be located outside of riparian habitat.

However, damage to this habitat may occur during construction activities. Impacts to California red-legged frog, foothill yellow-legged frog, western pond turtle, and other aquatic species in downstream areas could result from construction activities near Lauterwasser Creek.

Highland Reservoir and Pipelines

The Highland Reservoir is located within upland habitat. Seasonal aquatic habitats along the Highland Pipeline do not have the potential to support special-status species (Hartwell, 2005c). As discussed above, western pond turtles are known to be present in Lafayette Reservoir and may also occur in Lafayette Creek. The pipeline crossing of Lafayette Creek would be constructed at the culvert within Mt. Diablo Boulevard to avoid disturbance to the creek bed and bank. Impacts to western pond turtle could result from construction activities within and adjacent to Lafayette Creek and Lafayette Reservoir.

Lafayette Reclaimed Water Pipeline

As discussed in Impacts 3.6-1 and 3.6-2, construction of the pipeline crossing of Lafayette Creek would result in removal of riparian habitat and potential disturbance to the bed and bank of Lafayette Creek, which provides potential habitat for western pond turtle. Impacts to western pond turtle and other aquatic species could result from construction activities within and adjacent to Lafayette Creek.

Operation of the Lafayette Reclaimed Water Pipeline, including discharge of the Lafayette WTP filter backwash treatment system, could result in adverse water quality effects on Lafayette Reservoir through increased water temperatures and the introduction of chlorine, ammonia, nitrogen, and other materials. This impact is discussed fully in Section 3.5, Hydrology and Water Quality. Given compliance with effluent and receiving water limitations as well as monitoring requirements specified in applicable National Pollutant Discharge Elimination System (NPDES) permits, potential impacts to aquatic habitat within Lafayette Reservoir and to western pond turtles would be less than significant.

Moraga Road Pipeline

Seasonal aquatic habitat within the Lafayette Reservoir Recreation Area along the Moraga Road Pipeline is generally not suitable for special-status aquatic species (Hartwell, 2005c). However, special-status aquatic species may be present in perennial downstream aquatic habitats within the watershed. In addition, California red-legged frogs are known to occur within Laguna Creek adjacent to the paved Moraga Road between Campolindo Drive and Via Granada (CDFG, 2005). This drainage may also support western pond turtles. The pipeline would cross this drainage within the road above or below the culvert, downstream of the California red-legged frog occurrence, and habitat for this species is not likely to be removed. Other drainages along the paved portion of Moraga Road may provide some habitat for California red-legged frog as well. Pipeline crossings would be installed under or above the culvert within Moraga Road to minimize disturbance to drainages and associated riparian habitat. Minimal trimming of riparian trees may be required. Impacts to western pond turtle, California red-legged frog, steelhead, and other aquatic species in downstream areas could result from construction activities within and adjacent to aquatic habitats.

Tice Pumping Plant and Pipeline

Las Trampas Creek provides potential habitat for California red-legged frog, foothill yellow-legged frog, and western pond turtle. Downstream aquatic habitats in the Walnut Creek watershed that are below migration barriers may support steelhead. The Tice Pipeline would be installed under or above the culvert within the road to minimize disturbance to Las Trampas Creek and associated riparian habitat. Impacts to California red-legged frog, foothill yellow-legged frog, western pond turtle, and other aquatic species in downstream areas could result from construction activities near Las Trampas Creek.

Mitigation Measures

Measure 3.6-7a: EBMUD will avoid disturbing central California coast steelhead, other aquatic species, and associated habitats.

Implementation of Measures 3.5-1a and b, 3.5-3, and 3.5-6 (see Section 3.5, Hydrology and Water Quality), as well as best management practices (BMPs) for construction activities, would reduce potential impacts to steelhead and other aquatic species and habitat resulting from sedimentation, turbidity, and hazardous materials. Specific measures aimed at protecting steelhead and other aquatic species include:

- Prior to construction, EBMUD will implement a biological resource education program for construction crews and contractors (primarily crew and construction foremen). The education program would include a review of central California coast steelhead, California red-legged frog, foothill yellow-legged frog, western pond turtle, and other special-status species and sensitive resources that could exist in the project study area (including their life history and habitat requirements); the locations of sensitive biological resources on the WTTIP project site; and their legal status and protection. The education program would include materials describing sensitive resources, resource avoidance, permit conditions, and possible fines for violations of state or federal environmental laws.

- Construction activities within and adjacent to aquatic and riparian habitats will be monitored by a qualified biologist. The biologist will survey the work area for sensitive resources prior to the start of construction each day and monitor identified biological resources during construction activities, such as initial clearing and grading, installation of silt fencing, pipeline trench excavation, and backfilling and compaction.

- Water from around the section of the worksite that is within the actively flowing channel of Lafayette Creek will be diverted past the construction site. This diversion will reduce the potential for sediment or other pollutants to enter the waterways and affect downstream resources. The diversion will be installed so as to capture water from the existing outlet structure and release the diverted water downstream of the construction site.

- Sediment curtains will be placed downstream of the construction or maintenance zone to prevent sediment disturbed during trenching activities from being transported and deposited outside of the construction zone.
- If groundwater is encountered, or if water remains within the worksite after flows are diverted, it will be pumped out of the construction area and into a retention basin constructed of hay bales lined with filter fabric. The pump(s) will be screened to avoid entrapment of aquatic species.
- Silt fencing will be installed in all areas where construction occurs within 100 feet of actively flowing water.
- A spill prevention plan for potentially hazardous materials will be prepared and implemented. The plan will include the proper handling and storage of all potentially hazardous materials, as well as the proper procedures for cleaning up and reporting any spills. If necessary, containment berms will be constructed to prevent spilled materials from reaching the creek channels.
- Equipment and materials will be stored at least 50 feet from waterways. No debris (such as trash and spoils) will be deposited within 100 feet of wetlands. Staging and storage areas for equipment, materials, fuels, lubricants, and solvents will be located outside of the stream channel and banks and be limited to the smallest size feasible as determined by EBMUD. Stationary equipment such as motors, pumps, generators, compressors, and welders located within or adjacent to the stream will be positioned over drip pans. Any equipment or vehicles driven and/or operated within or adjacent to the stream will be checked and maintained daily to prevent leaks of materials that, if introduced to water, could be deleterious to aquatic life. Vehicles will be moved away from the stream prior to refueling and lubrication.
- Proper and timely maintenance of vehicles and equipment will be performed to reduce the potential for mechanical breakdowns that could lead to a spill of materials into or around creeks. Maintenance and fueling will be conducted at least 75 feet from riparian or aquatic habitats.
- WTTIP project sites will be revegetated with an appropriate assemblage of native upland vegetation and, if necessary, riparian and wetland vegetation suitable for the area. A plan describing pre-project conditions, invasive species control measures, and restoration and monitoring success criteria will be prepared prior to construction.

Measure 3.6-7b: EBMUD will avoid disturbing California red-legged frog and its habitat.

Project activities will avoid potential habitat for California red-legged frog through the use of bore-and-jack or other trenchless construction techniques; creek crossings will be constructed above or below the culverts within paved roads at Lauterwasser Creek and its tributaries, Las Trampas Creek, and at unnamed drainages along Moraga Road. California red-legged frog habitat within San Pablo Creek near the Sobrante WTP will be avoided by constructing outside the riparian corridor. To prevent impacts to California red-legged frog during and after construction adjacent to these and other areas that provide potential habitat for this species, reasonable and prudent measures for protection of California red-legged frog from the USFWS Biological Opinion for this species (USFWS, 1999), as well as any additional protection measures developed through informal consultation with the USFWS, will be implemented. These measures include environmental training, construction equipment and materials storage guidelines, silt fencing, and revegetation, as described in Measure 3.6-7a, as well as the following measures:

- The name and credentials of a biologist qualified to act as a project biologist/construction monitor will be submitted to USFWS for approval at least 15 days prior to the commencement of work.

- A USFWS-approved biologist will survey the worksites two weeks before the onset of construction activities. If California red-legged frogs, tadpoles, or eggs are found, the approved biologist will contact the USFWS to determine if moving any of these life-stages is appropriate. If the USFWS approves moving the animals, the biologist will be allowed sufficient time to move frogs from the worksites before work activities begin. If California red-legged frogs are not identified, construction may proceed at these sites.

- Exclusion fencing will be installed around WTTIP project sites, as directed by the USFWS, to prevent California red-legged frogs in adjacent areas from moving into project work areas.

- A USFWS-approved biologist will be present at the active worksites until such time that the removal of California red-legged frogs, instruction of workers, and habitat disturbance have been completed. After this time, the contractor or permittee will designate a person to monitor onsite compliance with minimization measures. The biologist will ensure that this individual receives training outlined in the programmatic Biological Opinion.

- During work activities, trash that may attract predators will be properly contained, removed from the worksite, and disposed of regularly. Following construction, trash and construction debris will be removed from work areas.

- Work activities within or adjacent to potential California red-legged frog aquatic habitat will be completed between April 1 and November 1.

- The USFWS-approved biologist will remove exotic species, such as crayfish and centrarchid fish, from the project area.

Should the USFWS determine through informal consultation that formal consultation is necessary, EBMUD will prepare a biological assessment and initiate formal consultation with the USFWS under Section 7 of FESA. Any additional California red-legged frog protection measures and additional habitat compensation required for program-level project impacts included in the USFWS Biological Opinion will be implemented during and after construction, as applicable.

Measure 3.6-7c: EBMUD will avoid disturbing western pond turtle, foothill yellow-legged frog, and their habitats.

No more than two weeks prior to the commencement of ground-disturbing activities, a qualified biologist retained by EBMUD will perform surveys for foothill yellow-legged frog and western pond turtle within suitable habitat on the WTTIP project sites. Surveys will include western pond turtle nests as well as individuals. The biologist (with the appropriate agency permits) will temporarily relocate any identified western pond turtles or foothill yellow frogs upstream of the construction site, and temporary barriers will be placed around the construction site to prevent ingress.

Construction will not proceed until the work area is determined to be free of foothill yellow-legged frogs, as well as western pond turtles and their nests. The biologist will be responsible for relocating adult turtles and frogs that move into the construction zone after construction has begun. If a nest is located within a work area, the biologist (with the appropriate permits from the CDFG) may move the eggs to a suitable facility for incubation, and release hatchlings into the creek system in late fall. The biologist will be present on the WTTIP project sites during initial ground clearing and grading, culvert replacement and/or installation over drainages, and during all other construction activities within or adjacent to drainages with the potential to support foothill yellow-legged frog or western pond turtle.

Impact 3.6-8: Disruption to existing migratory wildlife corridors on WTTIP project sites and some fragmentation of this wildlife habitat.

Habitat within the following WTTIP project sites does not support mountain lions or constitute a substantial portion of an established migratory wildlife corridor: Walnut Creek WTP, Upper San Leandro WTP, Ardith Reservoir/Donald Pumping Plant, Fay Hill Pumping Plant and Pipeline Improvements, Leland Isolation Pipeline and Bypass Valves, Moraga Reservoir, and Withers Pumping Plant. Therefore, these projects would not affect existing migratory wildlife corridors or fragment wildlife habitat. Impacts at the remaining WTTIP project sites are discussed below.

Woodland and scrubland habitats suitable for mountain lions and other migratory wildlife are present within the Lafayette Reservoir Recreation Area at the Highland Reservoir and Pipelines site and along the Moraga Road Pipeline alignment. Mountain lions, a CDFG fully protected species, are known to occur within the recreation area and in the vicinity of project pipelines (Skahill, 2005). As discussed in the Setting, vegetation removal and disturbance required for these pipelines would be temporary. Disturbed areas would be revegetated with native species upon completion of the project to prevent habitat degradation or an increase in invasive plant species (see Measures 3.6-1a through 3.6-1d and Measures 3.6-2a through 3.6-2f). With the exception of the Highland Reservoir, the proposed WTTIP does not include the construction of above-ground structures in the Lafayette Reservoir Recreation Area. The Highland Reservoir site and permanent paved access road are located within grassland and woodland habitat that would continue to facilitate wildlife movement through the project area. Thus, proposed activities are not likely to significantly affect wildlife movement through the Lafayette Reservoir Recreation Area or fragment habitat for migratory or resident wildlife.

Pipeline crossings of Las Trampas Creek, Lauterwasser Creek, and San Pablo Creek would be constructed at culverts within roads, thereby avoiding riparian areas and minimizing disturbance to additional migratory wildlife corridors in the project area. Riparian habitat removal at Lafayette Creek during pipeline construction would be temporary, and disturbed areas would be revegetated with native species (see Measures 3.6-1a through 3.6-1d and Measures 3.6-2a through 3.6-2f). The majority of facilities constructed near Lafayette Creek at the Lafayette WTP and near San Pablo Creek at the Orinda WTP would be located in areas that currently contain structures and lighting. New lighting constructed as part of these projects would be low intensity focused on specific areas to keep light from spilling onto nearby drainages and riparian habitat. Thus, due to the temporary nature of pipeline construction disturbance, post-construction revegetation of disturbed areas with native species, avoidance of aquatic and riparian habitat through pipeline installation at culverts for most stream crossings, and use of low-impact lighting focused away from sensitive habitat, the remaining WTTIP projects would have a less-than-significant impact on migratory wildlife corridors.

Lafayette WTP

Alternative 1

Lafayette Creek and its associated riparian habitat provide a migratory corridor for wildlife moving through the project area. Riparian habitat removal at Lafayette Creek during pipeline construction under Alternative 1 would be temporary, and disturbed areas would be revegetated with native species after construction. New lighting constructed as part of this project would be low-impact and would be focused on specific areas to keep light from spilling onto Lafayette Creek and adjacent riparian habitat.

Alternative 2

Habitat within the construction disturbance area at the Lafayette WTP under Alternative 2 does not support mountain lions or constitute a substantial portion of an established migratory wildlife corridor. Therefore, this project would not affect existing migratory wildlife corridors or fragment wildlife habitat.

Orinda WTP

Alternative 1

Habitat within the construction disturbance area at the Orinda WTP under Alternative 1 does not support mountain lions or constitute a substantial portion of an established migratory wildlife corridor. Therefore, this project would not affect existing migratory wildlife corridors or fragment wildlife habitat.

Alternative 2

San Pablo Creek and its associated riparian habitat, as well as oak woodland habitat between the Orinda WTP and the ballfields, provide a migratory corridor for wildlife moving through the project area. Oak woodland and scrub habitat removal at the Orinda WTP to accommodate project activities under Alternative 2 would be temporary, and disturbed areas would be revegetated with native species after construction. New lighting constructed as part of this project would be low-impact and would be focused on specific areas to keep light from spilling onto San Pablo Creek and its adjacent riparian habitat as well as oak woodland habitat between the Orinda WTP and the ballfields.

Sobrante WTP – Alternative 1 or 2

San Pablo Creek and its associated riparian habitat provide a migratory corridor for wildlife moving through the project area. Although construction is proposed adjacent to San Pablo Creek, proposed activities at the Sobrante WTP would not occur within riparian habitat and thus would not substantially fragment or otherwise affect established migratory wildlife corridors.

Orinda-Lafayette Aqueduct – Alternative 2

Lafayette Creek, San Pablo Creek, riparian habitat along these drainages, and oak woodland habitat between the Orinda WTP and the ballfields provide migratory corridors for wildlife moving through the project area. Removal of oak woodland, scrub, and/or riparian habitat near San Pablo Creek, at Lafayette Creek and its tributary, and between the Orinda WTP and the ballfields, as well as construction staging, grading, and other activities associated with pipeline construction would be temporary. These disturbed areas would be revegetated with native species after construction.

Fay Hill Reservoir

The Fay Hill Reservoir is located atop an undeveloped hill and surrounded by grassland that provides a potential migratory corridor for wildlife moving through the adjacent residential areas. Project construction would temporarily disturb a small portion of this grassland habitat, but would not substantially fragment or otherwise affect established migratory wildlife corridors.

Glen Pipeline Improvements

The unnamed drainage crossed by the Glen Pipeline Improvements alignment and associated riparian habitat provide a minor migratory corridor for wildlife moving through the project area. Construction would occur within the paved road at the location of the culvert, thereby avoiding this drainage and adjacent riparian habitat. Thus, proposed activities at the Walnut Creek WTP would not substantially fragment or otherwise affect established migratory wildlife corridors.

Happy Valley Pumping Plant and Pipeline

Lauterwasser Creek, its tributaries, and associated riparian habitat provide migratory wildlife corridors through the project area. Project construction would temporarily disturb small portions of these habitats; however, construction of the pipeline would occur within the paved road at the location of the culvert, thereby avoiding most riparian habitat. The pumping plant has been sited near the road and existing residential development. This placement minimizes riparian habitat removal and disturbance as well as impacts to oak woodland and riparian habitat along Lauterwasser Creek and its tributary. Project activities would not substantially fragment or otherwise affect established migratory wildlife corridors.

Highland Reservoir and Pipelines

As discussed above, the Highland Reservoir and Pipelines site and vicinity have the potential to provide habitat for mountain lions and other migratory wildlife moving through the Lafayette

Reservoir Recreation Area. Vegetation removal and disturbance required for the Highland Pipeline would be temporary, and disturbed areas would be revegetated with native species upon completion of the project. The Highland Reservoir and permanent paved access road would be located within contiguous grassland and woodland habitat that would continue to facilitate wildlife movement through the project area. The pipeline crossing at Lafayette Creek would be constructed at the location of the culvert within Mt. Diablo Boulevard, thereby avoiding riparian areas and minimizing disturbance to migratory wildlife at Lafayette Creek. Therefore, proposed project activities are not likely to significantly affect wildlife movement through the Lafayette Reservoir Recreation Area or fragment habitat for migratory or resident wildlife.

Lafayette Reclaimed Water Pipeline

Lafayette Creek and its associated riparian habitat provide a migratory corridor for wildlife moving through the project area. Riparian habitat removal at Lafayette Creek during pipeline construction would primarily be temporary, and disturbed areas would be revegetated with native species after construction to the extent feasible.

Moraga Road Pipeline

As discussed above, the area surrounding the Moraga Road Pipeline alignment has the potential to provide habitat for mountain lions and other migratory wildlife moving through the Lafayette Reservoir Recreation Area. Vegetation removal and disturbance required for the Moraga Road Pipeline would be temporary, and disturbed areas would be revegetated with native species upon completion of the project to prevent an increase in invasive plant species and habitat degradation. No above-ground structures that could interfere with wildlife movement or fragment wildlife habitat are proposed as part of the Moraga Road Pipeline project. Disturbance to migratory wildlife and riparian areas would be minimized at Moraga Road creek crossings by constructing the pipeline crossings at the culvert within Moraga Road. Therefore, proposed project activities are not likely to significantly affect wildlife movement through the project area or fragment habitat for migratory or resident wildlife. Project area drainages and the Moraga Road Pipeline corridor within the Lafayette Reservoir Recreation Area would continue to facilitate wildlife movement through the project area and maintain habitat connectivity for migratory wildlife.

Sunnyside Pumping Plant

The Sunnyside Pumping Plant is surrounded by grassland and oak woodland that provides a potential migratory corridor for wildlife moving through the adjacent residential areas. Project construction would remove a small portion of this grassland habitat, but would not substantially fragment or otherwise affect established migratory wildlife corridors.

Tice Pumping Plant and Pipeline

The Tice Pumping Plant is surrounded by grassland and oak woodland that provides a potential migratory corridor for wildlife moving through the adjacent residential areas. Las Trampas Creek and its associated riparian corridor also provide migratory wildlife habitat. Project construction would temporarily disturb a small portion of this grassland habitat; however, Last Trampas Creek and riparian habitat would be avoided by performing construction within the paved road at the location of the culvert. Project activities would not substantially fragment or otherwise affect established migratory wildlife corridors.

Program-Level Elements

Lafayette WTP

Vegetation

The Lafayette WTP is a developed site situated among natural oak woodland and mixed oak riparian woodland along Lafayette Creek. The potential future facilities proposed for the Lafayette WTP under Alternative 1 would be sited in a developed area; thus, no vegetation, including protected trees, would likely be removed. However, construction of the proposed UV disinfection building and realignment of the Walter Costa Trail could damage adjacent riparian vegetation along Lafayette Creek. Implementation of measures similar to Measures 3.6-1a through 3.6-1e as well as Measure 3.6-2b, described above for the project-level elements would reduce impacts on trees at the Lafayette WTP to a less-than-significant level.

Water-Associated Features

The facilities proposed for the Lafayette WTP would be sited in a developed area; thus, no wetlands or water-associated features would be removed. However, construction of the proposed UV disinfection building could damage adjacent riparian vegetation along Lafayette Creek. In addition, grading and excavation near drainages, as well as dewatering into creeks during construction could increase sediments and construction fluids in creeks, causing turbidity and reduced water quality, which could then adversely affect aquatic species. Discharges of chlorminated water also may adversely impact jurisdictional features and associated species. Impacts to jurisdictional features, including riparian corridors, are considered significant. Implementation of measures similar to Measures 3.6-1a through 3.6-1e as well as Measure 3.6-2b would reduce these impacts to a less-than-significant level.

Special-Status Plants

Construction of the proposed UV disinfection building could damage adjacent riparian vegetation along Lafayette Creek that may include Northern California black walnut and western leatherwood. Any impacts on these special-status plants would be considered significant. Implementation of measures similar to Measures 3.6-3a through 3.6-3c would reduce impacts on special-status plants at the Lafayette WTP to a less-than-significant level.

Special-Status Wildlife Species

Oaks, eucalyptus, and other trees and shrubs at the Lafayette WTP and riparian habitat in the adjacent Lafayette Creek may provide habitat for special-status nesting birds species such as Cooper’s hawk, sharp-shinned hawk, red-tailed hawk (and other raptors), oak titmouse, Pacific-slope flycatcher, and Allen’s hummingbird as well as fringed myotis bat and other special-status bats. No suitable habitat for special-status aquatic species is present on the project site. However, riparian and aquatic habitat within the adjacent Lafayette Creek may support western pond turtle. Steelhead and other special-status aquatic species may occur in downstream aquatic habitats. Any impacts to special-status wildlife species would be considered significant and require mitigation similar to that described above for the project-level elements.

Migratory Wildlife Corridors

Facilities proposed at the Lafayette WTP would be constructed in developed areas with ornamental landscaping; these areas do not provide a migratory corridor for wildlife moving through the project area. Thus, proposed activities at this site are not expected to fragment or otherwise affect established migratory wildlife corridors.

Orinda WTP

Vegetation

The Orinda WTP is a developed site situated among natural oak woodland and mixed oak riparian woodland along San Pablo Creek. Under Alternative 1 or 2, construction activities for the proposed facilities (primarily open-trench construction for the pipelines and construction of the UV disinfection building, high-rate sedimentation unit, and chlorine contact basin) would potentially require removal of some upland and riparian trees. Some of these trees may meet the criteria for protection under Orinda's tree ordinance. The clearwell and chlorine contact basin would be located within existing developed areas at the ballfields. The other program-level clearwell (Alternative 1 only) and pumping plants would be located at the site of the existing settling basins. Implementation of measures similar to Measures 3.6-1a through 3.6-1e and Measures 3.6-2a through 3.6-2f, above, would reduce any impacts on trees at the Orinda WTP to a less-than-significant level.

Water-Associated Features

Under Alternative 1 or 2, construction activities for the proposed facilities (primarily open-trench construction for the pipelines and construction of the UV disinfection building, high-rate sedimentation unit and chlorine contact basin) could adversely affect two unnamed tributaries to San Pablo Creek as well as San Pablo Creek and remove associated riparian habitat. These unnamed tributaries are potentially subject to Sections 401 and 404 of the Clean Water Act and Sections 1600–1616 of the California Fish and Game Code; the associated riparian habitat is potentially subject to Sections 1600–1616 of the California Fish and Game Code. Any impacts to jurisdictional drainages through direct fill or removal, dewatering during construction, discharge of chloraminated water, or other means would be considered significant. Implementation of measures similar to Measures 3.6-1a through 3.6-1e and Measures 3.6-2a through 3.6-2f would reduce these impacts to a less-than-significant level.

Special-Status Plants

Under Alternative 1 or 2, construction activities for the facilities (primarily the UV disinfection building, high-rate sedimentation unit, and pipelines to the ballfields) would adversely affect two unnamed tributaries to San Pablo Creek as well as San Pablo Creek and remove associated riparian habitat that may include the special-status plants Northern California black walnut and western leatherwood. Special-status plant impacts would likely be similar to those described above for the project-level elements. Impacts to special-status plants would be considered significant. Implementation of measures similar to Measures 3.6-3a through 3.6-3c would reduce these impacts to a less-than-significant level.

Special-Status Wildlife Species

The well-developed riparian corridor of San Pablo Creek adjacent to the north side of the Orinda WTP and the dense oak woodland between the ballfields and the Orinda WTP provide potential nesting and/or roosting habitat for Cooper's hawk, sharp-shinned hawk, red-tailed hawk (and other raptors), oak titmouse, Pacific-slope flycatcher, Allen's hummingbird, Bewick's wren, Pacific western big-eared bat, long-eared myotis, long-legged myotis, and fringed myotis. In addition, numerous San Francisco dusky-footed woodrat nests were observed within this area. Two small intermittent tributaries to San Pablo Creek flow through oak woodland habitat between the Orinda WTP and the ballfields. California red-legged frog and western pond turtle downstream of the project site have a low potential to move into habitat within San Pablo Creek. Construction activities associated with pipelines and other facilities would result in disturbance and removal of habitat along the two intermittent drainages. Construction activities within aquatic and riparian habitat could result in mortality of California red-legged frog and western pond turtle if these species move into the construction area. Additional potential impacts to other aquatic species in downstream reaches of San Pablo Creek are discussed in Impact 3.6-7, above. Impacts to special-status nesting birds, bats, San Francisco dusky-footed woodrat, and aquatic species resulting from construction activities are discussed above in Impacts 3.6-4, 3.6-5, 3.6-6, and 3.6-7.

While the Orinda WTP is near proposed critical habitat for Alameda whipsnake, the project area itself does not provide any of the primary habitat elements, nor is this species known to occur there. Thus, proposed activities at the Orinda WTP are not expected to affect this species.

Migratory Wildlife Corridors

San Pablo Creek and its associated riparian habitat, as well as oak woodland habitat between the Orinda WTP and the ballfields, provide a migratory corridor for wildlife moving through the project area. Construction activities associated with pipelines and other facilities, including tree removal, grading, and other activities, would result in disturbance and removal of oak woodland. Vegetation removal and disturbance would be temporary, and disturbed areas would be revegetated with native species upon completion of the project. No above-ground structures are proposed as part of the project; therefore, proposed project activities are not likely to significantly affect wildlife movement through the project area or fragment habitat for migratory or resident wildlife. Oak woodland habitat near the Orinda WTP would continue to facilitate wildlife movement through the project area and maintain habitat connectivity for migratory wildlife. Project impacts would likely be less than significant, and no mitigation would be required.

Walnut Creek WTP

Vegetation

The potential program-level facilities proposed for the Walnut Creek WTP would be constructed within previously disturbed areas that do not support native vegetation. No trees would be removed, and project activities would not affect trees protected by local ordinances.

Water-Associated Features

The proposed construction areas at the Walnut Creek WTP do not support any features that are subject to Sections 401 and 404 of the Clean Water Act and Sections 1600–1616 of the California Fish and Game Code; thus, the facilities proposed at the Walnut Creek WTP would not likely affect potentially jurisdictional water features. No mitigation would be required.

Special-Status Plants

The Walnut Creek WTP site does not support habitat for special-status plants; thus, the facilities proposed at the Walnut Creek WTP would not likely affect special-status plants. No mitigation would be required.

Special-Status Wildlife Species

Under Alternative 1 or 2, project facilities would be constructed within previously disturbed areas that do not support vegetation. However, grassland and oak woodland vegetation in surrounding areas may provide habitat for special-status nesting birds such as Cooper’s hawk, sharp-shinned hawk (and other raptors), oak titmouse, Pacific-slope flycatcher, loggerhead shrike, and Allen’s hummingbird as well as Pacific western big-eared bat, pallid bat, long-eared myotis, long-legged myotis, and fringed myotis. No suitable habitat for aquatic species or other special-status species is present on the project site. Indirect disturbance and other impacts to special-status nesting birds and bats resulting from construction activities would likely be similar to those discussed above in Impacts 3.6-4 and 3.6-5.

Migratory Wildlife Corridors

The Walnut Creek WTP site is surrounded by grassland and oak woodland that may provide a potential migratory corridor for wildlife moving through the adjacent residential areas. Project construction activities would be located within previously disturbed areas outside of potential migratory wildlife corridors. Thus, the proposed project would not substantially fragment or otherwise affect established migratory wildlife corridors or reduce the value of the surrounding area for migratory wildlife.

Leland Reservoir Replacement

Vegetation

Replacement of the Leland Reservoir could result in the removal of protected trees. Impacts on jurisdictional drainages would be considered significant. Implementation of measures similar to Measures 3.6-1a through 3.6-1e and Measures 3.6-2a through 3.6-2f would reduce impacts on trees at the Leland Reservoir site to a less-than-significant level.

Water-Associated Features

The site of the proposed replacement of the Leland Reservoir contains a drainage with riparian vegetation, northwest of the existing reservoir, that may be subject to Sections 401 and 404 of the Clean Water Act and Sections 1600–1616 of the California Fish and Game Code. Grading and excavation for the new facilities could indirectly affect the drainage and associated riparian habitat and result in erosion. Dewatering during construction and discharges of chloraminated water may also adversely impact jurisdictional features and associated species. Implementation of measures similar to Measures 3.6-1a through 3.6-1e and Measures 3.6-2a through 3.6-2f would likely reduce these impacts to a less-than-significant level.

Special-Status Plants

The site of the Leland Reservoir replacement contains a natural drainage with riparian vegetation northwest of the existing reservoir. Riparian vegetation that includes the special-status plants Northern California black walnut and western leatherwood could be directly or indirectly affected by project activities. Any special-status plant impacts would be similar to those described above for the project-level elements. Implementation of measures similar to Measures 3.6-3a through 3.6-3c would likely reduce any impacts to a less-than-significant level.

Special-Status Wildlife Species

Trees and shrubs at the Leland Reservoir replacement site may provide habitat for special-status nesting birds such as Cooper’s hawk, sharp-shinned hawk (and other raptors), oak titmouse, Pacific-slope flycatcher, loggerhead shrike, and Allen’s hummingbird as well as fringed myotis and other special-status bats. Though a tributary to Las Trampas Creek is located near the project site, no suitable habitat for special-status aquatic species is likely to occur on the project site.

Migratory Wildlife Corridors

Ornamental vegetation and other habitat within the construction disturbance area at Leland Reservoir are not likely to provide a migratory corridor for wildlife moving through the project area. The site is bound by Highway 24 to the north and residential development on its other sides. Project construction would likely remove a small portion of habitat, but would not substantially fragment or otherwise affect established migratory wildlife corridors. As discussed above, project impacts would likely be less than significant, and no mitigation would be required.

New Leland Pressure Zone Reservoir and Pipeline

Vegetation

The New Leland Pressure Zone Reservoir and Pipeline site primarily supports oaks, ornamental vegetation associated with adjacent residential development, coastal scrub, and grassland. The project also includes a bore-and-jack crossing of San Ramon Creek. Construction activities associated with construction of the reservoir, access roads, and San Ramon Creek crossing could result in the removal of protected trees. Implementation of measures similar to Measures 3.6-1a through 3.6-1e would reduce impacts on trees to a less-than-significant level.

Water-Associated Features

The reservoir and access roads proposed for the New Leland Pressure Zone Reservoir and Pipeline would likely be sited in upland areas; thus, wetlands or water-associated features are not likely to be removed for these project components. However, construction activities associated with the bore-and-jack crossing of San Ramon Creek as well as dewatering and discharge of chloraminated water could result in erosion, sedimentation, release of deleterious materials, and other impacts to San Ramon Creek and other jurisdictional features in the project area. Impacts to jurisdictional features, including riparian corridors, would be similar to those discussed above and would be considered significant.

Special-Status Plants

Construction activities could directly or indirectly affect special-status plants, if present within grassland, coastal scrub, woodland, and riparian habitat at the New Leland Pressure Zone Reservoir and Pipeline site. Any special-status plant impacts would be similar to those described above for the project-level elements.

Special-Status Wildlife Species

Trees and other vegetation and riparian habitat at the New Leland Pressure Zone Reservoir and Pipeline site may provide habitat for special-status nesting birds such as Cooper’s hawk, sharp-shinned hawk, burrowing owl, white-tailed kite (and other raptors), oak titmouse, Pacific-slope flycatcher, California horned lark, loggerhead shrike, and Allen’s hummingbird as well as fringed myotis and other special-status bats. California red-legged frog, western pond turtle, and other aquatic species may occur within San Ramon Creek. Potential impacts to special-status wildlife species would be similar to those described above for the project-level elements.

Migratory Wildlife Corridors

Habitat within the construction disturbance area at the New Leland Pressure Zone Reservoir and Pipeline site is part of the Sugarloaf Open Space and is likely to provide a migratory corridor for wildlife moving through the project area. The site is surrounded by Interstate 680 to the west and residential development to the east. Project construction would likely remove a small portion of habitat, but would not substantially fragment or otherwise affect established migratory wildlife corridors. As discussed above, project impacts would likely be less than significant, and no mitigation would be required.

St. Mary’s Road/Rohrer Drive Pipeline

Vegetation

Vegetation along the pipeline alignment consists primarily of ornamental species, mixed oak woodland, and mixed riparian woodland. Upland and riparian trees that occur within or immediately adjacent to the pipeline construction zone could be damaged by construction activities, such as excavating, grading, and soil compaction, and could result in mortality if the damage is extensive. Some of these upland and riparian trees may meet the criteria for protection under Lafayette’s tree ordinance.

Water-Associated Features

Las Trampas Creek and several unnamed tributaries to Las Trampas Creek parallel the proposed pipeline alignment along St. Mary's Road and Moraga Road. Trenching and dewatering activities could expose these potentially jurisdictional water features to temporary disturbance, sedimentation, soil erosion, and undercutting. Riparian vegetation along these features might also be removed.

Special-Status Plants

Las Trampas Creek and several unnamed tributaries to Las Trampas Creek parallel the proposed pipeline alignment along St. Mary's Road and Moraga Road and support riparian vegetation. Riparian vegetation that includes the special-status plants Northern California black walnut and western leatherwood could be directly or indirectly affected by project activities.

Special-Status Wildlife Species

The St. Mary's Road/Rohrer Drive Pipeline would likely be constructed within paved roads or other disturbed rights-of-way. However, the pipeline alignment would be located adjacent to and potentially within ornamental landscaping, grassland, oak woodland, and riparian habitat associated with Las Trampas Creek, Grizzly Creek, and other drainages that may support Cooper's hawk, sharp-shinned hawk, burrowing owl, golden eagle, red-tailed hawk (and other raptors), oak titmouse, yellow warbler, white-tailed kite, Pacific-slope flycatcher, California horned lark, yellow-breasted chat, loggerhead shrike, Allen's hummingbird, Bewick's wren, California thrasher, Pacific western big-eared bat, pallid bat, fringed myotis, long-eared myotis long-legged myotis, Yuma myotis, and San Francisco dusky-footed woodrat. In addition, these drainages could support steelhead, California red-legged frog, foothill yellow-legged frog, and western pond turtle.

Alameda Whipsnake

The St. Mary's Road/Rohrer Drive Pipeline would likely be constructed within paved roads or other disturbed rights-of-way. However, the pipeline alignment would be located adjacent to USFWS proposed critical habitat for Alameda whipsnake. Coastal scrub, woodland, grassland, riparian, and other habitats along this pipeline alignment may support this species. If Alameda whipsnakes are present, grading and other construction activities within or adjacent to the alignment have the potential to result in harassment due to noise or vibration, entrapment in pipeline trenches, and other harm (including direct mortality). In addition, the pipeline could result in temporary removal of proposed critical habitat for this species. These impacts would be significant.

EBMUD will ensure that construction-related impacts to individual Alameda whipsnakes and critical habitat are mitigated to a less-than-significant level through the development and implementation of an Alameda Whipsnake Protection and Monitoring Plan. This plan will be approved by the USFWS during formal consultation under Section 7 of FESA and would include, but not be limited to, the following measures: preconstruction and/or trapping surveys, installation of exclusion fencing, biological monitoring, worker environmental training, and revegetation of Alameda whipsnake habitat removed during project construction.

Migratory Wildlife Corridors

The St. Mary's Road/Rohrer Drive Pipeline would likely be constructed within paved roads or other disturbed rights-of-way. However, the pipeline alignment would be located adjacent to oak woodland and riparian habitat associated with Las Trampas Creek, Grizzly Creek, and other drainages that provide movement corridors for migratory wildlife. Construction of the pipelines could result in tree removal, grading, and other activities within oak woodland and riparian habitats. Vegetation removal and disturbance would be temporary, and disturbed areas would be revegetated with native species upon completion of the project. No above-ground structures are proposed as part of the project; therefore, proposed project activities are not likely to significantly affect wildlife movement through the project area or fragment habitat for migratory or resident wildlife. Habitat near the St. Mary's Road/Rohrer Driver Pipeline alignment would continue to facilitate wildlife movement through the project area and maintain habitat connectivity for migratory wildlife. Project impacts would likely be less than significant, and no mitigation would be required.

San Pablo Pipeline

Vegetation

The proposed pipeline alignment would parallel a variety of native plant communities, including upland and riparian woodlands, shrublands, grasslands, meadows and wetlands. Upland and riparian trees that occur within or immediately adjacent to the pipeline construction zone could be damaged by construction activities, such as excavating, grading, and soil compaction, and could result in mortality if the damage is extensive. Some trees may meet the criteria for protection under Orinda's tree ordinance.

Water-Associated Features

Several drainages to San Pablo Reservoir and associated wetlands cross the proposed pipeline alignment. Trenching activities and dewatering could expose these features to temporary disturbance, sedimentation, soil erosion, and undercutting. Riparian vegetation along these features might also be removed.

Special-Status Plants

Trenching activities for the pipeline could expose riparian vegetation containing the special-status plants Northern California black walnut and western leatherwood to temporary disturbance, such as excavation, soil erosion, and undercutting. Special-status plant impacts would be similar to those described above for the project-level elements.

Special-Status Wildlife Species

The area surrounding the San Pablo Pipeline alignment contains large valley oaks, eucalyptus, pines, riparian habitats, and coyote brush scrub interspersed with grassland. Bald eagle, golden eagle, and yellow warbler are known to occur within the project area, and the following special-status bird species may use these habitats for nesting: Cooper's hawk, sharp-shinned hawk, golden eagle, red-tailed hawk, white-tailed kite, northern harrier, burrowing owl, osprey (and other raptors), oak titmouse, Bewick's wren, Pacific-slope flycatcher, Bell's sage sparrow, California horned lark, yellow-breasted chat, loggerhead shrike, Allen's hummingbird, and California thrasher. The project area may also support special-status bats, such as Pacific western big-eared bat, pallid bat, fringed myotis, long-eared myotis, long-legged myotis, and Yuma myotis, as well as San Francisco dusky-footed woodrat, which is common in woodland and riparian habitats throughout the EBMUD watershed lands. Both California red-legged frog and western pond turtle are known to occur within the San Pablo Recreation Area. These species may be present within aquatic habitat near the San Pablo Pipeline alignment. Downstream aquatic habitats may support steelhead and other special-status aquatic species.

Though the pipeline would be located on or near an existing trail, vegetation removal and disturbance to upland, aquatic, and riparian habitats could occur. In addition, the San Pablo Pipeline project could result in disturbance or removal of trees and habitat areas known to be utilized by wintering bald eagles. Potential impacts to special-status nesting birds, burrowing owl, bald eagle, bats, San Francisco dusky-footed woodrat, and aquatic species resulting from construction activities would be similar to those discussed above under the project-level elements. However, if construction activities are not able to avoid removal of known bald eagle winter roosts, impacts could remain significant.

Alameda Whipsnake

Although the San Pablo Pipeline alignment would be located on or near an existing trail, vegetation removal within areas potentially supporting Alameda whipsnake could occur. The project area is located within USFWS proposed critical habitat for this species. Coastal scrub, woodland, grassland, and other habitats along the pipeline alignment could support this species. If Alameda whipsnakes are present, grading and other construction activities within or adjacent to these areas have the potential to result in harassment due to noise or vibration, entrapment in pipeline trenches, and other harm (including direct mortality). In addition, the pipeline could result in temporary removal of proposed critical habitat for this species. Measures similar to those described above under the St. Mary's Road/Rohrer Drive Pipeline discussion would likely be required.

Migratory Wildlife Corridors

The area surrounding the San Pablo Pipeline alignment contains woodland, scrub, grassland, and riparian habitats that may support that provide habitat for mountain lions and other migratory wildlife moving through the San Pablo Recreation Area. Although the pipeline would be located on or near an existing trail, vegetation removal could occur. Vegetation removal and disturbance required to install the pipeline would be temporary, and disturbed areas would be revegetated with native species upon completion of the project. No above-ground structures are proposed as part of the San Pablo Pipeline project; therefore, proposed project activities are not likely to significantly affect wildlife movement through the project area or fragment habitat for migratory or resident wildlife. The San Pablo Dam Recreation Area would continue to facilitate wildlife movement through the project area and maintain habitat connectivity for migratory wildlife. Project impacts would be less than significant, and no mitigation would be required.

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3.7 Cultural Resources

3.7.1 Approach to Analysis

The assessment of project impacts on cultural resources under CEQA (CEQA Guidelines, Section 15064.5) is a two-step process: (1) determine whether the project site contains cultural resources (defined as prehistoric archaeological, historic archaeological, or historic architectural resources[1]). If the site is found to contain a cultural resource, then (2) determine whether the project would cause a substantial adverse change to the resource. The setting discussion describes the existing properties at and in the vicinity of the WTTIP project sites and assesses whether the properties are cultural resources for the purposes of CEQA. The impact discussion reviews the criteria for determining significant impacts on cultural resources and assesses the impact of the project on cultural resources. The methodology used in the cultural resources analysis included a literature review and field reconnaissance by qualified cultural resource personnel.

3.7.2 Setting

This section includes information on the prehistoric and historic development in the vicinity of WTTIP project sites. An analysis was performed to determine whether properties in the vicinity of WTTIP project sites can be considered cultural resources for the purposes of CEQA.[2] National, state, and local historic preservation listings and surveys, as well as listings maintained by EBMUD, are summarized in this section.

Prehistoric and Ethnographic Background

The natural marshland biotic communities along the edges of bays and channels were the principal source for subsistence and other activities from the middle Holocene until the contact period in the San Francisco Bay region. Efforts to reconstruct prehistoric times into broad cultural stages (e.g., Early Period, Middle Period) allows researchers to describe a wide number of sites with similar cultural patterns and components during a given period of time, thereby creating a regional chronology.

Many of the original surveys of archaeological sites in the Bay region were conducted between 1906 and 1908 by N.C. Nelson and yielded the initial documentation of nearly 425 “earth mounds and shell heaps” along the littoral zone of the Bay (Nelson, 1909). From these beginnings, the most notable sites in the Bay region were excavated, such as the Emeryville shellmound (Ala-309), the Ellis Landing Site (CCo-295) in Richmond, and the Fernandez Site (CCo-259) in Rodeo Valley (Morrato, 1984). These dense midden sites are vast accumulations of domestic debris, which have been carbon-14 dated to be between 2,100 and 2,500 years old, but other evidence

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1 For the purposes of this report, the term “historic architectural resources” is synonymous with “historical resources” (CEQA Guidelines, Section 15064.5).

2 See CEQA Guidelines Section 21084.1.

from around the Bay suggests that human occupation in the region is of greater antiquity, or ±5000 B.C. (Jones, 1992). While many interpretations exist as to the function of the shellmounds, much of the evidence suggests that they served as sociopolitical landmarks on the cultural landscape and perhaps as ceremonial features as well.

For the San Francisco Bay Area, the Early Period, or the so-called “Berkeley Pattern,” is characterized by almost exclusive use of cobble mortars and pestles, which is often associated with a heavy reliance on acorns in the economy (Moratto, 1984). This unusually intensive reliance on one foodstuff indicates that, by around 1000 BP, a shift away from the earlier reliance on a broad spectrum of dietary sources to supply demand was needed. The Late Pleistocene/Early Holocene profusion of food availability along lakeshores and estuaries likely led to an overexploitation of the resources, which initially resulted in population increases but may also have forced inhabitants to rely on a readily available yet lower-ranked resource like acorns or seeds (Jones, 1991). Nevertheless, given the burgeoning size of Early Period settlements, the populations were probably denser and more sedentary, yet continued to exploit a diverse resource base—from woodland, grassland, and marshland to bayshore resources throughout the San Francisco Bay Area (King, 1974). Many of the Berkeley traits diffused throughout the region and spread to the interior areas of central California during this time period.

The population increases and larger, more complex settlements that began in the late-Early Period typify the Middle Period (circa 500 BC–AD 1000) (Arnold et al., 2004). The sociopolitical landscape also appears to become more elaborate, with clear differentiations in wealth and evidence of personal aggrandizement. During the Late Period (circa AD 1000–1700), however, new sites start to decline in the record, and the large shellmounds were abandoned. The Late Period also showed population declines and concomitant changes in resource use—likely due to human-caused depletions in some terrestrial food sources during the Middle Period (Broughton, 1994).

Interior Contra Costa County

While the archaeological record for the immediate Bay Area clearly focuses on bayshore sites, the interior valleys and watersheds exhibit a wide range of Early to Late Period sites and traditions (Moratto, 1984). In particular, the Stone Valley site, CA-CCo-308, located in the San Ramon Valley, represented five archaeological sites that collectively reflected at least seven components spanning about 4,000 years (Fredrickson, 1993). The types and patterns of artifacts found at CA-CCo-308 indicate relationships with both the early Central Valley (“Windmiller” tradition) and Berkeley Pattern of the Bay Area; mortars and pestles dominate the lower levels of these sites, suggesting that the acorn was of greater significance in the interior valleys, and much earlier than it was in the bayshore region.

Ethnographic Setting

Prior to Euro-American contact, this area of present-day Contra Costa County was occupied by the Ohlone (also known by their linguistic group, Costanoan[3]). Politically, the Costanoan were organized into groups called tribelets. A tribelet constituted a sovereign entity that held a defined territory and exercised control over its resources. It was also a unit of linguistic and ethnic differentiation.

The Ohlone economy was based on fishing, gathering, and hunting, with the land and waters providing a diversity of resources, including acorns, various seeds, salmon, deer, rabbits, insects, and quail. The acorn was the most important dietary staple of the Costanoan, and the acorns were ground to produce a meal that was leached to remove the bitter tannin. The Costanoan crafted tule balsa, basketry, stone tools such as mortars and metates (a mortar-like flat bowl used for grinding grain), and household utensils. The Costanoan, like many other Native American groups in the Bay Area, likely lived in conical tule thatch houses.

In 1770, the Costanoan-speaking people lived in approximately 50 separate and politically autonomous nations or tribelets. The Orinda and Lafayette areas were likely within the territory of the Huchiun tribelet (Pahl and Weinberg, 1982).

During the Mission Period (1770–1835), native populations, especially along the California coast, where brought—usually by force—to the missions by the Spanish missionaries to provide labor. The missionization caused the Costanoan people to experience cataclysmic changes in almost all areas of their life, including a massive decline in population due to introduced diseases and declining birth rate. Following the secularization of the missions by the Mexican government in the 1830s, most Native Americans gradually left the missions to work as manual laborers on the ranchos that were established in the surrounding areas.

Native American archaeological sites that could shed light on the Costanoan ways of life in the pre-mission era tend to be situated near the historic extent of the Bay tidal marshland.

Historical Background

Euroamerican settlement in the region, including much of today's Orinda, Lafayette, and Moraga, is generally associated with the Mexican land grant period, which extended from about 1841 to 1883. The area that includes the southern half of today's Orinda, much of Lafayette, and all of Moraga was in the 13,316-acre Moraga land grant received in 1835 by Joaquin Moraga from the Mexican government for his service in the military. Joaquin Moraga was the grandson of Joseph Joaquin Moraga, who was second in command of the Anza expedition of 1776, the founder of San Francisco's Mission Dolores, and the founder and first commandant of the San Francisco Presidio. The original land grant was known as Rancho Laguna de los Palos Colorados ("Ranch of the Lake of the Redwoods"). In 1841, Joaquin Moraga built an adobe ranch house on a knoll in

[3] "Costanoan" is derived from the Spanish word Costaños meaning "coast people." No native name of the Costanoan people as a whole existed in prehistoric times, as the Costanoan were neither a single ethnic group nor a political entity.

the eastern hills of today's Orinda.[4] The northern portion of Orinda, including the San Pablo and El Sobrante areas, was originally within the 22,000-acre El Sobrante land grant given to brothers Juan Jose and Victor Castro by Governor Juan Bautista in 1841. Portions of today's Lafayette were within the 3,300-acre Acalanes land grant, deeded to Candelario Valencia in 1835. After California statehood in 1850, the Mexican land grant period was supplanted by the American rancher period, which lasted until about 1916. During this period, farms stretched from San Pablo on the north to Moraga on the south, with the only sizeable village between these settlements located at Orinda Park at the present-day junction of San Pablo Dam Road, Bear Creek Road, and Wildcat Canyon Road in Orinda.

The following discussion provides a brief historical overview of Orinda, Lafayette, and Moraga, as well as a brief history of EBMUD.

Orinda

In 1887, brothers Jose and Miguel de Laveaga bought 1,178 acres of what would ultimately become part of Orinda. The original name "Orinda Park" was shortened to "Orinda" in 1900 by Alice Marsh, the daughter of Contra Costa County's first settler, John Marsh, and wife of the land speculator William Cameron, who purchased 2,937 acres in Orinda in 1875. Residential growth in Orinda was spurred by the California and Nevada Railroad, which began service in 1885 between Emeryville and Berkeley. The line was extended through Albany, Richmond, San Pablo and into Orinda, generally following the current alignment of Old San Pablo Dam Road, and terminated at Bryant Station[5] circa 1890 (Contra Costa County, 1989). Orinda Park was a popular destination along the railroad line for weekend trips and those seeking warmer climates. A hotel and a school were developed near the current intersection of San Pablo Dam Road, Bear Creek Road, and Wildcat Canyon Road (see discussion below of Orinda Park School and Orinda Park Hotel).

The town of Orinda did not see wide-scale development until the 1920s. In 1921, the de Laveaga family had roads graded to the west of San Pablo Dam Road and created a small reservoir, later named Orinda Park Pool. Orinda Village was laid out in 1923 by Miguel's grandson, Edward de Laveaga, who in the previous year had started Hacienda Homes, Inc. in order to develop the area east of San Pablo Dam Road (EBMUD, 1991). To help sell the homes, de Laveaga established the Orinda Country Club and Lake Cascade (in 1924), and provided private water service to the development, as Orinda was not served by the water company operating in the area at the time. The success of de Laveaga's housing developments inspired other developers and businesses, which grew along Camino Pablo Avenue.

With completion of the Broadway Low Level (Caldecott) Tunnel in 1937, Orinda began to attract new residents (EBMUD, 1991). Orinda became more accessible by private automobile, reducing the commute time from Orinda to San Francisco from over an hour to less than 30 minutes. In the post-war era, Orinda developed into a full-scale suburban community. Between 1940 and 1970,

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4 The Joaquin Moraga Adobe is considered to be the oldest structure in Contra Costa County. It still exists today as a private home, at 24 Adobe Lane in Orinda, although greatly altered from its original appearance. The Joaquin Moraga Adobe is listed in the National Register of Historic Places and is California Historical Landmark #509.

5 Named in honor of San Francisco Mayor Andrew Bryant, who had a summer home in Orinda.

more than 60 percent of Orinda's 6,300 homes were built (City of Orinda, 1994). The City of Orinda was incorporated in 1984 during a California Supreme Court case to save the 1941 Art Deco–style Orinda Theater and American Trust Bank from demolition.

Lafayette

Much of present-day Lafayette was within the 3,300-acre Acalanes land grant, deeded to Candelario Valencia in 1835. Valencia, who had been a soldier in San Francisco from 1823 to 1833, sold the land to wealthy San Francisco merchant William Leidesdorff. In late 1847, after exploring the area for a place to settle, Elam Brown bought Rancho Acalanes from Leidesdorff (Town of Moraga, 2005). In 1848, Brown built the first of three homes in today's Lafayette, as well as a horse-drawn grist mill and a steam-powered mill, on Lafayette Creek near First Street. The commercial center of Lafayette began to grow around the mill at the present-day intersection of Mt. Diablo Boulevard and Moraga Road. These first businesses were a blacksmith's shop, a bar, a general store, and rooming houses. Elam Brown's first permanent home was a small frame house located at present-day 985 Hough Avenue on Lafayette Creek in downtown Lafayette. The house was erected as early as 1849, occupied by various members of the Brown family throughout the late 1800s, and torn down in the late 1920s (City of Lafayette, 2005). A row of about 10 locust trees on the east side of Happy Valley Road, about 0.75 mile north from its intersection with Mt. Diablo Boulevard, was planted by early settlers and are classified as "heritage trees" (Contra Costa County, 1989).

Benjamin Shreve came to Lafayette after failing to make a fortune in the California Gold Rush of 1849. Shreve built and ran Lafayette's first school; in 1857 he became postmaster and named the town, "La Fayette."[6] In the early 1860s, the Pony Express rode through town, stopping to get a fresh horse at what was then the historic core of Lafayette at the intersection of Mt. Diablo Boulevard and Moraga Road. Lafayette remained a quiet farming village until the post–World War II building boom. The City of Lafayette was incorporated in 1968 (City of Lafayette, 2005).

Moraga

Moraga is named after Joaquin Moraga, whose rancho was established in the area in 1841, as described above. This historic structure still stands, although greatly modified, as a private home within Orinda city boundaries. Most of present-day Moraga was open grazing land until the early 20th century. By 1912, most of the original Joaquin Moraga rancho was purchased by James Irvine,[7] who started the Moraga Land Company with the intention of developing the area. The period of 1912–1913 brought the Oakland Antioch Railroad to Moraga, with service from Oakland to Chico through Moraga. This line would later become the Sacramento Northern Railroad, which served many early residents of the Moraga Valley. In 1914, the Moraga Ranch was built near the current intersection of School Street and Moraga Way. Many of these historic buildings are still standing, including a cook house, a commissary, a walk-in cooler, and a mess hall. The ranch also had a garage, a repair shop, bunk houses, a bath house, a warehouse, and blacksmith shop. The Moraga Barn was originally constructed in 1914 as a hotel and stage stop

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6 The town's name was changed to its current spelling, "Lafayette," in 1932.
7 The same James Irvine of the Irvine Ranch Company of Orange County, California.

across Moraga Way from the Moraga Ranch. The Moraga Ranch/Moraga Barn area was an important stop along the Sacramento Northern Railroad.

In 1927, the Moraga Land Company gave 100 acres to St. Mary's College and College of Holy Names, and in 1928 the college moved from its original site in San Francisco's Mission District to Moraga Valley. A number of buildings from the late 1920s and early 1930s still exist on the campus. In 1935, most of the Moraga Land Company property was bought by the Utah Construction and Mining Company, and many subdivisions and homes were started in the area. Utah Construction later sold the remaining land to Russell Bruzzone, a Lafayette developer who developed much of the property in the post-war period.

Similar to the towns of Orinda and Lafayette, Moraga remained a quiet village until the post–World War II building boom. Donald Rheem, who bought 20 acres surrounding his Hacienda de las Flores in 1929, originally wanted to develop a country club, but eventually developed the Rheem shopping center on the property in the mid-1950s. Most of the homes, roads, and businesses in present-day Moraga were built since 1960. The Town of Moraga was incorporated in 1974 (Town of Moraga, 2005).

EBMUD

East Bay water companies were in existence as early as the 1860s. Among them were the Contra Costa Water Company, Syndicate Water Company, and Richmond Water Company. In 1906, these three companies were absorbed by the People's Water Company, which had an interest in developing local watershed resources for public usage. Land near the present-day San Pablo Dam was purchased, and the area surrounding many creeks was developed for use as reservoirs, aqueducts, and mains to serve parts of Alameda and Contra Costa Counties. In 1917, the People's Water Company was purchased by the East Bay Water Company, which developed the San Pablo Reservoir in 1919, the Upper San Leandro Reservoir in 1926, and the Upper San Leandro WTP in 1927[8] (EBMUD, 1991, 2005b).

EBMUD was formed on May 8, 1923, the product of a bond issue passed by the voters of Oakland, Berkeley, Alameda, Emeryville, Albany, San Leandro, and El Cerrito. Richmond and Piedmont would later become part of the system. EBMUD engineers Arthur Powell Davis, General Goethals, and William Mulholland selected the Mokelumne River as the water supply source and Lancha Plana in the Sierra Nevada mountains as the site for the reservoir (Noble, 1970).

As originally designed, water from the Mokelumne River in the Sierra Nevada mountains collected behind Pardee Dam at Lancha Plana, then flowed via gravity into a series of pipelines built across California's Central Valley and Delta region. The water flowed to a pumping plant in Walnut Creek, which pushed the water to East Bay customers; some of the water was delivered by a pipeline tunnel into a storage reservoir in Lafayette, and then directed into San Pablo Creek in Orinda where it could fill San Pablo Reservoir or be diverted into the Claremont Tunnel in the Oakland-Berkeley Hills (Noble, 1970).

8 The Upper San Leandro WTP had major expansions in 1961 and 1991 (EBMUD, 2003).

In 1928, five years after the District was formed, a $26 million bond was used to purchase the existing system of the East Bay Water Company. With the facilities came 40,000 acres of land in Alameda and Contra Costa Counties and all of the East Bay Water Company's previously completed reservoirs and treatment plants (EBMUD, 2003). In the year the District was formed, the Lafayette Reservoir was completed as a terminal storage reservoir in the EBMUD system. The Pardee Dam and the first Mokelumne Aqueduct were completed in 1929, with the first water deliveries from the Sierra Nevada mountains to the East Bay in June of that year.

By 1930, EBMUD was serving 35 million gallons per day (mgd) to a population of 460,000. A study of District lands commissioned in the same year indicated that 7,000 to 10,000 acres were not needed for watershed protection purposes and were suitable for parks and recreation use. In 1934, the East Bay Regional Park District (EBRPD) was created to acquire and manage District lands not needed for water quality protection. In 1936, EBMUD agreed to sell 2,162 acres of watershed land in Wildcat Canyon, Tilden Park, Roundtop Peak, and Temescal Reservoir to the EBRPD (EBMUD, 2003). EBMUD constructed the Art Deco–style Orinda Filter Plant (Orinda WTP) in 1936, which continues to be the largest of the District's six water treatment plants.[9]

EBMUD continued to grow during the post-war period. Populations in the East Bay grew to 850,000, necessitating a second Mokelumne Aqueduct, which was completed in 1950. In 1958, Pardee Reservoir was opened for public recreation. In 1964, EBMUD constructed the Sobrante WTP.[10] In 1966, the Lafayette and Chabot Reservoirs were opened for public recreation; the Upper San Leandro WTP underwent a major expansion in the same year. By 1967, a third Mokelumne Aqueduct and the new Comanche Dam and Reservoir were completed; in the same year, EBMUD constructed the Walnut Creek WTP. By 1970, EBMUD was serving 220 mgd to an East Bay population of 1,100,000 (Noble, 1970; EBMUD, 2005b).

Methods

Archival

ESA conducted a cultural resources records search of pertinent survey and site data at the Northwest Information Center of the California Historical Resources Information System, Sonoma State University, on October 20, 2005 (File No. 05-363). The information center staff accessed the records for the Briones Valley, Walnut Creek, Las Trampas Ridge, Oakland East, and Richmond U.S. Geological Survey (USGS) 7.5-minute quadrangles and included the project area along with a quarter-mile radius around each project element. The records search included a review of the Directory of Properties in the Historic Property Data File for Contra Costa County (Office of Historic Preservation, 2005) for information on sites of recognized historical significance in the National Register of Historic Places, California Register of Historical Resources, California Inventory of Historic Resources, California Historical Landmarks, and California Points of Historical Interest.

9 EBMUD claims the building was constructed in 1935, while the City of Orinda says it was 1936, as indicated on the building's plaque. Regardless, the plant was expanded in 1961 and again in 1997 (EBMUD, 2003). This facility was designated a City of Orinda Historical Landmark in 1988 (City of Orinda, 1988).

10 Many later improvements were made in 1991 (EBMUD, 2003).

Field Methods

A field reconnaissance was conducted by an archaeologist to obtain a general impression of the area's potential to yield significant cultural resource sites and to visually inspect project areas in relation to known archaeological sites. Because the majority of the project area is highly developed, standard archaeological survey methods have little to no value due to the lack of visible native ground surface and significant alteration of the topographic setting. However, a number of alignments and proposed reservoir sites are undeveloped and therefore were subjected to a pedestrian survey (Hester et al., 1997) (see the discussion of survey methods and results for each relevant project component). In these cases, the proposed pipeline route or project facility footprint was walked, using zigzagging transects, and the ground surface inspected for archaeological deposits (e.g., stone artifacts, organic soil residues, fire-cracked rock, etc.). An architectural historian/preservation planner conducted a field reconnaissance to visually inspect for potential historic architectural resources.

Native American Consultation

The Native American Heritage Commission was contacted on December 16, 2005 to request a database search for sacred lands or other cultural properties of significance to local Indian people. The records search did not indicate the presence of Native American sacred lands in the project areas. The Commission provided a list of people who may have specific information pertaining to cultural resources in the project areas, and letters were sent to each person. No response has been received to date.

Cultural Resources within the EBMUD WTTIP Project Areas

EBMUD maintains records of all recorded cultural resources within its watershed boundaries. The District has identified 48 recorded cultural resource sites within its East Bay watershed boundaries, including prehistoric archaeological resources, historic archaeological resources, and historic architectural resources (EBMUD, 2005a). A full list of these resources is provided in Appendix F, in addition to a list of all recorded historic resources within Orinda, Lafayette, and Moraga. Of the 48 recorded historic resources in EBMUD watershed boundaries, only a few are within the immediate vicinity of proposed WTTIP project sites. These resources are described below by city.

City of Orinda

Recorded cultural resources in Orinda and in the vicinity of WTTIP project sites include the following: (1) Orinda Filter Plant (Orinda WTP), (2) Wagner Ranch and Home sites, (3) the Orinda Park Hotel site, and (4) the Orinda Park School site. A brief history and description of these resources are provided below.

Orinda Filter Plant

The Orinda Filter Plant (Orinda WTP), at 190 Camino Pablo, is owned and operated by EBMUD. The facility was completed in 1936 and was one of three buildings designed by architect Mark Daniels in 1934 (the main building, chemical building, and grounds/maintenance building) in an

Art Deco style of architecture (OHS, 2005; City of Orinda, 1988). The filter plant was built as part of EBMUD's Mokelumne River/Aqueduct Project. The filter plant was expanded in 1961 and extensively renovated in 1997/1998, including a restoration of the plant's Art Deco design and details. In November 1988, the Orinda Filter Plant was designated Orinda's first historic landmark (City of Orinda, 2005; EBMUD, 2003). EBMUD also identifies the Orinda WTP as a historic architectural resource (EBMUD, 2005a). The Orinda Filter Plant is considered a cultural resource for the purposes of CEQA.

Wagner Ranch and Home Site

In the 1870s, General Theodore Wagner[11] obtained about 241 acres around the intersection of Wildcat Canyon Road, Bear Creek Road, and San Pablo Dam Road through his marriage into the Sandow family (OHS, 2005). In 1882, General Wagner built a large home and ranch on what is now the Wagner Ranch Nature Area, just north of today's intersection of San Pablo Dam Road and Bear Creek Road. Wagner's Oak View Ranch was self-sustaining and contained orchards, olive trees, vineyards, a dairy, brick kiln, gas house, horse barn, carriage house, fish pond, dairy, hotel (see Orinda Park Hotel Site discussion, below), blacksmith's shop, and servant's house (City of Orinda, 2005). In July 1887, the original Wagner home was destroyed in a fire and rebuilt later that year on a smaller scale. By 1891 the property was sold to Moses Hopkins (a brother of Mark Hopkins), and, by 1895, Wagner had moved to Berkeley (Muir, 1970). The property was eventually purchased by the Contra Costa Water Company (which became the People's Water Company and was later absorbed by the East Bay Water Company, which in turn was purchased by EBMUD). Although the building no longer exists, EBMUD maintains the original homesite as a historical study and nature area. The Wagner Ranch and Home sites are considered cultural resources for the purposes of CEQA.

Orinda Park Hotel Site

The Orinda Park Hotel was constructed on the Wagner Ranch property across and to the north of Bear Creek Road from the Wagner Ranch homesite. General Wagner built the hotel in 1885 in anticipation of the extension of the California-Nevada Railroad. After the railroad reached Orinda Park in 1889, the hotel became a favorite with hunters, fishermen, and harvesters. However, due to the failure of the railroad around 1900 and the slow development of the area, the building was sold and used only for community parties and dances. The hotel was torn down in 1913. Part of its stone foundation is still visible, and the hotel site is now located on EBMUD property (City of Orinda, 2005; Contra Costa County, 1989). The Orinda Park Hotel site is considered a cultural resource for the purposes of CEQA.

Orinda Park School Site

The Orinda Park School District was formed in 1881. In 1882, the Orinda Park School was constructed on land donated by Wagner at a site near the present-day intersection of San Pablo Dam Road and Wildcat Canyon Road. The school was used until 1925, when the Orinda High School District was formed and a new school was built at 26 Orinda Way (now the

[11] Wagner's title of "General" was due to his role as United States Surveyor General. He was also a member of the California Supreme Court.

Orinda Community Center). The Orinda Park School building was auctioned in April 1925, and the land reverted to the East Bay Water Company (now EBMUD). In the 1960s, the Orinda Union School District chose the Wagner site for construction of a new school. The Wagner Ranch Elementary School opened for its first students in September 1969. The original school building no longer exists (OHS, 2005). The Orinda Park School site is considered a cultural resource for the purposes of CEQA.

City of Lafayette

Recorded historic resources in Lafayette and in the vicinity of WTTIP project sites include the Lafayette Reservoir Dam, and potentially one pumping facility within the Lafayette WTP. These resources are described below.

Lafayette Reservoir Dam

The Lafayette Reservoir Dam is a 126-foot-tall, 1,200-foot-wide earthen embankment; it covers a watershed area of 75 square miles and impounds the Lafayette Reservoir, which can hold 1.4 billion gallons of water (Noble, 1970). The dam was constructed by EBMUD in 1928 as part of the storage system for the Mokelumne River/Aqueduct Project, and is now one of five terminal storage reservoirs in the EBMUD system (the other four are the Briones, San Pablo, Upper San Leandro, and Chabot Reservoirs). The dam was designed by EBMUD supervising engineer George B. Sturgeon and engineering inspector Leo J. Coleman, Sr. (City of Lafayette, 2005). Prior to its construction, the reservoir site required multiple property condemnations, two of which were tried in court by the landowners (who sued over the condemnation price being offered by EBMUD). The suits were eventually settled and construction began on the dam. During construction in September 1927, the dam began sliding off its foundation and large cracks opened up in the reservoir bed. To solve the engineering difficulties, the dam was reduced in height by 40 feet and the side slopes were flattened. This change reduced the dam’s storage capacity from 10,540 acre-feet to 3,700 acre-feet (Noble, 1970). The Lafayette Reservoir remained closed to the general public until 1966, when it was opened for recreational purposes. Although not identified as a national, state, or local historical resource, EBMUD lists the Lafayette Reservoir Dam as a historic architectural resource (EBMUD, 2005b). The Lafayette Reservoir Dam is considered a cultural resource for the purposes of CEQA.

A small remnant of an old orchard can be seen between the base of the dam and Mt. Diablo Boulevard. This orchard may have been part of a larger orchard that existed in the valley before the property was condemned by EBMUD in the 1920s. No historic farmhouse or related structures in the area appear to be associated with the orchard, and while the orchard itself is likely over 75 years old, it has not been identified as a historic resource. Due to its highly altered setting and loss of historical integrity, the orchard would not likely qualify as a significant cultural resource in the future, even upon further research. As such, the orchard is not considered a cultural resource for the purposes of CEQA.

Bryant #2 Pumping Plant (Lafayette WTP)

The Lafayette Screening Chamber and Pump House (now called the Bryant #2 Pumping Plant) was constructed in 1927, contemporaneously with the Lafayette Reservoir Dam (located immediately southwest and across Mt. Diablo Boulevard from the plant). The pumping plant was constructed adjacent to the Lafayette Tunnel, also completed in 1927, and was designed to lift water from the tunnel into the Lafayette Reservoir. Water from the reservoir could also be pumped through the pumping plant and its screening chambers into the Lafayette Tunnel for distribution further down the line. The two-story Art Deco–style facility was designed by EBMUD engineer H.A. Knudsen in 1926 (EBMUD, 1926). Water treatment facilities designed in an industrial-modern architectural style were added to the north of the pumping plant in 1953, with an expansion in 1960 and later renovations and additions in the early 1990s (EBMUD, 2003). Neither the Lafayette WTP nor the 1927 pumping plant within it are listed as a national, state, or local historical resource, nor are they identified as historic sites by EBMUD. However, based on the field reconnaissance and limited historical research of the Bryant #2 Pumping Plant within the Lafayette WTP in October 2005, this facility may be individually eligible for listing in the California Register of Historical Resources (i.e., a historic resource for CEQA purposes) due to its age, its associations with the initial development of EBMUD's Mokelumne River/Aqueduct Project, and as a good example of the Art Deco style of architecture as applied to an industrial building.[12] Although there are many pumping plants in the EBMUD system, this plant appears to be one of the oldest and has retained a high level of overall physical integrity. For these reasons, the Bryant #2 Pumping Plant is considered a cultural resource for CEQA purposes. Given the relatively recent dates of alterations to the other water treatment facilities at the Lafayette WTP, the remainder of the facility would not likely be eligible for listing in the California Register, and therefore is considered a cultural resource for CEQA purposes.

Town of Moraga

Recorded historic resources in Moraga and in the vicinity of WTTIP project sites include the Rheem Estate/Hacienda de las Flores (Moraga Road Pipeline project), and St. Mary's College (St. Mary's Drive/Rohrer Drive Pipeline program-level project). These historic resources are described below.

Rheem Estate/Hacienda de las Flores

The Rheem Estate, also called the Hacienda de las Flores, is located at the intersection of Moraga Road and Donald Drive (2100 Donald Drive) in Moraga. The Spanish-style estate was designed by architect Clarence Tantau and constructed in about 1917 as an orphanage to be directed by Hortense Higgens and Gertrude Mallelle (Contra Costa County, 1989). In 1934, the structure and 20 surrounding acres were sold to Donald Rheem, who greatly expanded the building to become an 18-room mansion.[13] In 1961, Rheem sold the estate to the Christian Brothers, who ran St. Mary's College; the brothers in turn sold it to the Town of Moraga in 1973 (Contra Costa Times, 2005). The structure now serves as the offices of the Town of Moraga and the Moraga Parks Department. The Rheem Estate/Hacienda de las Flores is considered by the Town of Moraga to be a historical resource (Town of Moraga, 2002) and is therefore a cultural resource for CEQA purposes.

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[12] Reconnaissance-level historical evaluation conducted by an ESA architectural historian/preservation planner on October 12, 2005.

[13] Rheem was an heir to the Standard Oil fortune.

St. Mary's College

St. Mary's College is located on St. Mary's Road in eastern Moraga. As described above, the Moraga Land Company gave 100 acres to St. Mary's College and College of Holy Names in 1927, and in 1928 the college moved from its original site in San Francisco's Mission District to Moraga Valley. Although the campus has changed substantially, with many newer facilities constructed over the years, a number of the original Spanish-style buildings still exist, including the main chapel. The chapel and other original buildings dating from the late 1920s and early 1930s are considered by the Town of Moraga (2002) to be historical resources and are therefore cultural resources for CEQA purposes.

Paleontologic Resources

Paleontologic resources are fossilized evidence of past life found in the geologic record. Despite the prodigious volume of sedimentary rock deposits preserved worldwide and the enormous number of organisms that have lived through time, preservation of plant or animal remains as fossils is an extremely rare occurrence. Because of the infrequency of fossil preservation, fossils (particularly vertebrate fossils) are considered to be nonrenewable resources. Because of their rarity and the scientific information they can provide, fossils are highly significant records of ancient life. Paleontologic resource localities are sites where the fossilized remains of extinct animals and/or plants have been preserved.

Sedimentary rock formations that yield significant vertebrate or invertebrate fossil remains are considered to possess paleontological sensitivity. Significant paleontological resources can be found anywhere within the geographic extent of sedimentary rocks formations in the project area.

Regulatory Framework

Cultural resource surveys provide information about existing properties that may be of value to a community. Designation or listing in a registry of cultural and/or historical resources may occur if a building or site is found to be of value; designation or listing can also alert potential developers of the public's interest in such properties through review by public boards and commissions. The following regulatory framework identifies the national, state, and local criteria used to identify and protect cultural resources. Since the recorded cultural sites within the WTTIP project area are located in Orinda, Lafayette, and Moraga, the regulatory framework identifies all of these cities' general plans, ordinances, and other related policies and regulations.

National Register of Historic Places

The National Register of Historic Places is the nation's master inventory of known historic resources. The National Register is administered by the National Park Service and includes listings of buildings, structures, sites, objects, and districts that possess historic, architectural, engineering, archaeological, or cultural significance at the national, state, or local level.

Structures, sites, buildings, districts, and objects over 50 years of age can be listed in the National Register as significant historical resources. However, properties under 50 years of age that are of exceptional importance or are contributors to a district can also be included in the National Register. The criteria for listing in the National Register include resources that:

- Are associated with events that have made a significant contribution to the broad patterns of history;
- Are associated with the lives of persons significant in our past;
- Embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
- Have yielded or may likely yield information important in prehistory or history.

California Environmental Quality Act

CEQA requires that public or private projects financed or approved by public agencies assess the effects of the project on historical resources. CEQA also applies to effects on archaeological sites, which may be included among "historical resources" as defined by CEQA Guidelines Section 15064.5, subdivision (a), or may be subject to the provisions of Public Resources Code Section 21083.2, which governs review of "unique archaeological resources." Historical resources generally include buildings, sites, structures, objects, or districts, each of which may have historical, architectural, archaeological, cultural, or scientific significance.

Under CEQA, "historical resources" include the following:

- A resource listed in, or determined to be eligible by the State Historical Resources Commission, for listing in the California Register of Historical Resources (Public Resources Code, Section 5024.1).
- A resource included in a local register of historical resources, as defined in Section 5020.1(k) of the Public Resources Code or identified as significant in a historical resource survey meeting the requirements of Section 5024.1(g) of the Public Resources Code, will be presumed to be historically or culturally significant. Public agencies must treat any such resource as significant unless the preponderance of evidence demonstrates that it is not historically or culturally significant.
- Any object, building, structure, site, area, place, record, or manuscript which a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California may be considered to be a historical resource, provided the lead agency's determination is supported by substantial evidence in light of the whole record. Generally, a resource will be considered by the lead agency to be "historically significant" if the resource meets the criteria for listing in the California Register of Historical Resources (Public Resources Code, Section 5024.1), including the following:
  - Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;
  - Is associated with the lives of persons important in our past;

  - Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or
  - Has yielded, or may be likely to yield, information important in prehistory or history.

- The fact that a resource is not listed in or determined to be eligible for listing in the California Register of Historical Resources, not included in a local register of historical resources (pursuant to Section 5020.1[k] of the Public Resources Code), or identified in a historical resources survey (meeting the criteria in Section 5024.1[g] of the Public Resources Code) does not preclude a lead agency from determining that the resource may be a historical resource as defined in Public Resources Code Section 5020.1(j) or 5024.1.

Archaeological resources that are not historical resources according to the above definitions may be “unique archaeological resources” as defined in Public Resources Code Section 21083.2, which also generally provides that “non-unique archaeological resources” do not receive any protection under CEQA. If an archaeological resource is neither a unique archaeological nor a historical resource, the effects of the project on those resources will not be considered a significant effect on the environment. It is sufficient that the resource and the effects on it be noted in the EIR, but the resource need not be considered further in the CEQA process.

CEQA requires that if a project results in an effect that may cause a substantial adverse change in the significance of a historical resource, or would cause significant effects on a unique archaeological resource, then alternative plans or mitigation measures must be considered. Therefore, prior to assessing effects or developing mitigation measures, the significance of cultural resources must first be determined. The steps that are normally taken in a cultural resources investigation for CEQA compliance are as follows:

- Identify potential historical resources
- Evaluate the eligibility of historical resources
- Evaluate the effects of the project on eligible historical resources

EBMUD East Bay Watershed Master Plan (1996)

The District’s goal for cultural resources is to avoid adverse effects on sensitive cultural resources during the implementation of District activities on watershed lands, and to establish relationships with local Native American groups. Specific objectives to implement these goals include the following:

- Identify, preserve, and protect significant cultural resources
- Provide for appropriate research and educational uses of District lands with respect to cultural resources
- Maintain an ongoing relationship with Native Americans who have ancestral ties to District lands

The District’s *East Bay Watershed Master Plan* also contains 11 guidelines for the identification and protection of cultural resources. (See Appendix D, Table D-7 for specific language.)

City of Orinda General Plan and Historic Landmarks Ordinance

The Conservation Element of the Orinda General Plan (City of Orinda, 1994) contains goals and policies that address the identification and preservation of historic structures and sites. (See Appendix D, Table D-5 for applicable general plan language.)

In addition, City Council adopted Title 17.25 (Historic Landmarks) of the Orinda Municipal Code as the City's landmarks preservation ordinance. The purpose of the ordinance is to preserve, protect, perpetuate, enhance, and use historic landmarks. The ordinance also allows the City Council to designate a site, building, structure, monument, tree, work of art, or other object in the city as a historical landmark.

In 1988, the Orinda City Council designated the Orinda Filter Plant as a historical landmark (City of Orinda, 1988). Notable building features cited in the designation include the gargoyles at the entrance, the arched entrance ceiling and chandelier at the main building, the light fixtures and the railings on the walls on the side elevation of the building above the filter gallery, and exterior lamp posts (City of Orinda, 1988). The City Council found the Orinda Filter Plant to be significant for the following reasons:

- It is part of the development and heritage characteristics of Orinda.
- It is located on a site of significant historic events.
- It represents a distinctive example of an architectural period of style.
- It is associated with important governmental and social developments in the city.

The Orinda Planning Department reserves the right to require a plan check for changes to any building or object with landmark status. Changes are defined as exterior alteration, destruction or removal, interior alteration that could affect an area customarily open to the public and that has special historic or aesthetic value, or onsite physical changes to the grounds, as defined in the landmark designation. As the Orinda Filter Plant is a water conveyance facility owned and operated by EBMUD, a state-chartered utility, it is exempt from regulations imposed under the local historic landmark ordinance, pursuant to Section 53091 of the Water Code. The city ordinance makes note of this fact by stating, "… the sole purpose of the Landmark designation is to recognize the site as a place of historical significance."

City of Lafayette General Plan and Historic Landmarks Ordinance

The Land Use Element of the Lafayette General Plan (City of Lafayette, 2002) contains goals and policies that call for the identification and preservation of archaeological and historic resources. (See Appendix D, Table D-2 for applicable general plan language.)

In addition, City Council adopted Title 6.21 (Historic Landmarks) of the Lafayette Municipal Code as the city's landmarks preservation ordinance. The purpose of the ordinance is to safeguard the heritage of the city by preserving and perpetuating locations, areas, places, sites, buildings, structures, monuments, works of art, and other objects that reflect elements of the city's cultural, historical, archaeological, social, economic, political, agricultural, military, educational, or architectural history. The ordinance allows the Lafayette City Council to designate historical landmarks and to issue certificates of appropriateness for proposed alterations to designated landmarks.

Town of Moraga General Plan

The Community Design Element of the Moraga General Plan (Town of Moraga, 2002) contains goals and policies that address the identification and preservation of historic buildings and sites and sets guidance for adjacent infill development. (See Appendix D, Table D-3 for applicable general plan language.)

The Town of Moraga does not have a historic landmarks ordinance as part of its municipal code.

3.7.3 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:

- A substantial adverse change in the significance of a historical resource that is either listed or eligible for listing in the National Register of Historic Places, the California Register of Historical Resources, or a local register of historic resources;
- A substantial adverse change in the significance of a unique archaeological resource;
- Disturbance or destruction of a unique paleontological resource or site or unique geologic feature; or
- Disturbance of any human remains, including those interred outside or formal cemeteries.

CEQA provides that a project may cause a significant environmental effect where the project could result in a substantial adverse change in the significance of a historical resource (Public Resources Code, Section 21084.1). CEQA Guidelines Section 15064.5 defines a “substantial adverse change” in the significance of a historical resource to mean physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of a historical resource would be “materially impaired” (CEQA Guidelines, Section 15064.5[b][1]).

CEQA Guidelines, Section 15064.5(b)(2), defines “materially impaired” for purposes of the definition of “substantial adverse change” as follows:

> The significance of a historical resource is materially impaired when a project:
>
> (A) Demolishes or materially alters in an adverse manner those physical characteristics of an historical resource that convey its historical significance and that justify its inclusion in, or eligibility for, inclusion in the California Register of Historical Resources; or

(B) Demolishes or materially alters in an adverse manner those physical characteristics that account for its inclusion in a local register of historical resources pursuant to Section 5020.1(k) of the Public Resources Code or its identification in an historical resources survey meeting the requirements of Section 5024.1(g) of the Public Resources Code, unless the public agency reviewing the effects of the project establishes by a preponderance of evidence that the resource is not historically or culturally significant; or

(C) Demolishes or materially alters in an adverse manner those physical characteristics of a historical resource that convey its historical significance and that justify its eligibility for inclusion in the California Register of Historical Resources as determined by a lead agency for purposes of CEQA.

In accordance with CEQA Guidelines Section 15064.5(b)(3), a project that follows the Secretary of the Interior's *Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings* or *Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings* is considered to have mitigated impacts to historic resources to a less-than-significant level.

Historic resources are usually 50 years old or older and must meet at least one of the criteria for listing in the California Register (such as association with historical events, important people, or architectural significance), in addition to maintaining a sufficient level of physical integrity (CEQA Guidelines Section 15064.5[a][3]).

Impacts and Mitigation Measures

Table 3.7-1 indicates the level of significance of potential impacts to cultural resources by project facility.

Impact 3.7-1: Potential disturbance to archaeological resources, including unrecorded cultural resources.

The discussions below identify archaeological resource investigations conducted for the WTTIP sites. Previously unknown and buried (or otherwise obscured) prehistoric or historic cultural resources may be present almost anywhere in the construction zones identified for the projects, and all WTTIP projects would involve excavation. As a result, construction of the WTTIP projects could result in degradation and/or destruction of unrecorded cultural resources, a significant impact. With implementation of Measure 3.7-1a (see page 3.7-24) for all WTTIP projects, these potential impacts would be reduced to a less-than-significant level.

Lafayette WTP

Alternative 1 – Supply from Orinda and Lafayette WTPs

Under Alternative 1, a significant amount of subsurface excavation and grading would occur, primarily resulting from construction of the two proposed clearwells to be placed west of the plant near Lafayette Creek (refer to Map D-LWTP-1 at the end of Chapter 2). Several proposed pipelines would cross the creek. A recent surface reconnaissance of the clearwell sites did not

TABLE 3.7-1
SUMMARY OF POTENTIAL PROJECT-LEVEL CULTURAL RESOURCE IMPACTS

Facility	Impact 3.7-1 Archaeological resources	Impact 3.7-2 Paleontological Resources	Impact 3.7-3 Historic Resources
Lafayette WTP			
Alternative 1 or 2	SM	SM	LTS
Orinda WTP			
Alternative 1 or 2	SM	SM	LTS
Walnut Creek WTP			
Alternative 1 or 2	SM	SM	–
Sobrante WTP			
Alternative 1 or 2	SM	SM	–
Upper San Leandro WTP			
Alternative 1 or 2	SM	SM	–
Orinda-Lafayette Aqueduct			
Alternative 2	SM	SM	–
Ardith Reservoir/ Donald Pumping Plant	SM	SM	–
Fay Hill Pumping Plant and Pipeline Improvements	SM	SM	–
Fay Hill Reservoir	SM	SM	–
Glen Pipeline Improvements	SM	SM	–
Happy Valley Pumping Plant and Pipeline	SM	SM	–
Highland Reservoir and Pipelines	SM	SM	LTS
Lafayette Reclaimed Water Pipeline	SM	SM	LTS
Leland Isolation Pipeline and Bypass Valves	SM	SM	–
Moraga Reservoir	SM	SM	–
Moraga Road Pipeline	SM	SM	LTS
Sunnyside Pumping Plant	SM	SM	–
Tice Pumping Plant and Pipeline	SM	SM	–
Withers Pumping Plant	SM	SM	–

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

reveal any evidence of prehistoric use, although the area had been recently grubbed, and gravel roads have been cut through the area. No previous cultural resource surveys had been conducted at the Lafayette WTP. Lafayette Creek is an area of moderate to high sensitivity for cultural resources. One prehistoric archaeological site (CA-CCo-231) has been identified about one-quarter mile northwest of the WTP along the creek; this site is discussed below under the Orinda-Lafayette Aqueduct. The pipeline crossing locations proposed in both alternatives were inspected for archaeological deposits in the creek banks (which provide a deep stratigraphic cross-section of the soil deposits); no evidence of prehistoric use of this area was observed. Due to the previous disturbance at the Lafayette WTP site and the absence of recorded cultural sites in the vicinity, archaeological resources are not likely to be encountered. However, due to the sensitivity of

Lafayette Creek, Measures 3.7-1a and 3.7-1b are recommended for any WTTIP project construction within 200 feet of the Creek.

Alternative 2

Under Alternative 2, ground disturbance associated with the Lafayette WTP would be substantially less than that under Alternative 1; however, pipeline construction would still occur near Lafayette Creek (see Orinda-Lafayette Aqueduct discussion).

Orinda WTP

Alternative 1

Under Alternative 1, a substantial amount of subsurface excavation and grading would be required, particularly for construction of potential future facilities (see discussion below). The Orinda WTP had been previously surveyed for archaeological resources with negative results (Bramlette, 1987). The field reconnaissance of the Orinda Sports Field conducted for the WTTIP did not identify any cultural resources. Exposed native surfaces were more closely inspected, but the area was mostly covered by grasses, which diminished the surface visibility. However, a number of cultural resources have been recorded on EBMUD property in the vicinity of the Orinda WTP; these include prehistoric archaeological resources within the San Pablo Reservoir watershed (for example, sites CA-CCo-401 and CA-CCo-409), four historic archaeological sites (the Wagner Ranch and Home sites, the Orinda Park Hotel site, and the Orinda Park School site), and one historic resource (the Orinda Filter Plant). Recorded historic archaeological sites associated with Wagner Ranch and Orinda Park are located about 1,500 feet north of the Orinda Sports Field (or north of Wagner Ranch Elementary School). The Wagner Ranch covered some 240 acres and included the entire Orinda WTP site. Subsurface artifacts from this previous use as a self-sufficient ranch could exist anywhere in the project area.

Construction of the proposed project could result in degradation or destruction of unrecorded cultural resources. With implementation of Measure 3.7-1a, this impact would be reduced to a less-than-significant level.

Alternative 2

Under this alternative, there would be subsurface excavation and grading for the following proposed facilities (in addition to the facilities that would also be constructed under Alternative 1): the new Los Altos Pumping Plant, Orinda-Lafayette Aqueduct, the clearwell at the existing washwater settling basin area, and pipelines connecting these facilities, (refer to Map D-OWTP-2 at the end of Chapter 2). Construction of the proposed facilities could result in degradation or destruction of unrecorded cultural resources. With implementation of Measure 3.7-1a, this impact would be reduced to a less-than-significant level.

Walnut Creek WTP – Alternative 1 or 2

No cultural resources have been recorded on the Walnut Creek WTP site or immediate vicinity. The current project area is highly developed with concrete and asphalt paving; consequently, the field reconnaissance was constrained and did not identify any cultural resources. However, because unrecorded cultural resources could exist anywhere in the construction zone, this project could result in significant impacts to cultural resources. With implementation of Measure 3.7-1a, this impact would be reduced to a less-than-significant level.

Sobrante WTP – Alternative 1 or 2

No cultural resources have been recorded on the Sobrante WTP site; however, a single prehistoric site, CA-CCo-387, was previously identified about 1,500 feet west of the Sobrante WTP on a terrace above San Pablo Creek, off of La Honda Road. The WTP facility itself is highly developed; although the existing backwash water settling basins west of the WTP are located on the bank of the San Pablo Creek, the area has been modified to accommodate the basins and, as such, did not provide favorable conditions for visual inspection of the surface. The pathway on the creek-side of the settling basins was inspected with negative results. The proposed changes to the Sobrante WTP appear to avoid site CA-CCo-387. An archaeological survey conducted for the widening of Valley View Road was negative for archaeological resources (Baldrica, 1981). However, because unrecorded cultural resources could exist anywhere in the construction zone, this project could result in significant impacts to cultural resources. With implementation of Measure 3.7-1a, this impact would be reduced to a less-than-significant level.

Upper San Leandro WTP – Alternative 1 or 2

No cultural resources have been recorded on the Upper San Leandro WTP site or immediate vicinity. The WTP site is mostly paved; the site reconnaissance of areas that would be disturbed did not identify any archaeological resources. However, because unrecorded cultural resources could exist anywhere in the construction zone, this project could result in significant impacts to cultural resources. With implementation of Measure 3.7-1a, this impact would be reduced to a less-than-significant level.

Orinda-Lafayette Aqueduct

A substantial amount of subsurface excavation and grading would be required for construction of the Orinda-Lafayette Aqueduct. Two recorded prehistoric or historic archaeological resources have been identified in the immediate project vicinity (CA-CCo-231 and CA-CCo-142). This portion of the project would also involve subsurface disturbance near Lafayette Creek, which is considered to be moderate to highly sensitive for cultural resources. CA-CCo-231, a poorly defined site that contained burials, is directly within the Orinda-Lafayette Aqueduct alignment (this site was originally recorded by Loud [1913]). An attempt to relocate CA-CCo-231 was conducted in the exposed area at the edge of the Bentley School parking lot adjacent to Lafayette Creek. The area has been disturbed by the parking lot and ornamental landscaping, which tended to obscure the native surface. No archaeological deposits were identified. However, jack-and-bore and trenching activities could potentially affect CA-CCo-231 and any previously unknown site material. The other previously identified site, CA-CCo-142, is located on the ground surface, more than 100 feet above the proposed tunnel alignment; consequently, no direct impacts to this site are expected.

With implementation of Measures 3.7-1a and 3.7-1b, this impact would be reduced to a less-than-significant level.

Ardith Reservoir and Donald Pumping Plant

No cultural resources have been recorded on the proposed Ardith Reservoir/Donald Pumping Plant site or immediate vicinity. The area has been previously disturbed. However, because unrecorded cultural resources could exist anywhere in the construction zone, this project could result in significant impacts to cultural resources. With implementation of Measure 3.7-1a, this impact would be reduced to a less-than-significant level.

Fay Hill Pumping Plant and Pipeline Improvements

No cultural resources have been recorded on the proposed Fay Hill Pumping Plant and Pipeline site or immediate vicinity. The area has been previously disturbed. However, because unrecorded cultural resources could exist anywhere in the construction zone, this project could result in significant impacts to cultural resources. With implementation of Measure 3.7-1a, this impact would be reduced to a less-than-significant level.

Fay Hill Reservoir

No cultural resources have been recorded on the proposed Fay Hill Reservoir site or immediate vicinity. The upland hillside overlooking the Rheem Valley (where the Fay Hill Reservoir is located) was previously surveyed with negative results (Self, 1990). The reservoir site is located at a high point with views of Mount Diablo; however, the hillside has long been used for grazing, and much of the native vegetation is gone. However, because unrecorded cultural resources could exist anywhere in the construction zone, this project could result in significant impacts to cultural resources. With implementation of Measure 3.7-1a, this impact would be reduced to a less-than-significant level.

Glen Pipeline Improvements

One prehistoric cultural resource has been recorded near the proposed Glen Pipeline alignment:

- *CA-CCo-232*. This site was identified on Happy Valley Road near the termination of the Glen Pipeline route. While identified as a large habitation site, it has since likely been destroyed (Loud, 1926).

Although the area has been previously disturbed, components of the above site or unknown sites could exist anywhere in the construction zone of the Glen Pipeline Improvements, especially along Nordstrom Lane, which would be subjected to subsurface excavation and grading. CA-CCo-232 was poorly recorded and without subsurface data on the site, deposits may exist within the project excavation corridor. With implementation of Measures 3.7-1a and 3.7-1b, this impact would be reduced to a less-than-significant level.

Happy Valley Pumping Plant and Pipeline

No cultural resources have been recorded within the Happy Valley Pumping Plant and Pipeline project area or immediate vicinity. Two previous cultural resource investigations conducted along most of the pipeline route were negative for archaeological deposits (Holman, 1991, 1993). The pipeline route is currently paved, thereby eliminating the surface visibility. The proposed pumping plant location is on an undeveloped terrace above Lauterwasser Creek. A surface inspection of the pumping plant site did not reveal any archaeological site deposits. However, given the proximity to the creek, subsurface deposits may be present in this area. The pipeline would be constructed within existing rights-of-way that were previously disturbed during the development of roads (such as Minor Road and Lombardy Lane), and therefore no cultural resources are likely to be present. However, cultural resources could exist anywhere in the construction zone, which would be subjected to a substantial amount of subsurface excavation and grading. In addition, certain portions of the project would involve subsurface disturbance near Lauterwasser Creek, which is considered to be moderately sensitive for containing cultural resources. Because unrecorded cultural resources could exist anywhere in the construction zone, this project could result in significant impacts to cultural resources. With implementation of Measure 3.7-1a, this impact would be reduced to a less-than-significant level.

Highland Reservoir and Pipelines

No cultural resources have been recorded within the Highland Reservoir and Pipelines project area or immediate vicinity. The proposed reservoir and pipelines are located west of the Lafayette Dam in an oak woodland habitat. The site, pipeline routes, stockpile area, and construction access road were inspected for archaeological remains using pedestrian survey methods. While much of the pipeline alignments and the proposed reservoir site are covered in grasses, some areas along the dirt access roads allowed for greater surface visibility. However, no archaeological deposits were identified. Despite the disturbance caused by the original construction of the Lafayette Reservoir Dam, significant archaeological resources could exist anywhere in the construction zone, potentially resulting in significant impacts to cultural resources. With implementation of Measure 3.7-1a, this impact would be reduced to a less-than-significant level.

Lafayette Reclaimed Water Pipeline

No cultural resources have been recorded within the Lafayette Reclaimed Water Pipeline project area or immediate vicinity. The proposed pipeline would cross Lafayette Creek, which is an area of moderate to high sensitivity for cultural resources. One prehistoric archaeological site (CA-CCo-231) has been identified about one-quarter mile northwest of the WTP along the creek; this site is discussed below under the Orinda-Lafayette Aqueduct. The pipeline crossing locations proposed were inspected for archaeological deposits in the creek banks (which provide a deep stratigraphic cross-section of the soil deposits); no evidence of prehistoric use of this area was observed. Due to the previous disturbance at the Lafayette WTP site and the absence of recorded cultural sites in the vicinity, archaeological resources are not likely to be encountered. However, due to the sensitivity of Lafayette Creek, Measures 3.7-1a and 3.7-1b are recommended for any WTTIP project construction within 200 feet of the Creek.

Leland Isolation Pipeline and Bypass Valves

No cultural resources have been recorded within the Leland Isolation Pipeline and Bypass Valves project area or immediate vicinity. One previous investigation conducted along a portion of the Leland Isolation Pipeline alignment was negative (Chavez, 1997). The entire alignment is paved. However, because unrecorded cultural resources could exist anywhere in the construction zone, this project could result in significant impacts to cultural resources. With implementation of Measure 3.7-1a, this impact would be reduced to a less-than-significant level.

Moraga Reservoir

No cultural resources have been previously recorded or identified on the proposed Moraga Reservoir site or immediate vicinity. The site is within a developed residential area, which prevented any inspection of the native surface. However, because unrecorded cultural resources could exist anywhere in the construction zone, this project could result in significant impacts to cultural resources. With implementation of Measure 3.7-1a, this impact would be reduced to a less-than-significant level.

Moraga Road Pipeline

No cultural resources have been recorded along the proposed Moraga Road Pipeline project area or immediate vicinity. A number of previous studies on Moraga Road or adjacent to it have been conducted, namely Hall et al. (2000). These studies were negative for cultural resources. The overland portion of this pipeline alignment was surveyed using pedestrian techniques and employing a tablet computer with GPS/GIS[14] capabilities to guide the survey along the proposed pipeline. An existing EBMUD pipeline parallels the proposed pipeline, and sections of the old pipe are visible above the surface at creek crossings. The alignment passes through mostly oak woodland and chaparral habitats—in some cases up steep slopes or along slope lines. Segments of the alignment that traverse slopes with grades over 15 percent would not likely contain archaeological deposits. Portions of the proposed pipeline alignment follow existing fire road trails, which allowed for greater surface visibility than other segments that were mostly covered by grasses. No archaeological deposits were identified during this survey. Nevertheless, this area is mostly undeveloped and has characteristics that would have been attractive to prehistoric hunter-gatherers (i.e., access to fresh water resources and game); therefore, long-term habitation and/or ephemeral campsites could exist anywhere in the construction zone, which would be subjected to a substantial amount of excavation and grading. Because unrecorded cultural resources could exist anywhere in the construction zone, this project could result in significant impacts to cultural resources. With implementation of Measure 3.7-1a, this impact would be reduced to a less-than-significant level.

Sunnyside Pumping Plant

No cultural resources have been recorded on the proposed Sunnyside Pumping Plant site or were identified within the immediate vicinity. Two previous studies did not identify any cultural resources on this site (Chavez, 1983, 1984). The area has been previously disturbed. However,

[14] GPS/GIS = geographic positioning system/geographic information system.

because unrecorded cultural resources could exist anywhere in the construction zone, this project could result in significant impacts to cultural resources. With implementation of Measure 3.7-1a, this impact would be reduced to a less-than-significant level.

Tice Pumping Plant and Pipeline

No cultural resources have been recorded or were identified on the proposed Tice Pumping Plant and Pipeline project site or immediate vicinity. These areas have been previously disturbed. However, because unrecorded cultural resources could exist anywhere in the construction zone, this project could result in significant impacts to cultural resources. With implementation of Measure 3.7-1a, this impact would be reduced to a less-than-significant level.

Withers Pumping Plant

No cultural resources have been recorded or were identified on the proposed Withers Pumping Plant project site or immediate vicinity. Three previous cultural resource studies have been conducted within the Withers Pumping Plant project area; these studies were negative for archaeological sites (Stillinger, 1978; Hall et al., 2000; Pastron, 1995). However, because unrecorded cultural resources could exist anywhere in the construction zone, this project could result in significant impacts to cultural resources. With implementation of Measure 3.7-1a, this impact would be reduced to a less-than-significant level.

Mitigation Measures

> **Measure 3.7-1a:** EBMUD will include the following in WTTIP contract specifications for ground-disturbing activities, including excavation and grading. In the event of accidental discovery of cultural resources, such as structural features, bone, shell, artifacts, human remains, architectural remains (such as bricks or other foundation elements), or historic archaeological artifacts (such as antique glass bottles, ceramics, horseshoes, etc.), work will be suspended and EBMUD staff will be contacted. A qualified cultural resource specialist will be retained and will perform any necessary investigations to determine the significance of the find. EBMUD will then implement any mitigation deemed necessary for the recordation and/or protection of the cultural resources. In addition, pursuant to Sections 5097.97 and 5097.98 of the California Public Resources Code and Section 7050.5 of the California Health and Safety Code, in the event of the discovery of human remains, all work will be halted and the county coroner will be immediately notified. If the remains are determined to be Native American, guidelines of the Native American Heritage Commission will be adhered to in the treatment and disposition of the remains.

> **Measure 3.7-1b:** EBMUD will retain the services of a qualified archaeological consultant that has expertise in California prehistory to monitor ground-disturbing or vegetation removal activity within 500 feet of a known archaeological site. If an intact archaeological deposit is encountered, all soil-disturbing activities in the vicinity of the deposit will cease. The archaeological monitor will be empowered to temporarily redirect crews and heavy equipment until the deposit is evaluated. The monitor will immediately notify EBMUD of the encountered archaeological deposit. The monitor will, after making a reasonable effort to assess the identity, integrity, and significance of the encountered archaeological deposit, present the findings of this assessment to EBMUD. If the archaeological monitor

determines that the area being excavated does not contain archaeological materials, the monitor will modify the level of monitoring as needed.

If EBMUD, in consultation with the archaeological monitor, determines that a significant archaeological resource is present and that the resource could be adversely affected by the proposed project, EBMUD will:

- Redesign the project to avoid any adverse effects on the significant archaeological resource; or
- Implement an archaeological data recovery program (ADRP) (unless the archaeologist determines that the resource is of greater interpretive than research significance, and that interpretive use of the resource is feasible). If the circumstances warrant, an ADRP will be conducted. The project archaeologist and EBMUD will meet and consult to determine the scope of the ADRP. The archaeologist will prepare a draft ADRP that will be submitted to EBMUD for review and approval. The ADRP will identify how the proposed data recovery program would preserve the significant information the archaeological resource is expected to contain (i.e., the ADRP will identify the scientific/historical research questions that are applicable to the expected resource, the data classes the resource is expected to possess, and how the expected data classes would address the applicable research questions). Data recovery, in general, should be limited to the portions of the historical property that could be adversely affected by the proposed project. Destructive data recovery methods will not be applied to portions of the archaeological resources if nondestructive methods are practical.

Impact 3.7-2: Potential disturbance to paleontological resources.

All WTTIP Project Sites

A number of fossil discoveries have been documented within the greater Lafayette and Orinda areas—particularly within the bedrock along the ridges above San Pablo Dam, Lafayette Dam, and Briones Reservoir (UCMP, 2005). However, it does not appear that any specific paleontologic resource would be affected by the proposed WTTIP. No paleontologic resources have been located near the Sobrante and Upper San Leandro WTPs. Most of the project areas are within recent alluvial floodplain soils and surface deposits underlain by bedrock layers, which may yield deposits of ancient marine shell and other highly common accumulations of ancient life found in certain bedrock layers (e.g., the Briones Formation). However, these areas are less likely to harbor paleontological resources that would qualify as significant—in terms of scientific importance—for the purposes of CEQA (CEQA Guidelines Section 15064.5[a][3]).

Nevertheless, significant fossil discoveries can be made even in areas designated as having a low potential for such resources and could result from excavation activities related to the proposed program. Excavation activities can have a deleterious effect on such resources. This impact would be reduced to a less-than-significant level with the incorporation of the following mitigation measure.

Mitigation Measure

Measure 3.7-2: EBMUD or an appointed representative will notify a qualified paleontologist of any discoveries, document the discovery as needed, evaluate the potential resource, and assess the significance of the find under the criteria set forth in Section 15064.5 of the CEQA Guidelines. In the event a fossil is discovered during construction, excavations within 50 feet of the find will be temporarily halted or diverted until the discovery is examined by a qualified paleontologist, in accordance with Society of Vertebrate Paleontology standards (SVP, 1995). The paleontologist will notify EBMUD to determine procedures to be followed before construction is allowed to resume at the location of the find. If EBMUD determines that avoidance is not feasible, the paleontologist will prepare an excavation plan for mitigating the effect of the project on the qualities that make the resource important, and the plan will be implemented. The plan will be submitted to EBMUD for review and approval.

Impact 3.7-3: Disturbance or alteration to historic resources.

No historic architectural resources were located at or in the vicinity of the majority of the WTTIP project sites. However, four historic (or potentially historic) architectural resources are located near (and, in some cases, at) the following WTTIP project sites:

- Lafayette WTP
- Orinda WTP
- Moraga Road Pipeline
- Highland Reservoir and Pipelines

No significant direct impacts, such as demolition or substantial alteration, to historic or potentially historic resources at these project sites are expected, for the reasons detailed below. However, potential indirect impacts, such as alterations to the setting of a historic or potentially historic resource could occur as a result of the WTTIP projects. As described below, these impacts would be less than significant. Construction-related vibration, such as tunnel blasting, jack-and-bore techniques, trenching and backfill operations, and heavy construction equipment have the potential to damage fragile historic architectural resources immediately near the source of vibration. However, construction-related vibration is not expected to cause a significant adverse impact to historic resources due to the use of construction techniques that are intended to minimize vibration, and the relatively far distances between the source of construction vibration and historic architectural resources in the project areas. In addition, implementation of the performance standard of 0.5 inches per second peak particle velocity (as required in Measure 3.10-3a) would preclude damage to nearby structures (see Section 3.10, Noise and Vibration, for further detail).

Lafayette WTP – Alternative 1

Both the Bryant Pumping Plant #2 (located at the Lafayette WTP) and the Lafayette Reservoir Dam are considered historic resources for CEQA purposes. Various components of the proposed Lafayette WTP project under Alternative 1 would be constructed in the vicinity of the Bryant

Pumping Plant #2; however, no substantial alterations to this facility or its immediate setting are expected. The closest new construction to the Bryant Pumping Plant #2 would be the proposed raw water control valves and flow meters immediately northwest of the building. These improvements would be relatively small, would be located toward the rear of the building, and would not substantially alter the building (to the extent it would no longer remain eligible for listing as a historic resource). A new solids storage tank would also be constructed in the vicinity, about 150 feet west of the pumping plant. Due to the distance between the tank and the pumping plant, no substantial changes to the building's immediate setting are expected. Finally, the pumping plant would be decommissioned under Alternative 1; however, no physical changes to the plant are expected as a result of decommissioning. Although the building would become nonoperational, it would receive routine maintenance. No changes to the Lafayette Reservoir Dam are expected as a result of Alternative 1 of the Lafayette WTP project. As no direct or indirect impacts to the dam or pumping plant are expected, the proposed project would have a less-than-significant impact on historic resources.

Lafayette WTP – Alternative 2

Under Alternative 2, the Lafayette WTP would be decommissioned, including the Bryant Pumping Plant #2, which is considered a historic resource for CEQA purposes. The only proposed construction in the vicinity of the pumping plant would be the new Colorados Pipeline. This below-grade facility would be about 100 feet from the plant and would not be visible after completion of the pipeline project. No physical changes to the plant are expected as a result of decommissioning. Although the plant would become nonoperational, the building would receive routine maintenance. As no direct or indirect impacts to this building are expected, the proposed project would have a less-than-significant impact on historic resources.

Orinda WTP – Alternative 1 or 2

The Orinda WTP (also referred to as the Orinda Filter Plant) is a designated City of Orinda historical landmark and has been identified by EBMUD as a historic resource. No changes to this facility are planned under Alternative 1. However, substantial alterations to this building's historic setting could affect its status as a historic resource, if such alterations were of sufficient magnitude to affect the building's local designation or otherwise substantially diminish its historic significance. Due to the distance between the proposed new facilities and the Orinda WTP, and the relatively low-profile design, impacts to historic resources would be less than significant.

Under Alternative 1 or 2, several new structures would be constructed in the vicinity of the Orinda WTP: a backwash water recycle system facility, an emergency generator building, a solids pumping plant, a sludge storage tank, and a high-rate sedimentation unit facility. The latter facility is a potential future project evaluated at a program-level of detail in this EIR (refer to the discussion below). The backwash water recycle system would be mostly below grade and would be partially obscured by the existing two-story chemical building; therefore, this facility would be minimally visible when looking northwest from the front entrance of the Orinda WTP (i.e., the front door of the historic plant building). The above-grade facilities that would be highly visible include the solids pumping plant, emergency generator building, and the sludge storage tank. These relatively small-scale industrial facilities would be about 16 feet tall and located approximately 100 feet southeast of the entrance gate on Manzanita Drive, and about 150 feet northwest of the front entrance of the Orinda WTP. These facilities would be visible when looking southeast from the entrance gate of the treatment plant, as well as when looking northwest from the front entrance of the Orinda WTP. No substantial changes to the historic setting of the Orinda WTP are expected, to the extent that this facility would no longer qualify as a local historic resource. However, additional landscaping in this area to screen the industrial equipment from view and soften its appearance would assist in maintaining its historic setting. As such, extra landscaping is recommended in Measure 3.7-3, below. Refer also to Section 6.4, which evaluates changes to the proposed layout of backwash water recycle facilities to diminish any adverse effect to the historic setting of the filter plant.

Alternative 2 would also include a clearwell at the existing backwash water settling basins, the new Los Altos Pumping Plant, the Orinda-Lafayette Aqueduct, and pipelines connecting these facilities. These new facilities would have no substantial direct or indirect impact on the historic setting of the Orinda WTP due to the distance between these facilities and the WTP, and the relatively low-profile design.

Walnut Creek WTP – Alternative 1 or 2

No historic resources were identified at the Walnut Creek WTP site or immediate vicinity. This facility was constructed by EBMUD in 1967 and is not of sufficient age to be eligible for listing as a cultural resource. Construction of a new pumping plant at the Walnut Creek WTP would not affect historic resources.

Sobrante WTP – Alternative 1 or 2

No historic resources were identified at the Sobrante WTP site or immediate vicinity. This facility was constructed by EBMUD in 1964 and is not of sufficient age to be eligible for listing as a cultural resource. Construction of the proposed improvements at the Sobrante WTP would not affect historic resources.

Upper San Leandro WTP – Alternative 1 or 2

No historic resources were identified at the Upper San Leandro WTP site or immediate vicinity. This facility was originally constructed by EBMUD in 1927, with major expansions and renovations in 1961 and 1991. Due to these later alterations to the WTP, this facility does not have sufficient physical integrity to be eligible for listing as a cultural resource. Construction of the proposed improvements at the Upper San Leandro WTP would not affect historic resources.

Orinda-Lafayette Aqueduct

Historic resources in the project area include the Lafayette Reservoir Dam and potentially the Bryant Pumping Plant #2. Neither of these facilities would be directly or indirectly affected by construction of the Orinda-Lafayette Aqueduct. One portion of this project, the proposed pipeline to the new Highland Reservoir, would be constructed about 100 feet from the Bryant Pumping Plant #2. This pipeline would be below grade and would not be visible from the pumping plant. No substantial alterations to the pumping plant or its immediate setting are expected, and the building would continue to be eligible for listing as a historic resource after completion of the project. Similarly, no changes to the dam are expected. As a result, impacts to historic resources resulting from this project would be less than significant.

Ardith Reservoir and Donald Pumping Plant

The Ardith Reservoir and new Donald Pumping Plant would be located at the site of the existing Donald Pumping Plant, which was constructed in 1960. Due to the recent date of construction of the Donald Pumping Plant, this site is not eligible for listing as a historic resource. Adjoining properties at 122 and 128 Ardith Drive and 2 Westover Court are single-family Ranch-style homes constructed in 1978, 1960, and 1959, respectively (Contra Costa County, 2005), and are not eligible for listing as historic resources due to their recent construction dates. Therefore, no impacts to historic resources would occur.

Fay Hill Pumping Plant and Pipeline Improvements

Due to the recent date of construction of the Fay Hill Pumping Plant (1965), this facility is not eligible for listing as a historic resource. Therefore, no impacts to historic resources would occur.

Fay Hill Reservoir

Due to the recent date of construction of the Fay Hill Reservoir (1965), this facility is not eligible for listing as a historic resource. Therefore, no impacts to historic resources would occur.

Glen Pipeline Improvements

No historic resources were identified in the vicinity of the Glen Pipeline project area (i.e., within the right-of-way of Nordstrom Lane and Glen Road) that could be adversely affected by this project. While many older homes (i.e., 50 years old or older) are located along Nordstrom Lane and Glen Road, they would only be eligible for listing as historical resources if other significance criteria applied, such as associations with important historical events or individuals, or substantial architectural significance. Although these homes have not been evaluated for their potential historical and architectural significance, no direct or indirect impacts to them would occur as a result of the project. As a result, no impacts to historic resources would occur.

Happy Valley Pumping Plant and Pipeline

The Happy Valley Pumping Plant would be a two-story building, approximately 1,500 square feet in size, constructed on an undeveloped site adjacent to existing single-family homes. No historic resources have been recorded within the project area or immediate vicinity. Adjoining properties at 156, 157, and 164 Lombardy Lane are single-family Ranch-style homes constructed in 1948, 1955, and 1977, respectively (Contra Costa County, 2005). The home at 156 Lombardy Lane is 58 years old (as of 2006), but would only be eligible for listing as a historical resource if other significance criteria applied, such as associations with important historical events or individuals, or substantial architectural significance. While these homes have not been evaluated for their potential historical and architectural significance, no direct or indirect impacts to them would occur as a result of the project. As a result, no impacts to historic resources would occur.

Highland Reservoir and Pipelines

The only potential historic resource located near the Highland Reservoir and Pipelines project area is the Lafayette Reservoir Dam. This project component would not significantly affect, either directly or indirectly, the potential historic significance of this structure. As a result, no impacts to historic resources would occur.

Lafayette Reclaimed Water Pipeline

The Lafayette Reclaimed Water Pipeline would be constructed from the central portion of the Lafayette WTP, run south across Lafayette Creek across Mt. Diablo Boulevard and join the alignment of the Highland Reservoir Inlet/Outlet Pipeline (see previous heading). There are no known historic sites within the Lafayette WTP boundaries. However, both the Bryant Pumping Plant #2 (located at the Lafayette WTP) and the Lafayette Reservoir Dam are considered historic resources for CEQA purposes. No substantial alterations to the Bryant Pumping Plant or its immediate setting are expected. No changes to the Lafayette Reservoir Dam are expected as a result of the Lafayette Reclaimed Water Pipeline project. As no direct or indirect impacts to the dam or pumping plant are expected, the proposed project would have a less-than-significant impact on historic resources.

Leland Isolation Pipeline and Bypass Valves

There are no historic resources located within or immediately adjacent to the Leland Isolation Pipeline and Bypass Valves project area that could be affected by this portion of the project.

Moraga Reservoir

Due to the recent date of construction of the Moraga Reservoir (1960), this facility is not eligible for listing as a historic resource. Adjoining properties at 312–328 Donald Drive and 245–253 Draeger Drive are single-family ranch-style homes constructed between 1969 and 1971 (Contra Costa County, 2005) and are not eligible for listing as historic resources due to their recent construction dates. Therefore, no impacts to historic resources would occur.

Moraga Road Pipeline

The only recorded historic resource in the vicinity of the Moraga Road Pipeline project is the Rheem Estate/Hacienda de las Flores property, located immediately west of Moraga Road between Donald Drive and Devin Drive. This property, although highly modified, has been identified as a Town of Moraga historical resource. The pipeline would be constructed within the Moraga Road right-of-way and would have no direct or indirect impacts to this historic property. After completion, the pipeline would not be visible from this historic resource, and the property’s historic setting would remain intact. For these reasons, the proposed pipeline would have a less-than-significant impact on the Rheem Estate/Hacienda de las Flores property.

The Moraga Road Pipeline would also be constructed through a remnant orchard at the base of the Lafayette Reservoir Dam; this orchard may have been part of a larger orchard that once existed in the valley before the property was condemned by EBMUD in the 1920s. No historic farmhouses or related structures in the area appear to be associated with the orchard. While the orchard itself is likely over 75 years old, the setting has been highly altered and the orchard would not likely qualify as a historic resource/historic landscape in the future, even upon further research. Changes to this orchard would not affect historic resources.

Sunnyside Pumping Plant

The Sunnyside Pumping Plant would be a two-story building, approximately 1,500 square feet in size, on an undeveloped site adjacent to existing single-family homes. No historic resources have been recorded within the project area or immediate vicinity. The nearest adjoining property (a single-family home at 231 Sundown Terrace, Orinda) was constructed in 1989 (Contra Costa County, 2005) and is not eligible for listing as a historic resource due to its recent construction date. Therefore, no impacts to historic resources would occur.

Tice Pumping Plant and Pipeline

The Tice Pumping Plant would be a two-story building, approximately 2,100 square feet in size, on an undeveloped site adjacent to existing single-family homes on Olympic Boulevard in unincorporated Contra Costa County. No historic resources have been recorded on the project site or immediate vicinity. The nearest adjoining properties to the pumping plant site, located at 2424 and 2431 Olympic Boulevard, are single-family homes constructed in 1945 and 1948, respectively (Contra Costa County, 2005). These homes could be eligible for listing as historical resources due to their age (61 and 59 years old, respectively, as of 2006), but only if other significance criteria applied, such as associations with important historical events or individuals, or substantial architectural significance. While these homes have not been evaluated for their historical or architectural significance, no substantial direct or indirect impacts would occur to them as a result of the project. As a result, no impacts to historic resources would occur.

Withers Pumping Plant

Due to the recent date of reconstruction of the Grayson Reservoir (reconstructed in 1998), this facility is not eligible for listing as a historic resource. The Withers Pumping Plant would be a two-story building, approximately 1,500 square feet in size, on an undeveloped site just below the existing reservoir. Adjoining properties at 10–16 Silverhill Way and 1124–1140 Silverhill Court (constructed between 1984 and 1988) and at 2578–2590 Pebble Beach Loop (constructed in 1963) are single-family Ranch-style homes (Contra Costa County, 2005). These homes are not eligible for listing as historic resources due to their recent construction dates. Therefore, no impacts to historic resources would occur.

Mitigation Measure

> **Measure 3.7-3:** To reduce potential indirect effects to the historic setting of the Orinda WTP, EBMUD will provide additional landscaping around the proposed emergency

generator building, solids pumping plant, sludge storage tank, and (if implemented) high-rate sedimentation unit to screen these industrial elements from view and soften their visual appearance. This measure is in addition to the landscape treatments already proposed for the immediate area as part of the project and will be included in an amended landscape plan for the Orinda WTP project.

Program-Level Elements

Although many of the areas designated for future program-level projects have been previously developed and disturbed, cultural resources could exist anywhere in the potential construction zone and could be affected, particularly where a substantial amount of excavation and grading occurred. Therefore, many of the construction-related impacts described under the project-level analysis above would also apply to the program-level projects, as would the mitigation measures to reduce their effects to a less-than-significant level.

Lafayette WTP

The project-level discussion and analysis for the Lafayette WTP, above, would apply to the program-level projects at the Lafayette WTP. However, because unrecorded cultural resources may exist anywhere in the construction zone, a measure similar to Measures 3.7-1a and 3.7-1b, described above, would also likely be required.

Orinda WTP

The proposed program-level facilities are within the area studied for the project-level analysis presented above; therefore, the impacts to cultural resources would be the equivalent to those identified in the project-level analysis, and a measure similar to Measure 3.7-1a would also likely apply.

One program element proposed at the Orinda WTP is construction of a high-rate sedimentation unit, about 10,000 square feet in size and one story high. This facility would be about 200-feet north of the historic Orinda WTP and would be visible across the parking lot from the front entrance to the WTP. This facility would also be visible from the entrance gate at Manzanita Drive when looking southeast toward the WTP. While no substantial changes to the historic setting of the Orinda WTP are expected, to the extent that this property would no longer qualify as a local historic resource, extra landscaping in this area to screen the industrial equipment from view and soften its visual appearance would assist in maintaining the building’s historic setting. As such, extra landscaping is recommended, as described in Measure 3.7-3. Under the Modified Orinda WTP Site Plan Alternative, described in Chapter 6 (Section 6.4), the location of the high-rate sedimentation unit would be reevaluated to determine whether an alternative location farther than the filter plant building was feasible. No other indirect impacts to historic resources are expected to occur as a result of this program-level work at the Orinda WTP.

Walnut Creek WTP

The project-level discussion and analysis for the Walnut Creek WTP, above, would apply to the program-level projects at the Walnut Creek, and a measure similar to Measure 3.7-1a would also likely apply.

Leland Reservoir Replacement

Archaeological Resources

The area surrounding the existing Leland Reservoir was surveyed by Hayes and Melandry (1990) with negative results. Two prehistoric sites were identified within a quarter-mile of the reservoir:

- *CA-CCo-236*. This site, also known as the Buchan Mound, was originally recorded by Loud (1913) and is located near the on-ramp to Highway 24, north of Old Tunnel Road. The site was disturbed in 1957 when residences were built over the site. Baker et al. (Baker, 1987; Baker et al., 1994) conducted data recovery on the site and removed burials. Components of this site may occur elsewhere along Reesley Creek.

- *CA-CCo-237*. This site, located on the west bank of Reesley Creek, is a similar site to CA-CCo-236. It does not appear that this site has been extensively studied.

Due to the existence of recorded cultural resources in the area, the Leland Reservoir Replacement project would have a moderate to high sensitivity for encountering cultural resources during excavation activities. Because unrecorded cultural resources may exist anywhere in the construction zone, a measure similar to Measure 3.7-1a would also likely apply.

Historic Architectural Resources

The reservoir went into service in the late 1950s and is not a historic resource due to its date of construction. No historic architectural resources were identified in the Leland Reservoir project vicinity that could be directly or indirectly affected by the proposed replacement project.

New Leland Pressure Zone Reservoir and Pipeline

Two cultural resources have been recorded within a quarter-mile of the New Leland Pressure Zone Reservoir and Pipeline project area:

- *CA-CCo-388H*. This site was recorded as a Southern Pacific rail line that does not likely have significance (Milliken, 1979).

- *CA-CCo-431*. This site (also called the Murwod School Site) was identified as a large habitation site with burials located near San Ramon Creek (Fong, 1990). The site was excavated and the burials removed. It appears the proposed pipeline and reservoir would avoid this site.

The project area may contain unknown cultural resources that could be encountered during construction of the reservoir, access road, and pipeline. With implementation of a measure similar to Measure 3.7-1a, direct effects to cultural resources would be avoided.

St. Mary's Road/Rohrer Drive Pipeline

Archaeological Resources

The upland areas along the western edge of St. Mary's Road were surveyed by Self (1990) and Schroder and Origer (2003); both surveys were negative for newly identified cultural resources. A previously recorded site, CA-CCo-640H, is located near the intersection of Rheem Boulevard and St. Mary's Road. This site is described as the possible remains of the 1860 residence of David and George Carrick, emigrant cattle ranchers (Self, 1991). A single bedrock mortar prehistoric feature is also present.

The St. Mary's Road portion of the St. Mary's Road/Rohrer Drive Pipeline would parallel the right-of-way of the former Oakland-Antioch/Sacramento Northern Railroad connecting Moraga to Oakland in the early 20th century. The former railroad right-of-way is now the Moraga Trail, a paved recreational path that parallels Moraga Road for some distance. Historic-era artifacts, such as railroad ties or iron spikes from the prior use as a railroad alignment, could be discovered anywhere along the proposed pipeline route. Two historic sites are located near the present-day intersection of Moraga Road and St. Mary's Road, including the Willow Spring School Site, the first school erected in Moraga Valley in 1855, and the David Carrick House, described above, thought to be one of the oldest houses in Moraga (Contra Costa County, 1989).

As a result, the St. Mary's Road/Rohrer Drive Pipeline project has a relatively high sensitivity for encountering cultural resources during construction. Therefore, a measure similar to Measure 3.7-1a would also likely apply to this program-level project.

Historic Architectural Resources

The only recorded historic resource in the vicinity of St. Mary's Road is St. Mary's College in Moraga. As part of this project, a new pipeline would be placed in the right-of-way of St. Mary's Road, as described above. The road is more than 1,500 feet west of the closest of the original Spanish-style buildings at the college campus. Due to this distance, no direct or indirect impacts to historic resources at St. Mary's College are expected. After completion, the pipeline would not be visible from these historic resources, and their historic setting would remain intact. No impacts to historic architectural resources resulting from the St. Mary's Road/Rohrer Drive Pipeline project are expected.

San Pablo Pipeline

The San Pablo Dam and Reservoir contains numerous recorded prehistoric sites,[15] many of which have been inundated by the reservoir; however, many others have been identified along the margins of the reservoir and Old San Pablo Dam Road (see Pahl & Weinberg, 1982, for details). Due to the existence of recorded sites in the area, unrecorded cultural sites are more likely to be discovered along the pipeline route.

[15] For example, CA-CCo-404H, CCo-406, CCo-409, CCo-412H, and C-1296.

The San Pablo Dam Pipeline would be constructed within the Old San Pablo Dam Road alignment, which was the original right-of-way for the former California-Nevada Railroad between El Sobrante and Orinda in the 1880s. The pipeline would also pass through the vicinity of Wagner Ranch and "Orinda Park," Orinda's first settlement near the present-day intersection of San Pablo Dam Road and Bear Creek Road. Although the area has been previously disturbed, historic-era artifacts from these prior uses could be discovered anywhere along the pipeline route.

As a result, the San Pablo Dam Pipeline project has a relatively high sensitivity for encountering cultural resources during construction. Because unrecorded cultural resources may exist anywhere in the construction zone, a measure similar to Measure 3.7-1a would also likely apply.

No historic architectural resources were identified within or adjacent to the San Pablo Dam Pipeline project area that could be directly or indirectly affected by this pipeline project.

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3.8 Traffic and Circulation

3.8.1 Approach to Analysis

ESA's registered traffic engineer evaluated potential traffic and circulation impacts on the basis of the following, augmented by professional traffic engineering judgment:

- Field reconnaissance to determine the characteristics of roads that are proposed to accommodate construction-generated vehicle trips, including the number of travel lanes, traffic control, on-street parking (permitted or prohibited), bicycle routes, transit service (including bus stops), and land uses served by the affected roads (e.g., sensitive uses like fire stations, schools, etc.).

- Automatic (72-hour) traffic volume counts (Tuesday–Thursday) on key local roadways (i.e., Moraga Road, El Nido Ranch Road, Mt. Diablo Boulevard, Miner Road, and Happy Valley Road).

- Estimated vehicle trips that project-related activities would generate during each construction phase, on both a daily and peak hourly basis.

3.8.2 Setting

WTTIP project sites are within the cities of Lafayette, Moraga, Orinda, Walnut Creek, Oakland, and unincorporated Contra Costa County. The roadway network that would be used for pipeline installation and/or for access for construction workers and construction vehicles (including trucks that would transport excavated spoils and fill material to and from the work zones) consists of regional highways and local roadways, although pipeline installation would occur only within local roadways.

Existing Traffic Circulation Network

Regional Roadways

Highway 24 is an east-west freeway that connects the city of Oakland at the Interstate 580/980 (I-580/I-980) interchange with cities east of the Caldecott Tunnel (e.g., Walnut Creek) and I-680. The most recent data published by the California Department of Transportation (Caltrans) indicates the average daily traffic volume on Highway 24 ranges from 168,000 to 187,000 vehicles; trucks comprise about 3 percent of the daily traffic volume (Caltrans, 2005a, 2005b). Freeway ramps within the project area include those for Moraga Way / Camino Pablo, St. Stephens Drive, Acalanes Road, Oak Hill Road / Deer Hill Road, and Pleasant Hill Road.

Interstate 680 (I-680) is a north-south freeway that connects I-80 near the city of Fairfield with I-280 in San Jose. Freeway ramps within the project area include those for Rudgear Road and North Main Street (Walnut Creek), and Contra Costa Boulevard (Pleasant Hill). The most recent data published by Caltrans indicates the average daily traffic volume on I-680 ranges from 172,000 to 180,000 vehicles (with about 3 percent trucks), south of Highway 24; and about

276,000 to 302,000 vehicles (with about 3 to 4 percent trucks), north of Highway 24 (Caltrans, 2005a, 2005b).

Local Roadways

Table 3.8-1 presents roadway characteristics (e.g., number of lanes, traffic volumes [where available], bike lanes, parking availability, transit service, etc.) for the local roadways that are anticipated to be affected by the WTTIP (for in-street pipeline construction and/or for worksite access for construction workers and vehicles).

Transit Service

The project area is served by three transit agencies: the Central Contra Costa Transit Authority (County Connection), Alameda-Contra Costa (AC) Transit, and the Bay Area Rapid Transit District (BART). The County Connection is the principal bus service provider in the project area; AC Transit has a bus line on San Pablo Dam Road – Camino Pablo (serving the Orinda BART station). Table 3.8-1 indicates the project area roadways that carry bus lines. The BART system provides regional access to Alameda, Contra Costa, San Francisco, and northern San Mateo Counties, and there are BART stations (Orinda and Lafayette) within the area where access could be affected by project construction.

Bikeways/Pedestrian Circulation

There are bicycle routes (i.e., Class II or III) on some of the roadways that would be affected by project construction. Class II bikeways are bike lanes striped within the paved areas of roadways and established for the preferential use of bicycles. Class III bikeways consist of designated bike routes on streets that allow shared use of the road width by bicycles and vehicles. Table 3.8-1 indicates the project area roadways that have bikeways.

The level of pedestrian facilities (e.g., sidewalks versus edge-of-road paths) and pedestrian volumes varies in the project area, but the predominant travel mode in the area is by automobile. Exceptions include the commercial area on Mt. Diablo Boulevard where pedestrians use sidewalks, and on residential streets where sporadic pedestrian flows (e.g., dog walking, jogging, etc.) occur.

Traffic Volumes

The theoretical daily carrying capacity (i.e., the highest traffic volume that can travel on a roadway in a day) ranges up to about 15,000 vehicles (for a two-lane road), about 25,000 vehicles (for a four-lane undivided road), and about 30,000 vehicles (for a four-lane divided road). The theoretical hourly carrying capacity is generally 10 percent of the daily capacity. As seen in Tables 3.8-1 and 3.8-2, Moraga Road north of Sky-Hy Drive currently carries more traffic than its theoretical capacity (the latter table provides more detail based on the traffic counts conducted for this EIR). All other streets listed in Tables 3.8-1 and 3.8-2 carry traffic volumes that are lower than their theoretical capacities.

TABLE 3.8-1
CHARACTERISTICS OF ROADWAYS IN THE PROJECT AREA

Roadway / Segment	No. of Lanes (width)[a]	Traffic Volumes[b]	Bike Lanes?	On-Street Parking Permitted?	Public Transit Lines?[c]	Comments
Lafayette WTP						
Acalanes Road: ▪ El Nido Ranch Road to Mt. Diablo Boulevard	2–3 lanes	N/A	Yes	No	Yes	See Map A1
Mt. Diablo Boulevard: ▪ Acalanes Road to WTP access	4 lanes	10,710 vpd	Yes	No	Yes	See Maps A1 and A2
Orinda WTP						
Camino Pablo: ▪ Highway 24 to Miner Road	4 lanes	26,400 vpd	Yes	No	Yes	See Map A1
▪ Miner Road to Manzanita Drive	2 lanes	19,300 vpd	Yes	No	Yes	
Manzanita Drive: ▪ Camino Pablo to WTP access	2 lanes	N/A	No	No	No	See Map A1
Walnut Creek WTP						
Pinneman Way: ▪ Lawrence Way to N. Main Street	2 lanes	N/A	No	No	No	See Map A3
N. Main Street: ▪ Pinneman Way to San Luis Road	4 lanes	36,800 vpd	No	No	Yes	See Map A3
San Luis Road: ▪ N. Main Street to Larkey Lane	2 lanes	4,200 vpd	No	Yes	No	See Map A3
Larkey Lane: ▪ San Luis Road to WTP access	2 lanes	N/A	No	Yes	No	See Map A3
Alfred Avenue: ▪ San Luis Road to WTP access	2 lanes	N/A	No	Yes	No	See Map A3
Sobrante WTP						
San Pablo Dam Road: ▪ I-80 to Appian Way	4 lanes	N/A	Yes	No	Yes	See Map A4
▪ Appian Way to Valley View Road	4 lanes	N/A	Yes	No	Yes	
▪ Valley View Road to Castro Ranch Road	4 lanes	N/A	No	Yes	No	
▪ Castro Ranch Road to Bear Creek Road	2 lanes	14,600 vpd	No	No	Yes	
Valley View Road: ▪ San Pablo Dam Road to Amend Road	4 lanes	N/A	No	No	No	See Map A4
D'Avila Way: ▪ Near Valley View Road	2 lanes	N/A	No	No	No	See Map A4
Amend Road: ▪ Valley View Road to WTP access	2 lanes	N/A	No	Yes	No	See Map A4
Upper San Leandro WTP						
Keller Avenue: ▪ I-580 to Greenly Drive	2 lanes	N/A	No	Yes	Yes	See Map A4
Greenly Drive: ▪ Keller Avenue to WTP access	2 lanes	N/A	No	Yes	Yes	See Map A4
Orinda-Lafayette Aqueduct						
See Orinda WTP (above) for Camino Pablo						
Altarinda Drive: ▪ Elen Court to St. Stephens Drive	2 lanes	N/A	No	No	No	See Map A1
El Nido Ranch Road: ▪ St. Stephens Drive to Acalanes Road	2 lanes (40 feet)	1,540 vpd	Yes	Yes	Yes	See Map A1 Parking permitted, but minimal use of the spaces
▪ Acalanes Road to Upper Happy Valley Road	2 lanes (40 feet)	2,530 vph	No	Yes	Yes	Parking permitted, but minimal use of the spaces

(See last page of table for footnotes)

TABLE 3.8-1 (Continued)
CHARACTERISTICS OF ROADWAYS IN THE PROJECT AREA

Roadway / Segment	No. of Lanes (width)[a]	Traffic Volumes[b]	Bike Lanes?	On-Street Parking Permitted?	Public Transit Lines?[c]	Comments
Orinda-Lafayette Aqueduct (cont.)						
▪ Upper Happy Valley Road to Mt. Diablo Boulevard	2 lanes (27–40 feet)	2,530 vph	No	Discontinuous	No	Bentley School (access driveways)
Mt. Diablo Boulevard: ▪ West of El Nido Ranch Road to WTP access	4 lanes (median)	10,710 vpd	Yes	No	Yes	See Maps A1 and A2
Ardith Reservoir and Donald Pumping Plant						
Moraga Way: ▪ Highway 24 to Glorietta Boulevard	4 lanes to 2 lanes	N/A	Yes	Discontinuous	Yes	See Map A2
▪ Glorietta Boulevard to Ivy Drive	2 lanes	13,770 vpd	Yes	Discontinuous	Yes	
▪ Ivy Drive to Canyon Road / Moraga Road	2 lanes to 4 lanes	13,770 vpd	Yes	Discontinuous	Yes	School; fire station
Ivy Drive: ▪ Moraga Way to Ardith Drive	2 lanes	N/A	No	Yes	No	See Map A1
Ardith Drive: ▪ Ivy Drive to site	2 lanes	N/A	No	Yes	No	See Map A1
Fay Hill Pumping Plant						
Deer Hill Road: ▪ Highway 24 westbound off-ramp to Oak Hill Road	4 lanes	N/A	Yes (Class II)	No	No	See Map A2
Oak Hill Road: ▪ Deer Hill Road to Mt. Diablo Boulevard	4 lanes	N/A	No	Yes	Yes	See Map A2
Mt. Diablo Boulevard: ▪ Oak Hill Road to Moraga Road	4 lanes	19,860 vpd	No	Yes	Yes	See Map A2
Moraga Road: ▪ Mt. Diablo Boulevard to St. Marys Road	4 lanes	22,500 vpd	No	Yes	Yes	See Map A2
▪ St. Marys Road to Madrone Drive	2 lanes	N/A	No	No	Yes	
▪ Madrone Drive to Rheem Boulevard	2 lanes	15,410 vpd	Yes	No	Yes	Campolindo High School
Fay Hill Pipeline Improvements						
See Fay Hill Pumping Plant (above) from Highway 24 to Rheem Boulevard						
Rheem Boulevard: ▪ Moraga Road to Chalda Way	3–4 lanes (52 feet)	N/A	No	No	No	See Map A2
Fay Hill Reservoir						
See Fay Hill Pumping Plant and Pipeline Improvements (above) from Highway 24 to Chalda Way						
Rheem Boulevard: ▪ Chalda Way to reservoir access road (south of Via Barcelona)	2–3 lanes	N/A	No	No	No	See Map A2
Glen Pipeline Improvements						
Nordstrom Lane: ▪ Hilltop Drive to Glen Road	2 lanes (30 feet)	N/A	No	No	No	See Map A2
Glen Road: ▪ Nordstrom Lane to Monticello Road	2 lanes (22 feet)	N/A	No	No	No	See Map A2
▪ Nordstrom Lane to Thompson Road	2 lanes	N/A	No	No	No	

(See last page of table for footnotes)

TABLE 3.8-1 (Continued)
CHARACTERISTICS OF ROADWAYS IN THE PROJECT AREA

Roadway / Segment	No. of Lanes (width)[a]	Traffic Volumes[b]	Bike Lanes?	On-Street Parking Permitted?	Public Transit Lines?[c]	Comments
Glen Pipeline Improvements (cont.)						
Thompson Road: ▪ Glen Road to Deer Hill Road	2 lanes	N/A	No	No	No	See Map A2
Deer Hill Road: ▪ Thompson Road to Oak Hill Road	4 lanes	N/A	Yes	No	Yes	See Map A2 Lafayette BART station
Happy Valley Pumping Plant and Pipeline						
Camino Pablo: ▪ Highway 24 to Miner Road	4 lanes	26,400 vpd	Yes	No	Yes	See Map A1
Miner Road: ▪ Camino Pablo to Lombardy Lane	2 lanes (22 feet)	6,140 vpd	No	No	Yes	See Map A1
Lombardy Lane: ▪ Miner Road to Van Ripper Lane	2 lanes (24 feet)	N/A	No	Yes	No	See Map A1
Highland Reservoir and Pipelines						
See Lafayette WTP (page 3.8-**Error! Bookmark not defined.**, above)						
Leland Isolation Pipeline						
Lacassie Drive: ▪ N. California Street to N. Main Street	2 lanes (43 feet)	N/A	No	Yes	No	See Map A3
Leland Isolation Bypass Value						
Danville Boulevard: ▪ Near Rudgear Road	2 lanes	6,300 vpd	Yes	No	Yes	See Map A3 Trailhead (with parking) for Iron Horse Trail is located on west side in this area.
Moraga Reservoir						
Moraga Way: ▪ Highway 24 to Canyon Road–Moraga Road	2 lanes to 4 lanes	13,770 vpd	Yes	Discontinuous	Yes	See Map A2
Moraga Road: ▪ Moraga Way to Draeger Drive	4 lanes to 2 lanes	18,170 vpd	No	No	Yes	See Map A2
Draeger Drive: ▪ Moraga Road to reservoir site	2 lanes	N/A	No	Discontinuous	No	See Map A2
Moraga Road Pipeline						
See Fay Hill Pumping Plant (page 3.8-4, above) from Highway 24 to Madrone Drive						
Moraga Road: ▪ Nemea Court to Sky-Hy Drive	2 lanes (24 feet)	15,410 vpd	No	No	Yes	See Map A2
▪ Sky-Hy Drive to Campolindo Drive	2 lanes (42–65 feet)	15,410 vpd	Yes	No	Yes	
▪ Campolindo Drive to Dolores Court	2 lanes (42–52 feet)	15,410 vpd	Yes	Discontinuous	Yes	Campolindo High School
▪ Dolores Court to Rheem Boulevard	4 lanes (divided)	15,410 vpd	Yes	No	Yes	
▪ Rheem Boulevard to Donald Drive	4 lanes (divided)	18,170 vpd	Yes	No	Yes	
▪ Donald Drive to Draeger Drive	4 lanes	18,170 vpd	No	Yes	Yes	

(See last page of table for footnotes)

TABLE 3.8-1 (Continued)
CHARACTERISTICS OF ROADWAYS IN THE PROJECT AREA

Roadway / Segment	No. of Lanes (width)[a]	Traffic Volumes[b]	Bike Lanes?	On-Street Parking Permitted?	Public Transit Lines?[c]	Comments
Sunnyside Pumping Plant						
Deer Hill Road: ▪ Highway 24 Westbound off-ramp to Oak Hill Road	4 lanes	N/A	Yes	No	No	See Map A1
▪ Oak Hill Road to Happy Valley Road	4 lanes	N/A	Yes	No	Yes	
Happy Valley Road: ▪ Deer Hill Road to Upper Happy Valley Road	2 lanes	5,000 vpd	No	No	Yes	See Map A1
▪ Upper Happy Valley Road to Sundown Terrace	2 lanes	N/A	No	Discontinuous	Yes	
Acalanes Road: ▪ Highway 24 eastbound off-ramp to El Nido Ranch Road	2 lanes	N/A	Yes	No	Yes	See Map A1
El Nido Ranch Road: ▪ Acalanes Road to Upper Happy Valley Road	2 lanes	2,530 vpd	No	Yes	Yes	See Map A1
Upper Happy Valley Road: ▪ El Nido Ranch Road to Happy Valley Road	2 lanes	4,440 vpd	No	No	Yes	See Map A1
Tice Valley Pumping Plant and Pipeline						
Pleasant Hill Road: ▪ Highway 24 to Olympic Boulevard	4 lanes	17,260 vpd	Yes	No	Yes	See Map A3
Olympic Boulevard: ▪ Pleasant Hill Road to Boulevard Way	2 lanes	20,900 vpd	Yes	No	Yes	See Map A3
▪ Boulevard Way to I-680	4 lanes	N/A	Yes	Discontinuous	Yes	
Boulevard Way: ▪ Olympic Boulevard to Warren Road	2 lanes (25 feet)	N/A	No	Yes	Yes	See Map A3
Withers Pumping Plant						
Contra Costa Boulevard: ▪ I-680 northbound off-ramp to Gregory Lane	6 lanes	36,000 vpd	No	No	No	See Map A4
Gregory Lane: ▪ Contra Costa Boulevard to Pleasant Hill Road	4 lanes	14,700 vpd	No	Discontinuous	Yes	See Map A4
Grayson Road: ▪ Pleasant Hill Road to Taylor Boulevard	2 lanes	7,430 vpd	Yes	Yes	No	See Map A4
▪ Taylor Boulevard to Reliez Valley Road	2 lanes	6,040 vpd	Yes	Yes	No	
Reliez Valley Road: ▪ Grayson Road to Silverhill Way	2 lanes	N/A	Yes	No	No	See Map A4

[a] Pavement width (in feet) is given for two-lane segments in which pipeline installation would occur; otherwise only the number of travel lanes is given.
[b] Abbreviations: N/A = not available; vpd= vehicles per day.
[c] Transit service in the project area is provided by the County Connection and AC Transit; route maps for each service provider were accessed in April 2006 for this project (Alameda-Contra Costa Transit District, 2006; County Connection, 2006).

SOURCE: ESA; traffic volume data obtained from appropriate jurisdictions and from new counts conducted for this analysis (see Table 3.8-2).

TABLE 3.8-2
EXISTING TRAFFIC VOLUMES ON AREA ROADWAYS

Roadway	Average Daily Traffic (Total)[a]	Average (Highest) Volume Per Hour[b] 7:00 a.m. to 9:00 a.m.	9:00 a.m. to 4:00 p.m.	4:00 p.m. to 6:00 p.m.
Moraga Road north of Sky-Hy Drive	15,410	1,065 (1,155)	985 (1,285)	1,215 (1,320)
Moraga Road south of Rheem Boulevard	18,170	1,370 (1,690)	1,195 (1,650)	1,526 (1,580)
Mt. Diablo Boulevard east of El Nido Ranch Road	10,710	544 (690)	774 (865)	895 (1,135)
El Nido Ranch Road between St. Stephens Drive and Acalanes Road	1,540	95 (125)	100 (140)	180 (230)
El Nido Ranch Road between Acalanes Road and Mt. Diablo Boulevard	2,530	185 (225)	175 (240)	220 (255)
Miner Road between Lombardy Lane and Oak Arbor Road	6,140	520 (570)	410 (520)	470 (510)
Happy Valley Road between Deer Hill Road and Mt. Diablo Boulevard	10,300	715 (865)	725 (865)	926 (1,000)

[a] Average daily (two-way) traffic over three days of continuous counting (Tuesday–Thursday, all November 1–3, 2005, except April 4–6, 2006 on Mt. Diablo Boulevard).
[b] The first number equals the average hourly (two-way) volume over the time period, and the second number (in parentheses) equals the highest hourly (two-way) volume counted on the three survey days.

SOURCE: ESA.

3.8.3 Impacts and Mitigation Measures

Significance Criteria

For the purposes of this EIR and consistent with Appendix G of the CEQA Guidelines, a WTTIP project that would cause an increase in traffic that is substantial in relation to the existing traffic load and capacity of the street system is considered to have a significant impact on the environment. The project is also considered to have a potentially significant impact if:

- Traffic generated by construction workers and construction vehicular activities substantially affects roadway traffic flow, especially during peak traffic hours;
- Construction substantially affects parking availability, causing traffic safety/operational problems;
- Construction activities pose a traffic safety hazard to motor vehicles, bicyclists, or pedestrians;
- Construction activities significantly affect local transit service; or
- Movement of heavy vehicles causes substantial damage or wear of public roadways.

The project would not cause long-term effects because the various project facilities, once installed, would only require maintenance activities similar to those that occur under existing conditions. The duration of the potential significant impacts would be limited to the period of time needed to construct the project. Therefore, mitigation measures for traffic-related impacts identified in this EIR focus on reducing construction-phase project effects.

Impacts and Mitigation Measures

Table 3.8-3 summarizes traffic and circulation impact significance by WTTIP project facility.

TABLE 3.8-3
SUMMARY OF POTENTIAL PROJECT-LEVEL TRAFFIC AND CIRCULATION IMPACTS

	Impact 3.8-1	Impact 3.8-2	Impact 3.8-3	Impact 3.8-4	Impact 3.8-5	Impact 3.8-6	Impact 3.8-7
Facility	**Increased Traffic**	**Reduced Road Width (Pipelines)**	**Parking**	**Traffic Safety**	**Access (Pipelines)**	**Transit (Pipelines)**	**Pavement Damage/Wear**
Lafayette WTP							
Alternative 1	SM	SM	SM	SM	–	–	LTS
Alternative 2	SM	SM	SM	SM	–	–	LTS
Orinda WTP							
Alternative 1	SM	–	SM	SM	–	–	LTS
Alternative 2	SM	–	SM	SM	–	–	LTS
Walnut Creek WTP *Alternative 1 or 2*	SM	–	LTS	SM	–	–	SM
Sobrante WTP *Alternative 1 or 2*	SM	–	SM	SM	–	–	LTS
Upper San Leandro WTP *Alternative 1 or 2*	SM	–	LTS	SM	–	–	SM
Orinda-Lafayette Aqueduct *Alternative 2 only*	SM	SM	SM	SM	SM	SM	LTS
Ardith Reservoir/ Donald Pumping Plant	SM	–	SM	SM	–	–	SM
Fay Hill Pumping Plant and Pipeline Improvements	SM	SM	SM	SM	SM	LTS	LTS
Fay Hill Reservoir	SM	–	LTS	SM	–	–	LTS
Glen Pipeline Improvements	SM	SU	SM	SM	SU	–	SM
Happy Valley Pumping Plant and Pipeline	SM	SM	SM	SM	SM	SU	SM
Highland Reservoir and Pipelines	SM	SM	SM	SM	LTS	LTS	LTS
Lafayette Reclaimed Water Pipeline	SM	SM	SM	SM	LTS	LTS	LTS
Leland Isolation Pipeline and Bypass Valves	SM	SM	SM	SM	LTS	LTS	LTS
Moraga Reservoir	SM	–	SM	SM	–	–	SM
Moraga Road Pipeline	SM	SM	SM	SM	SM	SM	LTS
Sunnyside Pumping Plant	SM	–	LTS	SM	–	–	LTS
Tice Pumping Plant and Pipeline	SM	SM	SM	SM	SM	SU	SM
Withers Pumping Plant	SM	–	LTS	SM	–	–	LTS

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

Table 3.8-4 summarizes the applicability of mitigation measures to project facilities.

TABLE 3.8-4
SUMMARY OF APPLICABLE MITIGATION MEASURES – IMPACTS 3.8-1 TO 3.8-7[a]

Facility	Measure 3.8-1 Encroachment Permit and/or Traffic Safety / Traffic Management Plan	Measure 3.8-7 Document Pre- and Post-construction Pavement Conditions, and Repair as Required
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 only	✓	–
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	✓	–

[a] The mitigation measures for Impacts 3.8-2 through 3.8-6 are to implement Measure 3.8-1, which stipulates actions required of contractor(s) to reduce impacts to a less-than-significant level.

✓ = Applicable Impact
– = No Impact

Impact 3.8-1: Short-term increases in vehicle trips by construction workers and construction vehicles.

Trip Generation – Overview

The proposed facility improvements would generate short-term increases in vehicle trips by construction workers and construction vehicles on area roadways. Appendix B contains detailed trip generation estimates for each WTTIP project. Table 3.8-1 describes local roadways that would be directly affected by project construction traffic. Construction-generated traffic would be temporary and therefore would not result in long-term degradation in operating conditions or level of service on project area roadways.[1] The primary offsite impacts from the movement of construction trucks would include a short-term and intermittent lessening of roadway capacities due to the slower movements and larger turning radii of the trucks compared to passenger vehicles.

Traffic-generating construction activities related to project facilities would consist of the daily arrival and departure of personnel (construction work crews and supervisory staff); trucks hauling equipment and materials to the worksites; and the hauling of excavated spoils from, and import of new fill to, the sites. The number of construction-related trips would vary among the different facilities studied herein, and among the tasks needed to complete facility construction. The analysis of potential impacts associated with each project facility, below, focuses on the maximum number of daily and hourly vehicle trips during the duration of each facility construction. Impacts during other tasks would be less than those described for the maximum trips.

The following assumptions were made as part of the trip generation estimate:

- The capacity of haul trucks would average 9 cubic yards (cy), except for water treatment plants (12.5 cy) and for tunnel work for the Orinda-Lafayette Aqueduct (20 cy); the capacity of concrete trucks would average 9 cy.
- The work schedule would be Monday through Friday, eight hours within 7:00 a.m. to 6:00 p.m.[2] (except as noted below for pipelines).
- For Water Treatment Plants:
    - Excavated soil would be used for backfill, but it is assumed there would be no onsite capacity to stockpile that material, so fill would be imported from a temporary offsite stockpile location.[3] Soil stockpiling for the Orinda WTP (for either Alternative 1 or 2) would occur at the nearby ballfields, which would be accessed via public roads.

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1 Level-of-service standards for roadways that are part of the Contra Costa County Congestion Management Plan (CMP) network are intended to regulate long-term traffic increases from operation of new development and do not apply to temporary construction projects. As such, the proposed project facilities would not exceed level-of-service standards established by the Contra Costa Transportation Authority for designated CMP roadways.

2 It is possible that work could last longer than eight hours each day, and to the degree that were true, the assumption that truck trips would be spread over eight hours is conservative, and the assumed hourly trip generation estimate is overstated.

3 It is possible that locations could have some capacity for stockpiling material, and to the degree that were true, the assumption of no onsite capacity is conservative, and the assumed trip generation estimate is overstated.

- The offsite haul schedule would be Monday through Friday, six hours within 9:00 a.m. to 4:00 p.m.[4]

- For Reservoirs:
  - Trips were calculated on the basis of estimated peak rates of loading and unloading trucks (i.e., based on the length of time needed to load a truck, and that rate continued over the number of hours of the workday).

- For Pipelines:
  - Trench dimensions: width of 2.5 feet and depth of 5.0 feet (for 12- and 16-inch-diameter pipes); width of 4.9 feet and depth of 11.6 feet (for 36-inch-diameter pipe); and width of 5.9 feet and depth of 11.6 feet (for 48-inch-diameter pipe).
  - The pace of installation would average about 80 feet of pipe each workday in paved areas, and up to 120 feet of pipe each workday in unpaved areas.
  - Excavated soil would be hauled offsite and replaced by aggregate base in roads; in unpaved areas, the soil would be stockpiled and reused.
  - The work schedule would be Monday through Friday, 7:00 a.m. to 6:00 p.m., and in accordance with encroachment permits.

The construction scenario characteristics described for each WTTIP project below have been developed to allow for a general assessment of the nature and magnitude of potential construction impacts associated with each individual facility. The final construction scheduling of specific facility projects would likely result in simultaneous or overlapping construction for more than one facility. If construction were to overlap for two facilities with a haul route in common, then the total number of vehicle trips added to that road could be the sum of the maximum number of daily and hourly vehicle trips. See Chapter 5, Cumulative Impacts, for a discussion of traffic and circulation impacts associated with overlapping construction.

Trip Generation – Facility-Specific

Table 3.8-5 presents estimated maximum daily and hourly one-way vehicle trip generation for each project facility (tied to the task during which the maximum daily trips would occur) and identifies the roadways that construction-generated vehicles would be expected to use traveling to and from the worksites. The information in this table is extracted from the more detailed, project-specific tables presented in Appendix B.

Project Impact – Common to All Facilities

Project-generated truck trips would be dispersed throughout the day, and construction workers would commute to and from the worksite primarily before or after peak traffic hours. Construction-related truck traffic occurring on roadways in the peak direction on weekdays during the hours of 7:00 a.m. to 9:00 a.m. and 4:00 p.m. to 6:00 p.m. would coincide with peak-period traffic on access roadways and therefore would have the greatest potential to impede

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[4] It is possible that offsite hauling could occur for more six hours each day, and to the degree that were true, the assumption that haul truck trips would be spread over six hours is conservative, and the assumed hourly trip generation estimate is overstated.

TABLE 3.8-5
ESTIMATED MAXIMUM VEHICLE TRIP GENERATION – BY WTTIP PROJECT

Facility	Task[a]	Vehicles per Day[a]	Trucks per Hour	Autos per Hour[b]	Haul Routes
Lafayette WTP					
Alternative 1	Foundation – Concrete	312	12	120	Acalanes Road; Mt. Diablo Boulevard
Alternative 2	Excavation	52	2	20	Acalanes Road; Mt. Diablo Boulevard
Orinda WTP					
Alternative 1	Foundation – Concrete	162	10	60	Camino Pablo; Manzanita Drive
Alternative 2	Excavation	324	21	120	Camino Pablo; Manzanita Drive
Walnut Creek WTP					
Alternative 1 or 2	Foundation – Concrete	84	4	30	Pinneman Lane; N. Main Street; San Luis Road; Larkey Lane; Alfred Avenue
Sobrante WTP					
Alternative 1 or 2	Foundation – Concrete	252	10	120	San Pablo Dam Road; Valley View Road; Amend Road; D'Avila Way
Upper San Leandro WTP					
Alternative 1 or 2	Foundation – Concrete	252	10	120	Keller Avenue; Greenly Drive
Orinda-Lafayette Aqueduct					
Alternative 2	Tunnel Portion	302	16	84	Camino Pablo
Alternative 2	Pipeline Installation	110	10	13	Altarinda Drive; St. Stephens Drive; El Nido Ranch Road; Mt. Diablo Boulevard
Ardith Reservoir	Excavation	178	24	15	Moraga Way; Ivy Drive; Ardith Drive
Donald Pumping Plant	Excavation/ Site Work	66	10	10	Moraga Way; Ivy Drive; Ardith Drive
Fay Hill Pumping Plant and Pipeline Improvements	Pipeline Installation	48	3	13	Deer Hill Road; Oak Hill Road; Mt. Diablo Boulevard; Moraga Road
Fay Hill Reservoir	Temporary Tank	178	24	10	Same as Fay Hill facilities above, plus Rheem Boulevard
Glen Pipeline Improvements	Pipeline Installation	48	3	13	Deer Hill Road; Thompson Road; Glen Road; Nordstrom Lane
Happy Valley Pumping Plant and Pipeline	Pipeline Installation	48	3	13	Camino Pablo; Miner Road; Lombardy Lane
Highland Reservoir and Pipelines[c]	Excavation	178	24	15	Acalanes Road; Mt. Diablo Boulevard
Leland Isolation Pipeline and Bypass Valves	Pipeline Installation	50	3	13	Ygnacio Valley Boulevard; Main Street; Lacassie Avenue; Danville Boulevard; Rudgear Road
Moraga Reservoir	Excavation	178	24	15	Moraga Way; Moraga Road; Draeger Drive
Moraga Road Pipeline	Pipeline Installation	102	10	13	Deer Hill Road; Oak Hill Road; Mt. Diablo Boulevard; Moraga Road
Sunnyside Pumping Plant	Foundation – Concrete	34	2	10	Deer Hill Road; Happy Valley Road; Acalanes Road; El Nido Ranch Road; Upper Happy Valley Road
Tice Pumping Plant and Pipeline	Excavation/ Site Work	66	10	13	Pleasant Hill Road; Olympic Boulevard; Boulevard Way
Withers Pumping Plant	Foundation – Concrete	118	12	10	Contra Costa Boulevard; Gregory Lane; Grayson Road; Reliez Valley Road

[a] Task during which the maximum daily one-way vehicle trips would be generated.
[b] One-way auto trips assumes that all workers would arrive and/or depart during one hour at the beginning and/or end of the workday.
[c] Includes Lafayette Reclaimed Water Pipeline.

SOURCE: ESA and EBMUD (see Appendix B – Trip Generation Tables).

traffic flow. The percent increase in traffic volumes caused by project-generated construction traffic on the arterials and freeways serving the project worksite would not be substantial relative to background traffic conditions (i.e., the estimated maximum daily one-way vehicle trip generation in Table 3.8-5 would increase the daily traffic volume on area roadways by less than 3 percent, and by no more than about 0.2 percent on Highway 24), nor would project traffic significantly disrupt daily traffic flow on these roadways.[5] Drivers could experience delays if they were traveling behind a construction truck. Traffic volume increases caused by project construction would be most noticeable on local-serving roadways. With implementation of Measure 3.8-1, identified below, this impact would be reduced to a less-than-significant level.

Project Impact – Facility-Specific

As described above, project-generated traffic volume increases would be most noticeable on local-serving roadways. Examples are as follows:

- *Walnut Creek WTP*. An increase in traffic volume on Larkey Lane would be more noticeable than on higher-volume North Main Street and the I-680 freeway.
- *Upper San Leandro WTP*. An increase in traffic volume on Greenly Drive would be more noticeable than on higher-volume Keller Avenue and the I-580 freeway.
- *Ardith Reservoir and Donald Pumping Plant*. An increase in traffic volume on Ivy Drive and Ardith Drive would be more noticeable than on higher-volume Moraga Way and Highway 24.
- *Moraga Reservoir*. An increase in traffic volume on Draeger Drive would be more noticeable than on higher-volume Moraga Way and Moraga Road.
- *Tice Pumping Plant and Pipeline*. An increase in traffic volume on Boulevard Way would be more noticeable than on higher-volume Olympic Boulevard, Pleasant Hill Road, and Highway 24.

Although project-generated trips on local-serving roadways would represent a higher (more noticeable) percent increase in daily traffic volumes on those local roads, the effect on traffic flow would be less than significant because the traffic volumes would remain at levels clearly less than the carrying capacity of the roads (which, as described above, is about 15,000 vehicles per day on two-lane roads).

Mitigation Measure

Measure 3.8-1: The following requirements will be incorporated into contract specifications for the project:

- The contractor(s) will obtain any necessary road encroachment permits prior to construction and will comply with conditions of approval attached to project implementation. As part of the road encroachment permit process, the contractor(s) will submit a traffic safety / traffic management plan (for work in the public right-of-way)

5 Day-to-day traffic volumes typically vary by as much as 10 percent (i.e., ±5 percent), and an increase of less than that is unlikely to be perceptible to the average motorist.

to the agencies having jurisdiction over the affected roads. Elements of the plan will likely include, but are not necessarily limited to, the following:

- Develop circulation and detour plans to minimize impacts to local street circulation. Use haul routes minimizing truck traffic on local roadways to the extent possible. Use flaggers and/or signage to guide vehicles through and/or around the construction zone.

- Control and monitor construction vehicle movements through the enforcement of standard construction specifications by periodic onsite inspections.

- To the extent feasible, and as needed to avoid adverse impacts on traffic flow, schedule truck trips outside of peak morning and evening commute hours.

- Limit lane closures during peak hours to the extent possible. Restore roads and streets to normal operation by covering trenches with steel plates outside of allowed working hours or when work is not in progress.

- Limit, where possible, the pipeline construction work zone to a width that, at a minimum, maintains alternate one-way traffic flow past the construction zone. Parking may be prohibited if necessary to facilitate construction activities or traffic movement. If the work zone width will not allow a 10-foot-wide paved travel lane, then the road will be closed to through-traffic (except emergency vehicles) and detour signing on alternative access streets will be used.

- Include signage to direct pedestrians and bicyclists around project construction work zones that displace sidewalks and/or bike lanes.

- Store all equipment and materials in designated contractor staging areas on or adjacent to the worksite, in such a manner to minimize obstruction to traffic.

- Identify locations for parking by construction workers (within the construction zone or, if needed, at a nearby location with transport provided between the parking location and the worksite).

- Comply with roadside safety protocols. Provide “Road Work Ahead” warning signs and speed control (including signs informing drivers of state-legislated double fines for speed infractions in a construction zone) to achieve required speed reductions for safe traffic flow through the work zone.

- Coordinate with facility owners or administrators of sensitive land uses such as police and fire stations, transit stations, hospitals, and schools. Provide advance notification to the facility owner or operator of the timing, location, and duration of construction activities and the locations of detours and lane closures.

- Coordinate construction activities, to extent possible, to minimize traffic disturbances adjacent to schools (e.g., do work during summer months when there is less activity at schools). For construction activities that occur during the school year, then at the start and end of the school day at schools adjacent to a pipeline project (e.g., Bentley School on El Nido Ranch Road, and Campolindo High School on Moraga Road), the contractor(s) will provide flaggers in the school areas to ensure traffic and pedestrian safety.

- Coordinate with the County Connection so the transit provider can temporarily relocate bus routes or bus stops in work zones as it deems necessary.
- To the extent feasible, and as needed to avoid adverse impacts on traffic flow, schedule construction of project elements to avoid overlapping maximum trip-generation construction phases.

Implementation of Measure 3.8-1 would ensure that effects on traffic flow conditions in the project vicinity would be less than significant.

Impact 3.8-2: Reduction in the number of, or the available width of, travel lanes on roads where pipeline construction would occur, resulting in short-term traffic delays for vehicles traveling past the construction zones.

The WTTIP includes installation of new pipelines in both unpaved areas and paved roadways. These actions could temporarily disrupt existing transportation and circulation patterns in the vicinity. Impacts would include direct disruption of traffic flows and street operations. Lane blockages or street closures during construction would result in a reduction in travel lanes and curb parking. Construction operations related to facility installation within and/or across high-traffic volume arterials could have a significant adverse impact on traffic flow and operations at these locations.

Construction Zone Requirements – Overview

Three construction methods for the installation of pipelines would be used: (1) open-cut trenching, which is the primary installation method, (2) bore and jacking, and (3) microtunneling. The latter two methods would not reduce the number or available width of travel lanes (pits used for bore and jack and microtunneling are assumed to be located out of public roadways). As stated in the roadway description section above, the pavement of pipeline alignment segments (including parking lanes in some cases) generally ranges from two-lane segments with widths of about 22 to 65 feet, to four-lane segments (some divided by a median).

As described on page 3.8-11, above, trench width and depth for pipeline installation would range from 2.5 to 5.9 feet and 5.0 to 11.6 feet, respectively, depending on the size of the pipeline being installed. The active work area along the open trench would be wider than the trench width to facilitate access by trucks and loaders (see Figure 2-9, in Chapter 2). Removed pavement and excavated soil would be loaded directly into dump trucks and hauled offsite for disposal. Imported backfill would be delivered to stockpiles near the open trench. Once the new pipeline is in place, backfill would be placed in the trench, and the streets would be compacted and paved; a temporary patch would be used until final repaving occurs.

From an engineering perspective, the ideal temporary construction zone for pipeline installation would be about 40 feet wide, which would allow truck and equipment access alongside the trench. However, the construction zone width could be as narrow as 25 feet, which was the assumed width for the assessment of potential project impacts in roadways, except in one case: on

Moraga Road in Moraga (see below), a width as narrow as about 22 feet could be used to maintain two-way traffic flow. There are areas where road closure would be required during construction hours.[6]

Project Impact

The pace of open-trench work for proposed pipeline improvements in paved areas is estimated to average 80 feet per day, and the work schedule would be 8:30 a.m. to 4:30 p.m., Monday through Friday. Depending on where the pipeline would be located within the roadway width and on whether on-street parking is currently provided, either two traffic lanes, or one travel lane and a parking lane, would be needed to accommodate the construction zone. Table 3.8-6 presents the proposed widths of the construction work zones, the method for maintaining traffic flow affected by the construction, and roadway segments that would have to be closed during pipeline construction. Some roadway segments would have sufficient pavement width outside of the construction zone to accommodate two-way traffic flow, but other roadways would not have sufficient remaining pavement width to maintain two-way traffic flow. In the latter case, alternate one-way traffic flow would be maintained on pavement as narrow as 10 feet. Traffic would be delayed as it travels past the construction zone, but implementation of Measure 3.8-1, above, would ensure that effects on traffic flow conditions would be less than significant.

Maintenance of traffic flow during installation of the Moraga Road Pipeline in the two-lane undivided portion of Moraga Road between Sky-Hy Drive / Via Granada and Dolores Court (see Maps C-MORPL-4 and C-MORPL-5) could be handled under two possible scenarios. The pavement width varies from about 42 feet to about 65 feet, and with a construction zone width as narrow as 22 feet (and as wide as 45 feet), two-way flow could be maintained. Under that scenario, the bike lanes would have to be closed for the length of each day’s construction zone; bus stops might need to be temporarily relocated; and, although on-street parking is prohibited on most of Moraga Road, the spaces near Campolindo High School (between Campolindo Drive and Buckingham Drive) would be unavailable during construction in that segment. The other scenario would involve maintaining alternate one-way flow in segments where the needed construction zone width would result in insufficient remaining width to maintain two-way traffic flow. Under either scenario, a voluntary detour (using St. Marys Road and Rheem Boulevard, or Moraga Way) would be available to motorists who wish to avoid delays on Moraga Road.

During installation of the Moraga Road Pipeline in the narrow (24-foot-wide) two-lane segment of Moraga Road between Nemea Court and Sky-Hy Drive / Via Granada, a 14-foot-wide construction zone would be used, and alternate one-way traffic flow would be maintained on the remaining 10 feet of pavement. The above-described voluntary detour route also would be available to motorists who wish to avoid delays on this portion Moraga Road.

[6] For roadways where it is not possible to provide a minimum 10-foot travel width to maintain alternate one-way traffic flow past the construction zone, the roadway would have to be closed to all except emergency vehicles during construction work hours.

TABLE 3.8-6
METHODS FOR MAINTAINING TRAFFIC FLOW AFFECTED BY PROJECT CONSTRUCTION

Roadway / Segment	No. of Lanes (width)	Proposed Width of Construction Work Zone	Methods to Maintain Traffic Flow
Orinda-Lafayette Aqueduct (pipeline portion)			
Altarinda Drive: ▪ just west of St. Stephens Drive	2 lanes (40 feet)	Up to 28 feet	Alternate one-way flow in one 12-foot-wide lane
El Nido Ranch Road: ▪ St. Stephens Drive to Upper Happy Valley Road	2 lanes (40 feet)	Up to 28 feet	Alternate one-way flow in one 12-foot-wide lane
▪ Upper Happy Valley Road to Bentley School parking lot	2 lanes (33–40 feet)	21–28 feet	Alternate one-way flow in one 12-foot-wide lane
Mt. Diablo Boulevard: ▪ West of El Nido Ranch Road to WTP access	4 lanes (divided)	30 feet	One lane in each direction on one (eastbound lanes) side of median
Fay Hill Pipeline Improvements			
Rheem Boulevard: ▪ Moraga Road to Chalda Way	3–4 lanes (52 feet)	Up to 32 feet	One lane in each direction on a minimum of 20 feet of clear pavement
Glen Pipeline Improvements			
Nordstrom Lane: ▪ Hilltop Drive to Glen Road	2 lanes (22 feet)	22 feet	Road closure (no detour available)
Glen Road: ▪ Nordstrom Lane to Monticello Road	2 lanes (22 feet)	22 feet	Road closure (no detour available)
Happy Valley Pumping Plant and Pipeline			
Miner Road: ▪ Oak Arbor Road to Lombardy Lane	2 lanes (22 feet)	22 feet	Road closure with detour routing
Lombardy Lane: ▪ Miner Road to Van Ripper Lane	2 lanes (24 feet)	24 feet	Road closure with detour routing
Highland Reservoir and Pipelines[a]			
Mt. Diablo Boulevard: ▪ East of El Nido Ranch Road to east of Lafayette WTP	4 lanes (divided)	30 feet	One lane in each direction on one (eastbound lanes) side of median
Leland Isolation Pipeline			
Lacassie Drive: ▪ N. California Street to N. Main Street	2 lanes (43 feet)	At least 23 feet; up to 31 feet	One lane in each direction on a minimum of 20 feet of clear pavement, *or* alternate one-way flow in one 12-foot-wide lane
Leland Isolation Bypass Valves			
Danville Boulevard: ▪ Near Rudgear Road	2 lanes (60 feet)	Up to 40 feet	One lane in each direction on a minimum of 20 feet of clear pavement
Moraga Road Pipeline			
Moraga Road: ▪ Nemea Court to Sky-Hy Drive	2 lanes (24 feet)	14 feet	Alternate one-way flow in one 10-foot-wide lane
Sky-Hy Drive to Dolores Court	2 lanes (42–65 feet)	At least 22 feet; up to 40 feet	One lane in each direction on a minimum of 20 feet of clear pavement
▪ Dolores Court to Draeger Drive	4 lanes	25 feet	One lane in each direction on a minimum of 20 feet of clear pavement
Tice Valley Pumping Plant and Pipeline			
Boulevard Way: ▪ Olympic Boulevard to Warren Road	2 lanes (25 feet)	25 feet	Road closure with detour routing
Olympic Boulevard: ▪ Boulevard Way to Acalanes Road	2–4 lanes (48+ feet)	Up to 28 feet	One lane in each direction on a minimum of 20 feet of clear pavement

[a] Includes Lafayette Reclaimed Water Pipeline.

There are roadways within proposed pipeline segments for which the construction zone would result in insufficient remaining width to maintain alternate one-way traffic flow. For example, segments of Nordstrom Lane, Glen Road, Miner Road, Lombardy Lane, and Boulevard Way (each 22 to 25 feet wide) would need to be closed to all through-traffic (except emergency vehicles) during work hours, with detour routing available in some, but not all, cases. See discussion about detour routing on page 3.8-21.

The impacts during peak traffic periods would be significant because levels of service would be reduced to an unacceptable level. The decrease in traffic volumes outside of the peak periods would typically, but not universally, be sufficient to allow the reduced number of travel lanes to accommodate the traffic flow without significant delays. Delays would also be experienced by drivers during off-peak hours, but because of the lower volume, fewer people would be affected by the delays during those periods.

As shown in Table 3.8-1, some roadways on the pipeline alignments have four travel lanes, in some cases divided by a median (raised or striped). Examples include Mt. Diablo Boulevard and part of Moraga Road (generally Dolores Court to Donald Drive). The proposed construction zone width would generally occupy the pavement on one side of the median plus the median itself, with two-way traffic flow (including turning vehicles and transit vehicles) accommodated on the opposite side of the median. The existing four through-traffic lanes (plus turn lanes and/or bike/parking lanes) divided by the median would need to be transitioned to two through-traffic lanes on one side of the median. This construction scenario would reduce the capacity of the roadway by more than the halving caused by the reduction in travel lanes from four to two; that is, because a choice would have to be made between (1) using 10 feet of the available width for left-turn lanes (removing all on-street parking and bike lanes, and forcing buses to stop at bus stops in the travel lane, temporarily blocking through-traffic) and (2) providing width for one-sided on-street parking, a bike lane, and bus stops along the outside curb lane (forcing vehicles to make left turns from the one through-lane, temporarily blocking through-traffic). The reduction in capacity on these four-lane roads during peak traffic periods would be a significant impact.

To ensure that the project effects are less than significant, contractor(s) would be required to limit lane closures during peak hours to the extent possible; restore roads and streets to normal operation when work is not in progress; and, where possible, limit the pipeline construction work zone to a width that, at a minimum, maintains alternate one-way traffic flow past the construction zone.

Mitigation Measure

> **Measure 3.8-2:** Implement Measure 3.8-1, which stipulates actions required of contractor(s) to reduce traffic flow impacts to a less-than-significant level.

Access impacts on roads for which no detour routing is available would be significant and unavoidable.

Impact 3.8-3: Demand for parking spaces to accommodate construction worker vehicles; temporary displacement of on-street parking along pipeline alignment routes.

Project Impact – Stationary Locations (WTPs, Reservoirs, and Pump Plants)

Proposed improvements would create temporary parking demand for construction workers and construction vehicles at the different worksites. For water treatment plants, reservoirs, and pumping plants, the worksites would generally have sufficient space for onsite parking. Exceptions to full onsite accommodation of parking demand are described below, and in some cases are discussed below under Project Impact – Pipeline Alignments.

- *Lafayette WTP*. In addition to parking onsite, parking spaces would be available beneath Highway 24 west of the plant.
- *Orinda WTP*. In addition to parking onsite, parking spaces would be available on the ballfields.
- *Sobrante WTP*. In addition to parking onsite, parking spaces would be available on nearby streets.
- *Ardith Reservoir/Donald Pump Plant*. In addition to parking onsite, parking spaces would be available on nearby Ardith Drive.
- *Moraga Reservoir*. In addition to parking onsite, parking spaces would be available on nearby streets.

Project Impact – Pipeline Alignments

As crews move along pipeline alignments, work within roads could temporarily displace on-street parking on affected streets. Assuming all personnel drive alone to each day's work location, the generated parking demand would be about 13 spaces (i.e., nine workers per crew, plus four for supervisory, inspector, and visitor personnel). As shown in Table 3.8-1, most of the roadways on proposed pipeline alignments do not have on-street parking spaces, and construction workers would have to park outside the immediate area of those streets. For the eastern pipeline segment of the Orinda-Lafayette Aqueduct, there is generally sufficient parking available on El Nido Ranch Road to accommodate the added parking demand. Given the proposed rate of construction during pipeline installation, impacts to parking would be relatively brief at any one location throughout the project area. To ensure that the project effects are less than significant, contractor(s) would be required to identify locations for parking by construction workers (within the construction zone or, if needed, at a nearby location with transport provided between the parking location and the worksite).

Mitigation Measure

> **Measure 3.8-3:** Implement Measure 3.8-1, which stipulates actions required of contractor(s) to reduce parking impacts to a less-than-significant level.

Impact 3.8-4: Potential traffic safety hazards for vehicles, bicyclists, and pedestrians on public roadways.

Construction-generated trucks on project area roadways would interact with other vehicles. Creation of a construction work zone on high-volume roadways (e.g., Moraga Road) would potentially create traffic safety hazards where traffic is routed into the travel lane adjacent to the work zone. Potential conflicts could also occur between construction traffic and bicyclists and pedestrians. Table 3.8-1 shows what roads in the project area have bicycle lanes.

Mitigation Measure

> **Measure 3.8-4:** Implement Measure 3.8-1, which stipulates actions required of contractor(s) to reduce potential traffic safety impacts to a less-than-significant level.

Impact 3.8-5: Access disruption to adjacent land uses and streets for both general traffic and emergency vehicles, as well as disruption to bicycle/pedestrian access and circulation.

Pipeline construction within or across streets, and temporary reduction in travel lanes, could result in delays for emergency vehicle access in the vicinity of the worksites. In addition, access to driveways and to cross streets along the construction route could be temporarily blocked due to trenching and paving. This could be an inconvenience to some and a significant problem for others, particularly schools and emergency service providers (e.g., police and fire). Table 3.12-3 in Section 3.12 (Public Services and Utilities) identifies by land use agency, name, and street address schools, (and preschools), hospitals, and fire stations in the vicinity of WTTIP project sites. Vehicle access would be restored at the end of each workday through the use of steel trench plates or trench backfilling. Employees and customers would continue to have access to the affected business establishments; only access to parking (on- or off-street) adjacent to the business would be affected, and truck deliveries could be made difficult. With sufficient advance notification regarding the timing of construction in front of each affected property, this short-term inconvenience would result in a less-than-significant impact.

The schools most likely to be adversely affected by project construction are Bentley School and Campolindo High School, which are located on roads proposed for pipeline installation (i.e., El Nido Ranch Road near Upper Happy Valley Road; and Moraga Road near Campolindo Drive). The aerial photograph maps presented after Chapter 2 show the location of schools identified in the vicinity of WTTIP projects during EIR preparation (see also Table 3.12-3). The Orinda-Lafayette Aqueduct (Alternative 2) would be constructed through the parking lot of Bentley School. Providing advance notification of construction and/or scheduling pipeline construction adjacent to schools during summer months (when there is less activity at schools) would mitigate adverse impacts. Providing flaggers in the school areas at the start and end of the school day would ensure traffic and pedestrian safety during construction activity.

Some of the proposed pipeline alignments could result in temporary full street closures because the width of the construction zone would not be sufficient to maintain alternate one-way traffic flow (i.e., 10 feet of available pavement width for traffic) adjacent to the work zone. Locations that could be subject to temporary closures to through-traffic are described below.

- Glen Pipeline:
  - Nordstrom Lane and Glen Road (22 feet wide), with no detour routing available
- Happy Valley Pipeline:
  - Miner Road (22 feet wide) between Oak Arbor Road and Lombardy Lane (detour routing is available, via St. Stephens Drive, Via Las Cruces, Honey Hill Road, and Miner Road)
  - Lombardy Lane (22 feet wide) between Miner Road and Van Ripper Lane (detour routing is available, via Upper Happy Valley Road, Happy Valley Road, Sundown Terrace, and Dalewood Drive)
- Tice Valley Pipeline:
  - Boulevard Way (25 feet wide) between Olympic Boulevard and Warren Road (various detour routings available on local streets in the area)

In addition, lane blockages or roadway closures during pipeline installation could result in temporary alterations in bicycle and pedestrian circulation; the specific location of the pipelines within each roadway is not yet known, but such blockages or closures would inconvenience bicyclists and pedestrians and is considered a significant impact.

Mitigation Measure

> **Measure 3.8-5:** Implement Measure 3.8-1, which stipulates actions required of contractor(s) to reduce access impacts to a less-than-significant level.

Access impacts on roads for which no detour routing is available would be significant and unavoidable.

Impact 3.8-6: Disruptions to transit service on pipeline alignment routes.

As discussed above, the proposed project could have temporary effects on traffic flow, particularly during pipeline installations proposed within road segments. Pipeline construction within or across streets, and temporary reduction in travel lanes, could result in delays for County Connection transit service in the vicinity of the worksites.

Table 3.8-1 shows the roads in the project area that carry bus routes. While buses could be slowed by project construction trucks on roads used as haul routes, a greater potential effect would occur on roads in which pipeline installation is proposed. Installation of new pipelines could disrupt access to bus stops along the alignments and could slow bus movements. Bus routes might need to be temporarily detoured, and/or bus stops temporarily relocated, on the following roads:

- Orinda-Lafayette Aqueduct (pipeline east of St. Stephens Drive):

- El Nido Ranch Road (St. Stephens Drive to Upper Happy Valley Road), County Connection Bus Line 206L (limited service, peak periods only)
- Mt. Diablo Boulevard (west of El Nido Ranch Road to the end of the work zone), County Connection Bus Line 206L (limited service, peak periods only)

- Happy Valley Pipeline:
  - Miner Road (Camino Pablo to Lombardy Lane), County Connection Bus Line 126, subject to temporary road closure (as described in Impact 3.8-5, above)

- Moraga Road Pipeline:
  - Moraga Road (Nemea Court to Draeger Drive), County Connection Bus Line 106

- Tice Pipeline:
  - Boulevard Way (Olympic Boulevard to Warren Road), County Connection Bus Line 101, subject to temporary road closure (as described in Impact 3.8-5, above)

Pipeline installation in Miner Road and Boulevard Way would require road closure to through-traffic (except emergency vehicles) during construction work hours (as described in Impact 3.8-5, above). Road closures during the hours of transit service would displace the County Connection bus lines that travels on those roads. Unless adequate alternative routing were provided, such displacement would have a significant impact on transit service and on people who use that service. While there would be detour routing available for regular traffic during temporary closure of Miner Road (Happy Valley Pipeline) and Boulevard Way (Tice Pipeline) (as described in Impact 3.8-5, above), those detour routings would not serve as adequate replacement routing for the affected bus lines. County Connection would be consulted to devise acceptable mitigation on a segment-by-segment basis in order to minimize impacts on transit service for riders on the affected bus lines.

Mitigation Measure

Measure 3.8-6: Implement Measure 3.8-1, which stipulates actions required of contractor(s) to reduce impacts to transit service to a less-than-significant level.

Transit impacts on roads for which adequate replacement routing for bus lines is not available would be significant and unavoidable.

Impact 3.8-7: Increased wear-and-tear on the designated haul routes used by construction vehicles.

The use of large trucks to transport equipment and material to and from the project worksites could affect road conditions on the designated haul routes by increasing the rate of roadwear. The degree to which this impact would occur depends on the roadway design (pavement type and thickness) and the existing condition of the roads that the construction trucks would use. Major arterials, such as Camino Pablo, Acalanes Road, El Nido Ranch Road, Mt. Diablo Boulevard, and Moraga Way are designed to handle a mix of vehicle types, including heavy trucks. The project’s impacts are expected to be negligible on those roads. Collector streets, such as Deer Hill Road and Oak Hill Road, are likewise designed to handle a mix of vehicle types. Residential streets are generally not built to withstand substantial truck traffic volumes. Examples of local roads that could be adversely affected by heavy truck traffic are Ivy Drive, Ardith Drive, Larkey Lane, and Greenly Drive. Because of the potential for excessive roadwear due to project construction trucks, the following measure is proposed to mitigate this potentially significant impact.

Mitigation Measure

> **Measure 3.8-7:** Prior to project construction, road conditions will be documented for all routes that will be used by project-related vehicles. Road conditions will also be documented after project construction is completed. Roads damaged by construction will be repaired to a structural condition equal to that which existed prior to construction activity.

Program-Level Elements

Program-level elements include facility improvements at the Lafayette, Orinda, and Walnut Creek WTPs, the Leland Reservoir Replacement, New Leland Pressure Zone Reservoir and Pipeline, the St. Mary's Road/Rohrer Drive Pipeline, and the San Pablo Pipeline. Potential traffic and circulation impacts associated with these elements are discussed below, recognizing that there are insufficient design details to reliably estimate trip generation.

Lafayette WTP

The proposed program facility improvements at the Lafayette WTP would generate short-term increases in vehicle trips by construction workers and construction vehicles on area roadways under Alternative 1 only. Construction-generated traffic would be temporary and therefore would not result in long-term degradation in operating conditions or level of service on project area roadways. The primary offsite impacts from the movement of construction trucks would include a short-term and intermittent lessening of roadway capacities due to the slower movements and larger turning radii of the trucks compared to passenger vehicles.

Project-generated truck trips would be dispersed throughout the day, and construction workers would commute to and from the worksite primarily before or after peak traffic hours. Construction-related truck traffic occurring on weekdays during the hours of 7:00 a.m. to 9:00 a.m. and 4:00 p.m. to 6:00 p.m. would coincide with peak-period traffic on access roadways and therefore would have the greatest potential to impede traffic flow. Drivers would experience intermittent delays if they were traveling behind a construction truck. Traffic volume increases caused by project construction would be most noticeable on local-serving roadways. With implementation of mitigation measures similar to Measures 3.8-1 and 3.8-7, identified above for the project-level elements, this impact would be reduced to a less-than-significant level.

Orinda WTP

The proposed program facility improvements at the Orinda WTP would generate short-term increases in vehicle trips by construction workers and construction vehicles on area roadways under both alternatives. Construction-generated traffic would be temporary and therefore would not result in long-term degradation in operating conditions or level of service on project area roadways. The primary offsite impacts from the movement of construction trucks would include a short-term and intermittent lessening of roadway capacities for reasons similar to that described above for the Lafayette WTP.

Project-generated truck trips would be dispersed throughout the day, and construction workers would commute to and from the worksite primarily before or after peak traffic hours. Traffic volume increases and delays caused by project construction would be most noticeable on local-serving roadways, particularly Camino Pablo. With implementation of mitigation measures similar to Measures 3.8-1 and 3.8-7, identified above for the project-level elements, this impact would be reduced to a less-than-significant level.

Walnut Creek WTP

The proposed program facility improvements at the Walnut Creek WTP would generate short-term increases in vehicle trips by construction workers and construction vehicles on area roadways under both alternatives. Construction-generated traffic would be temporary and therefore would not result in long-term degradation in operating conditions or level of service on project area roadways. The primary offsite impacts from the movement of construction trucks would include a short-term and intermittent lessening of roadway capacities, potential conflicts with weekday peak-hour commute traffic, and delays caused by slower moving trucks.

Traffic volume increases caused by project construction would be most noticeable on local-serving roadways such as Larkey Lane and San Luis Road. With implementation of mitigation measures similar to Measures 3.8-1 and 3.8-7, identified above for the project-level elements, this impact would be reduced to a less-than-significant level.

Leland Reservoir Replacement

The proposed reservoir replacement would generate short-term increases in vehicle trips by construction workers and construction vehicles on area roadways. Construction-generated traffic would be temporary and therefore would not result in long-term degradation in operating conditions or level of service on project area roadways. The primary offsite impacts from the movement of construction trucks would include a short-term and intermittent lessening of roadway capacities due to the slower movements and larger turning radii of the trucks compared to passenger vehicles.

Project-generated truck trips would be dispersed throughout the day, and construction workers would commute to and from the worksite primarily before or after peak traffic hours. Construction-related truck traffic occurring on weekdays during the hours of 7:00 a.m. to 9:00 a.m. and 4:00 p.m. to 6:00 p.m. would coincide with peak-period traffic on access roadways and therefore would have the greatest potential to impede traffic flow. Drivers would experience intermittent delays if they were traveling behind a construction truck. Traffic volume increases caused by project construction would be most noticeable on local-serving roadways. With implementation of mitigation measures similar to Measures 3.8-1 and 3.8-7, identified above for the project-level elements, this impact would be reduced to a less-than-significant level.

New Leland Pressure Zone Reservoir and Pipeline

The proposed reservoir and pipeline would generate short-term increases in vehicle trips by construction workers and construction vehicles on area roadways. In addition, construction activity associated with the proposed reservoir would include substantial haul truck traffic to remove excavated material. Several haul route options are under consideration some of which would involve use of residential streets and others that would primarily traverse open space lands. Truck traffic on residential streets would reduce the number or the available width of travel lanes on roads, resulting in short-term traffic delays for vehicles traveling past the construction zone on the affected roadways.

Construction activity on Danville Boulevard (New Leland Pressure Zone Pipeline) could also affect access to the parking lot for the Iron Horse Trail on the west side of the road near Rudgear Road. Construction-generated traffic would be temporary and therefore would not result in long-term degradation in operating conditions or level of service on project area roadways. The primary offsite impacts from the movement of construction trucks would include a short-term and intermittent lessening of roadway capacities due to the slower movements and larger turning radii of the trucks compared to passenger vehicles. Other potential impacts would include conflicts with weekday commute traffic and delays while traveling behind slower-moving construction trucks.

With implementation of mitigation measures similar to Measures 3.8-1 and 3.8-7, identified above for the project-level elements, this impact would be reduced but would likely remain significant and unavoidable at a program-level.

St. Mary's Road/Rohrer Drive Pipeline

The proposed pipeline project would generate short-term increases in vehicle trips by construction workers and construction vehicles on area roadways. In addition, construction activity would reduce the number or the available width of travel lanes on St. Mary's Road, resulting in short-term traffic delays for vehicles traveling past the construction zone. Rohrer Drive in particular is narrow and windy and it is likely that there would be access delays for residents and others during daytime pipeline construction as only alternate one-way access could be provided through the active construction zone. This impact would be considered potentially significant and unavoidable at a program-level.

Construction-generated traffic would be temporary and therefore would not result in long-term degradation in operating conditions or level of service on project area roadways. The primary offsite impacts from the movement of construction trucks would include a short-term and intermittent lessening of roadway capacities due to the slower movements and larger turning radii of the trucks compared to passenger vehicles. Project-generated truck trips would be dispersed throughout the day, and construction workers would commute to and from the worksite primarily before or after peak traffic hours. Therefore, conflicts with peak-period traffic on St. Mary's Road and Rohrer Drive would likely be less than significant. With implementation of mitigation measures similar to Measures 3.8-1 and 3.8-7, identified above for the project-level elements, impacts would be reduced.

San Pablo Pipeline

While the proposed pipeline would not be constructed within any public roadway, the project would generate short-term increases in vehicle trips by construction workers and construction vehicles on area roadways providing access, primarily Camino Pablo/San Pablo Dam Road. In addition, haul trucks would likely use Camino Pablo and could result in short-term traffic delays for vehicles traveling behind those trucks. Construction-generated traffic would be temporary and therefore would not result in long-term degradation in operating conditions or level of service. The primary offsite impacts from the movement of construction trucks would include a short-term and intermittent lessening of roadway capacities due to the slower movements and larger turning radii of the trucks compared to passenger vehicles.

Project-generated truck trips would be dispersed throughout the day, and construction workers would commute to and from the worksite primarily before or after peak traffic hours. Construction-related truck traffic occurring on weekdays during the hours of 7:00 a.m. to 9:00 a.m. and 4:00 p.m. to 6:00 p.m. would coincide with peak-period traffic on access roadways and therefore would have the greatest potential to impede traffic flow. With implementation of mitigation measures similar to Measures 3.8-1 and 3.8-7, identified above for the project-level elements, this impact would be reduced to a less-than-significant level.

References – Traffic and Circulation

Alameda-Contra Costa Transit District, Bus System Map, available online at http://www.actransit.org, April 17, 2006.

California Department of Transportation (Caltrans), *2004 Annual Average Daily Truck Traffic on the California State Highway System*, available online at http://www.dot.ca.gov/hq/traffops/saferesr/trafdata/index.htm, 2005b.

______, *2004 Traffic Volumes on California State Highways*, available online at http://www.dot.ca.gov/hq/traffops/saferesr/trafdata/index.htm, 2005a.

County Connection, Bus System Map, available online at http://www.cccta.org, April 17, 2006.

3.9 Air Quality

3.9.1 Approach to Analysis

The air quality impact analysis considers construction and operational impacts associated with the proposed WTTIP. Construction air emissions are evaluated in accordance with the Bay Area Air Quality Management District's *BAAQMD CEQA Guidelines* (BAAQMD, 1999). Operational emissions are discussed qualitatively.

3.9.2 Setting

Meteorology

Temperatures in Lafayette, Moraga, Orinda, and western Walnut Creek (hereafter referred to as the Lamorinda/Walnut Creek area) average 58 degrees Fahrenheit annually, with summer highs in the mid-80s and winter lows in the mid-30s. In Oakland, highs are about 10 degrees cooler and lows are about 10 degrees warmer. The rapid modification of coastal marine air as it moves inland results in temperatures that are about 15 degrees warmer in the Lamorinda/Walnut Creek area than in the Oakland/El Sobrante areas on summer afternoons, and about 10 degrees colder on winter mornings. While the coastal hills create sharp contrasts in temperature within short distances, precipitation is more uniformly distributed and averages about 20 inches per year throughout much of the Bay Area. Annual precipitation varies markedly from year to year. Thus, the rainfall total in one month of a heavy-precipitation year may exceed that of an entire annual total during a drought condition.

Winds are an important element in characterizing the air quality impact of any project. Wind controls both the microscale dispersion of any locally generated air emissions as well as their regional trajectory. Winds in the Oakland and El Sobrante areas are typically out of the west, west-northwest, and northwest (about 50 percent of the time), averaging nine miles per hour. Winds in the Lamorinda/Walnut Creek area are rather complex, because the prevailing onshore winds are southwest to west while the valley topography runs mainly northwest to southeast. During the day, localized emissions are funneled in a southeastward direction. At night, emissions are less readily ventilated and travel in more random directions. During the daytime, when the winds travel at an average speed of about eight miles per hour, there is usually little potential for large-scale stagnation. However, about one-third of the time winds at night are less than two to three miles per hour. Local radiation temperature inversions during the night (when the ground is cooler than the air) can combine with these light winds to create localized air stagnation near major air pollution emissions sources (e.g., freeways).

Air Quality Regulations

The Clean Air Act Amendments of 1970 established national ambient air quality standards, and individual states retained the option to adopt more stringent standards and to include other pollution sources. California had already established its own air quality standards when federal standards were established, and because of the unique meteorological problems in California, there is considerable diversity between the state and national ambient air quality standards, as shown in Table 3.9-1. California ambient standards tend to be at least as protective as national ambient standards and are often more stringent.

The ambient air quality standards are intended to protect the public health and welfare, and they specify the concentration of pollutants (with an adequate margin of safety) to which the public can be exposed without adverse health effects. They are designed to protect those segments of the public most susceptible to respiratory distress, known as sensitive receptors, including asthmatics, the very young, the elderly, people weak from other illness or disease, or persons engaged in strenuous work or exercise. Healthy adults can tolerate occasional exposure to air pollution levels that are somewhat above the ambient air quality standards before adverse health effects are observed.

Federal Standards

The 1977 Clean Air Act (last amended in 1990, 42 United States Code [USC] 7401 et seq.) required that regional planning and air pollution control agencies prepare a regional air quality plan to outline the measures by which both stationary and mobile sources of pollutants will be controlled in order to achieve all standards within the deadlines specified in the Clean Air Act. For the Bay Area Air Basin, the Association of Bay Area Governments (ABAG), the Metropolitan Transportation Commission (MTC), and the BAAQMD jointly prepared the *Bay Area Air Quality Plan* in 1982, which predicted attainment of the federal clean air standards within the basin by 1987. This forecast was somewhat optimistic in that attainment of federal clean air standards did not occur throughout the entire air basin until 1991. The plan, which is referred to as the State Implementation Plan (SIP), must contain control strategies that demonstrate attainment of national ambient air quality standards by deadlines established in the federal Clean Air Act.

The Bay Area Air Basin's current attainment status with respect to federal standards is summarized in Table 3.9-1. In general, the Bay Area experiences low concentrations of most pollutants when compared to federal standards, except for ozone and particulate matter (PM_{10} and $PM_{2.5}$), for which standards are exceeded periodically. The Bay Area's attainment status for ozone has changed several times over the past decade, first from "nonattainment" to "attainment" in 1995, then back to "unclassified nonattainment" in 1998 for the 1-hour federal ozone standard. In June 2004, the Bay Area was designated as "marginal nonattainment" for the 8-hour ozone standard. In 1998, after many years without violations of any carbon monoxide (CO) standards, the attainment status for CO was upgraded to "attainment."

In response to the U.S. Environmental Protection Agency's (U.S. EPA) redesignation of the basin for the 1-hour federal ozone standard to nonattainment, the BAAQMD, ABAG, and MTC were required to develop an ozone attainment plan to meet this standard. The *1999 Ozone Attainment Plan* (OAP) was prepared and adopted by these agencies in June 1999. However, in March 2001, the U.S. EPA proposed and took final action to approve portions of the 1999 OAP and disapprove

TABLE 3.9-1
STATE AND FEDERAL AMBIENT AIR QUALITY STANDARDS AND ATTAINMENT STATUS

Pollutant	Averaging Time	(State) SAAQS[a] Standard	(State) SAAQS[a] Attainment Status	(Federal) NAAQS[b] Standard	(Federal) NAAQS[b] Attainment Status
Ozone (O_3)	1-hour	0.09 ppm	**N**	NA	See Note (c)
	8-hour	0.07 ppm	See Note (d)	0.08 ppm	**N**
Carbon Monoxide (CO)	1 hour	20 ppm	A	35 ppm	A
	8 hour	9.0 ppm	A	9 ppm	A
Nitrogen Dioxide (NO_2)	1 hour	0.25 ppm	A	NA	NA
	Annual	NA	NA	0.053 ppm	A
Sulfur Dioxide (SO_2)	1 hour	0.25 ppm	A	NA	NA
	24 hour	0.04 ppm	A	0.14 ppm	A
	Annual	NA	NA	0.03 ppm	A
Particulate Matter (PM_{10})	24 hour	50 µg/m^3	**N**	150 µg/m^3	U
	Annual[e]	20 µg/m^3	**N**	50 µg/m^3	A
Fine Particulate Matter ($PM_{2.5}$)	24 hour	NA	NA	65 µg/m^3	A
	Annual	12 µg/m^3	**N**	15 µg/m^3	A
Sulfates	24 hour	25 µg/m^3	A	NA	NA
Lead	30 day	1.5 µg/m^3	A	NA	NA
	Quarter	NA	NA	1.5 µg/m^3	A
Hydrogen Sulfide	1 hour	0.03 ppm	U	NA	NA
Visibility-Reducing Particles	8 hour	See Note (f)	A	NA	NA

NOTES: A = Attainment; **N** = Nonattainment; U = Unclassified; NA = Not Applicable or no applicable standard; ppm = parts per million; µg/m^3 = micrograms per cubic meter.

a SAAQS = state ambient air quality standards (California). SAAQS for ozone, carbon monoxide (except Lake Tahoe), sulfur dioxide (1-hour and 24-hour), nitrogen dioxide, particulate matter, and visibility-reducing particles are values that are not to be exceeded. All other state standards shown are values not to be equaled or exceeded.

b NAAQS = national ambient air quality standards. NAAQS, other than ozone and particulates, and those based on annual averages or annual arithmetic means, are not to be exceeded more than once a year. The 1-hour ozone standard is attained if, during the most recent three-year period, the average number of days per year with maximum hourly concentrations above the standard is equal to or less than one. The 8-hour ozone standard is attained when the three-year average of the fourth highest daily concentration is 0.08 ppm or less. The 24-hour PM10 standard is attained when the three-year average of the 99th percentile of monitored concentrations is less than the standard. The 24-hour PM2.5 standard is attained when the three-year average of 98th percentile is less than the standard.

c The national 1-hour ozone standard was revoked by the U.S. EPA on June 15, 2005.

d This state standard was approved in April 2005 and is expected to become effective in 2006.

e State standard = annual geometric mean; national standard = annual arithmetic mean.

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

SOURCE: BAAQMD, 2005a.

other portions, while also making the finding that the Bay Area had not attained the national 1-hour ozone standard. As a result, a revised OAP was prepared and adopted in October 2001. The 2001 plan amends and supplements the 1999 plan and provides for attainment by 2006, the attainment deadline. In June 2005, the federal 1-hour ozone standard was revoked by the U.S. EPA, although the 8-hour standard is still in effect.

The 2001 OAP contains control strategies for stationary and mobile sources. The adopted mobile-source control program was estimated to significantly reduce volatile organic compound (VOC) and nitrogen oxide (NOx) emissions between 2000 and 2006, reducing emissions from on- and off-road diesel engines (including construction equipment). In addition to emission reduction requirements for engines and fuels, the OAP identified 28 transportation control measures to reduce automobile emissions, including improved transit service and transit coordination, new carpool lanes, signal timing, freeway incident management, and increased state gas tax and bridge tolls.

State Standards

In 1988, California passed the California Clean Air Act (California Health and Safety Code Sections 39600 et seq.), which, like its federal counterpart, called for the designation of areas as attainment or nonattainment, based on state ambient air quality standards rather than the federal standards. The Bay Area Air Basin attainment status with respect to state standards is summarized in Table 3.9-1. As shown in the table, the Bay Area experiences low concentrations of most pollutants when compared to state standards, except for ozone, PM_{10}, and $PM_{2.5}$, for which standards are exceeded periodically.

California Air Resources Board

The California Air Resources Board (CARB) is the state agency responsible for regulating air quality. The CARB's responsibilities include establishing state ambient air quality standards, emissions standards, and regulations for mobile emissions sources (e.g., autos, trucks, etc.), and overseeing the efforts of countywide and multi-county air pollution control districts, which have primary responsibility over stationary sources. The emission standards most relevant to the WTTIP are those related to automobiles and on- and off-road heavy-duty diesel engines. The CARB also regulates vehicle fuels with the intent to reduce emissions; it has set emission reduction performance requirements for gasoline (California reformulated gasoline) and limited the sulfur and aromatic content of diesel fuel to make it burn cleaner. The CARB also sets the standards used to pass or fail vehicles in smog-check and heavy-duty truck inspection programs.

In 2005, the CARB approved a regulatory measure to reduce emissions of toxic and criteria pollutants by limiting the idling of new heavy-duty diesel vehicles, which altered five sections of Title 13 of the California Code of Regulations. The relevant changes with respect to the WTTIP are Sections 2480 and 2485. The pertinent requirements of Section 2480, Airborne Toxic Control Measure to Limit School Bus Idling and Idling at Schools, include the following:

> (c)(2) A driver of a commercial motor vehicle:
>
> (A) must turn off the bus or vehicle engine upon stopping at a school and must not turn the bus or vehicle engine on more than 30 seconds before beginning to depart from a school; and
>
> (B) must not cause or allow a bus or vehicle to idle at any location within 100 feet of, but not at, a school for:

(i) more than five consecutive minutes; or

(ii) a period or periods aggregating more than five minutes in any one hour.

(c)(4) A motor carrier of a commercial motor vehicle must ensure that:

(A) the bus or vehicle driver, upon employment and at least once per year thereafter, is informed of the requirements in (c)(2), and of the consequences, under this section and the motor carrier's terms of employment, of not complying with those requirements;

(B) all complaints of non-compliance with, and enforcement actions related to, the requirements of (c)(2) are reviewed and remedial action is taken as necessary; and

(C) records of (4) (A) and (B) are kept for at least three years and made available or accessible to enforcement personnel as defined in subsection (g) within three business days of their request.

Pertinent requirements of Section 2485, Airborne Toxic Control Measure to Limit Diesel-Fueled Commercial Motor Vehicle Idling, include the following:

(c) The driver of any vehicle subject to this section:

(1) shall not idle the vehicle's primary diesel engine for greater than five minutes at any location, except as noted in subsection (d); and

(2) shall not operate a diesel-fueled auxiliary power system (APS) to power a heater, air conditioner, or any ancillary equipment on that vehicle during sleeping or resting in a sleeper berth for greater than five minutes at any location when within 100 feet of a restricted area, except as noted in subsection (d).

"Restricted area" means any real property zoned for individual or multifamily housing units that has one or more such units. There are 12 exceptions to this requirement (e.g., emergency situations, military, adverse weather conditions, etc.), including: when a vehicle's power takeoff is being used to run pumps, blowers, or other equipment; when a vehicle is stuck in traffic, stopped at a light, or under direction of a police officer; when a vehicle is queuing beyond 100 feet from any restricted area; or when an engine is being tested, serviced, or repaired.

Bay Area Air Quality Management District

The BAAQMD is the regional agency responsible for air quality regulation within the San Francisco Bay Area Air Basin. The BAAQMD regulates air quality through its planning and review activities. The BAAQMD has permit authority over most types of stationary emission sources and can require stationary sources to obtain permits, and can impose emission limits, set fuel or material specifications, or establish operational limits to reduce air emissions. The BAAQMD regulates new or expanding stationary sources of toxic air contaminants.

The BAAQMD's *Clean Air Plan* (CAP), last adopted in 2000, applies control measures to stationary and mobile sources and outlines transportation control measures. Although the 2000 CAP is an ozone plan, it includes PM_{10} attainment planning as an informational item. The 1997 CAP and 2000 CAP included 19 transportation control measures, many of which were partially implemented during 1998 to 2000. The 2000 CAP continues to implement and expand key mobile-source programs included in the 1997 CAP.

In September 2005, the BAAQMD, in cooperation with the MTC and ABAG, prepared the *Bay Area 2005 Ozone Strategy*. The draft Ozone Strategy is a roadmap showing how the San Francisco Bay Area will achieve compliance with the state 1-hour ozone standard as expeditiously as practicable, and how the region will reduce transport of ozone and ozone precursors to neighboring air basins. The draft Ozone Strategy describes how the Bay Area will fulfill California Clean Air Act planning requirements for the state 1-hour ozone standard through the proposed control strategy. The control strategy includes stationary-source control measures to be implemented through BAAQMD regulations; mobile-source control measures to be implemented through incentive programs and other activities; and transportation control measures to be implemented through transportation programs in cooperation with the MTC, local governments, transit agencies, and others.

Ambient Air Quality

The BAAQMD operates a regional monitoring network that measures the ambient concentrations of six criteria air pollutants: ozone, CO, particulate matter (PM_{10} and $PM_{2.5}$), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), and lead. Existing and probable future air quality in the Lamorinda area can be generally inferred from ambient air quality measurements conducted by the BAAQMD at its closest monitoring stations in Oakland and Concord. Table 3.9-2 is a six-year summary of monitoring data (1999–2004) from the BAAQMD's Oakland and Concord stations. Data from the Concord station are included because the Oakland monitoring station does not monitor NO_x, SO_2, PM_{10}, or $PM_{2.5}$ concentrations. Final data for 2005 are not yet available. Table 3.9-2 compares measured pollutant concentrations with state ambient air quality standards, which are more stringent than the corresponding federal standards.

Ozone

Ozone is a secondary air pollutant produced in the atmosphere through a complex series of photochemical reactions involving reactive organic gases (ROG) and NO_x. The main sources of NO_x and ROG, often referred to as ozone precursors, are combustion processes (including motor vehicle engines) and the evaporation of solvents, paints, and fuels. Automobiles are the single largest source of ozone precursors in the Bay Area. Ozone is a regional air pollutant because its precursors are transported and diffused by wind concurrently with ozone production through the photochemical reaction process. Ozone causes eye irritation, airway constriction, and shortness of breath and can aggravate existing respiratory diseases such as asthma, bronchitis, and emphysema (BAAQMD, 1999). Table 3.9-2 shows that, according to published data, the more stringent applicable standards (the state 1-hour standard of 0.09 parts per million [ppm] and the federal 8-hour standard of 0.8 ppm) have not been exceeded during the last six years.

TABLE 3.9-2
OAKLAND AND CONCORD AMBIENT AIR QUALITY MONITORING SUMMARY
(1999–2004)

Monitoring Station & Pollutant	Most Stringent Applicable Standard	Number of Days Standards were Exceeded and Maximum Concentrations Measured					
		1999	2000	2001	2002	2003	2004
Downtown Oakland Data							
Ozone (ROG)							
Days 1-hour standard exceeded	>0.09 ppm[a]	0	0	0	0	0	0
Maximum 1-hour concentration (ppm)[b]		0.08	0.07	0.07	0.05	0.08	0.08
Days 8-hour standard exceeded	>0.08 ppm[b]	0	0	0	0	0	0
Maximum 8-hour concentration (ppm)[b]		0.06	0.05	0.04	0.04	0.05	0.06
Carbon monoxide							
Days 1-hour standard exceeded	>20. ppm[a]	0	0	0	0	0	0
Maximum 1-hour concentration (ppm)		6.4	5.4	5.0	4.4	3.9	3.5
Days 8-hour standard exceeded	>9. ppm[a]	0	0	0	0	0	0
Maximum 8-hour concentration (ppm)		5.2	3.4	4.0	3.3	2.8	2.6
Concord Data							
Suspended particulates (PM10)							
Maximum 24-hour concentration (µg/m^3)		**64**	**54**	**106**	**63**	34	**51**
Days 24-hour standard exceeded[c]	>50 µg/m^3[a]	3	1	2	3	0	1
Suspended particulates (PM2.5)							
Maximum 24-hour concentration (µg/m^3)		57	53	**68**	**77**	50	**74**
Days 24-hour standard exceeded	>65 µg/m^3[b]	0	0	1	1	0	1
Annual average (µg/m^3)	>12 µg/m^3[a]	NA	NA	NA	**13.3**	9.7	10.7

NOTES: **Bold** values are in excess of applicable standard. "NA" indicates that data are not available.
ppm = parts per million; µg/m^3 = micrograms per cubic meter

[a] State standard, not to be exceeded.
[b] Federal standard, not to be exceeded.
[c] Since PM_{10} is only sampled every sixth day, actual days over the standard can be estimated to be six times the number shown.

SOURCE: BAAQMD, 2005b; CARB, 2005.

Carbon Monoxide

CO is an odorless, colorless gas usually formed as the result of the incomplete combustion of fuels. The single largest source of CO is motor vehicles; the highest emissions occur during low travel speeds, stop-and-go driving, cold starts, and hard acceleration. Exposure to high concentrations of CO reduces the oxygen-carrying capacity of the blood and can cause dizziness and fatigue, impair central nervous system function, and induce angina in persons with serious heart disease (BAAQMD, 1999). Table 3.9-2 shows that no exceedances of state CO standards were recorded between 1999 and 2004. Measurements of CO show low baseline levels, with the hourly maximum averaging less than 25 percent of the more stringent state standard. Similarly, maximum 8-hour CO levels average less than 40 percent of the allowable 8-hour standard.

Suspended and Inhalable Particulate Matter (PM_{10} and $PM_{2.5}$)

Particulate matter is a class of air pollutants that consists of solid and liquid airborne particles in an extremely small size range. Particulate matter is measured in two size ranges: PM_{10} for particles less than 10 microns in diameter, and $PM_{2.5}$ for particles less than 2.5 microns in diameter. Motor vehicles generate about half of Bay Area particulates, through tailpipe emissions as well as brake pad and tire wear. Wood burning in fireplaces and stoves, industrial facilities, and ground-disturbing activities such as construction are other sources of fine particulates. Fine particulates are small enough to be inhaled into the deepest parts of the human lung can cause adverse health effects. Among the criteria pollutants that the BAAQMD regulates, particulates appear to represent the most serious overall health hazard. Studies have shown that elevated particulate levels contribute to the death of approximately 200 to 500 people per year in the Bay Area. High levels of particulates have also been known to exacerbate chronic respiratory ailments, such as bronchitis and asthma, and have been associated with increased emergency room visits and hospital admissions (BAAQMD, 1999).

Diesel exhaust is a growing concern in the Bay Area and throughout California. The CARB identified diesel engine particulate matter as a toxic air contaminant. The exhaust from diesel engines includes hundreds of different gaseous and particulate components, many of which are toxic. Many of these toxic compounds adhere to the diesel particles, which are very small and can penetrate deeply into the lungs. Diesel engine particulate matter has been identified as a human carcinogen. Mobile sources such as trucks, buses, and automobiles are some of the primary sources of diesel emissions. Studies show that diesel particulate matter concentrations are much higher near heavily traveled highways and intersections. BAAQMD analysis shows that the cancer risk from exposure to diesel exhaust is much higher than the risk associated with any other toxic air pollutant routinely measured in the region (BAAQMD, 1999).

Table 3.9-2 shows that exceedances of the state PM10 standard occur relatively infrequently in Concord. The state 24-hour PM10 standard is estimated to have been exceeded an average of 10 days per year between 1999 and 2004. The less stringent federal 24-hour PM10 standard was not exceeded at the Concord monitoring station during this period. PM10 concentrations in the Lamorinda area are expected to be similar to those measured in Concord.

In 1997, the U.S. EPA adopted a new standard for PM2.5, which represents the fine fraction of particulate matter (Table 3.9-1). California's standard went into effect in 2003. The BAAQMD initiated the Community Air Risk Evaluation program in 2004 with the goal of sampling ambient levels of diesel particulate matter; however, the results are not yet available. The BAAQMD began monitoring PM2.5 concentrations in 1999; data from the Concord station for 1999 through 2004 are presented in Table 3.9-2. The federal 24-hour PM2.5 standard was exceeded once in 2001, 2002, and 2004, for a total of three days, while the state annual average standard was exceeded in 2002.

Other Criteria Air Pollutants

The standards for NO_2, SO_2, and lead are being met in the Bay Area, and pollutant trends suggest that the air basin will continue to meet these standards for the foreseeable future.

Odors

Although odor is not generally a concern at water treatment plants, sometimes open basins associated with backwash water processing can be sources of odor. Odors can derive from organic material suspended in the water, from outgassing of dissolved gases used for disinfection, or from sludge that has been removed from the water during treatment. Other proposed WTTIP facilities would be enclosed and would handle treated water, so there would be no sources of odor.

Sensitive Receptors

Land uses such as schools, children's daycare centers, hospitals, and convalescent homes are considered to be more sensitive than the general public to poor air quality because the population groups associated with these uses have increased susceptibility to respiratory distress. Persons engaged in strenuous work or exercise also have increased sensitivity to poor air quality. Residential areas are considered more sensitive to air quality conditions than commercial and industrial areas, because people generally spend longer periods of time at their residences, resulting in greater exposure to ambient air quality conditions. Recreational uses or parks are also considered sensitive due to the greater exposure to ambient air quality conditions, and because the presence of pollution detracts from the recreational experience.

There are residential uses adjacent to or near all but three of the WTTIP facility sites (the Fay Hill Pumping Plant and Reservoir sites and the Highland Reservoir site), while a few of the proposed WTTIP facilities are adjacent to or near schools and parks. The northern portion of the Orinda WTP site is currently used as a sports field, and Wagner Ranch Elementary School is located to the north of this field. Campolindo High School is adjacent to the Moraga Road Pipeline alignment. The Highland Reservoir and Pipelines would be located within the Lafayette Reservoir Recreation Area, and the Lafayette WTP is to the north of this area (across Mt. Diablo Boulevard). The Walnut Creek WTP is located adjacent to the Acalanes Ridge Open Space. The Briones–Mt. Diablo Trail is adjacent to the Walnut Creek WTP site, while the Iron Horse Regional Trail is adjacent to the Leland Isolation Bypass Valves site.

3.9.3 Impacts and Mitigation Measures

Significance Criteria

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

- Violate any ambient air quality standard;
- Contribute substantially to an existing or projected air quality violation; or
- Expose sensitive receptors to substantial pollutant concentrations.

For construction-phase impacts, the BAAQMD recommends that significance be based on a consideration of the control measures to be implemented (BAAQMD, 1999). If appropriate mitigation measures are implemented to control PM_{10} emissions, the impact would be less than significant. The *BAAQMD CEQA Guidelines* contain a list of feasible control measures for construction-related PM_{10} emissions and include significance criteria for evaluating operational-phase emissions associated with projects. In accordance with the *BAAQMD CEQA Guidelines*, a project would have a significant effect if it would:

- Cause a new increase in pollutant emissions of ROG, NOx, or PM_{10} exceeding 80 pounds per day (lbs/day); or
- Cause violations of the state ambient air quality standards for CO of 9 ppm averaged over 8 hours and 20 ppm for 1 hour, of which the potential for a violation occurs when CO levels exceed 550 lbs/day.

Any air quality impact determined to be significant under the above-described criteria would also be considered to have a significant cumulative air quality impact (BAAQMD, 1999). However, for projects having no significant operational air quality impacts, the determination of significance of cumulative impacts is based on the consistency of the project with the host jurisdiction's general plan and with the 1997 CAP.

Table 3.9-3 summarizes the significance determinations of air quality impacts identified for each WTTIP project.

Construction Impacts

Impact 3.9-1: Short-term increases in fugitive dust (including inhalable particulates) and equipment exhaust emissions during construction activities.

Fugitive Dust Emissions

Project construction would generate fugitive dust[1] (including PM_{10} and $PM_{2.5}$) and other criteria pollutants, primarily through excavation activities, construction equipment exhaust and haul truck trips, and related construction worker commute trips. This impact would be temporary and would span the duration of construction for each project, generally one to two years depending on the project (one water treatment plant project would last for four to six years). However, construction emissions associated with implementation of the WTTIP would span 12 years (2007 to 2018).

The BAAQMD does not require quantification of construction emissions, but considers any project's construction-related impacts to be adequately mitigated if BAAQMD-recommended dust-control measures are implemented. The extent of dust-control measures required by the BAAQMD depends on the size of the project. However, because of the unique characteristics of the WTTIP —the number of individual projects, the size of some of the projects, and the overall duration of construction activities—construction-phase emissions have been quantified. The BAAQMD's PM_{10} emission factor of 51 pounds per acre per day (BAAQMD, 1999) was applied to estimated earthmoving quantities (average volume per day). Table 3.9-4 shows the estimated

1 "Fugitive" emissions generally refer to those emissions that are released to the atmosphere by some means other than through a stack or tailpipe.

TABLE 3.9-3
SUMMARY OF POTENTIAL PROJECT-LEVEL AIR QUALITY IMPACTS

	Impact 3.9-1	Impact 3.9-2	Impact 3.9-3	Impact 3.9-4	Impact 3.9-5	Impact 3.9-6
Facility	**Construction Emissions**	**Diesel Particulate Emissions Along Haul Routes**	**Tunnel-Related Emissions**	**Operational Pollutant Emissions at Treatment Facilities**	**Operational Odor Emissions**	**Secondary Emissions from Electricity Generation**
Lafayette WTP						
Alternative 1	SM	LTS	–	LTS	LTS	LTS
Alternative 2	SM	LTS	–	LTS	LTS	LTS
Orinda WTP						
Alternative 1	SM	LTS	–	LTS	LTS	LTS
Alternative 2	SM	LTS	–	LTS	LTS	LTS
Walnut Creek WTP						
Alternative 1 or 2	SM	LTS	–	LTS	LTS	LTS
Sobrante WTP						
Alternative 1 or 2	SM	LTS	–	LTS	LTS	LTS
Upper San Leandro WTP						
Alternative 1 or 2	SM	LTS	–	LTS	LTS	LTS
Orinda-Lafayette Aqueduct						
Alternative 2 only	SM	LTS	SM	–	LTS	LTS
Ardith Reservoir/ Donald Pumping Plant	SM	LTS	–	–	LTS	LTS
Fay Hill Pumping Plant and Pipeline Improvements	SM	LTS	–	–	LTS	LTS
Fay Hill Reservoir	SM	LTS	–	–	LTS	LTS
Glen Pipeline Improvements	SM	LTS	–	–	LTS	LTS
Happy Valley Pumping Plant and Pipeline	SM	LTS	–	–	LTS	LTS
Highland Reservoir and Pipelines	SM	LTS	–	–	LTS	LTS
Lafayette Reclaimed Water Pipeline	SM	LTS	–	–	LTS	LTS
Leland Isolation Pipeline and Bypass Valves	SM	LTS	–	–	LTS	LTS
Moraga Reservoir	SM	LTS	–	–	LTS	LTS
Moraga Road Pipeline	SM	LTS	–	–	LTS	LTS
Sunnyside Pumping Plant	SM	LTS	–	–	LTS	LTS
Tice Pumping Plant and Pipeline	SM	LTS	–	–	LTS	LTS
Withers Pumping Plant	SM	LTS	–	–	LTS	LTS

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

TABLE 3.9-4
CONSTRUCTION DUST EMISSIONS

WTTIP Project (Organized by Schedule)	Expected Timeframe of Construction	Cubic Yards of Earth Moved				Surface Disturbance (acres/day)	Daily Emissions PM_{10} (lb/day)
		Cut	Fill	Total Volume	Average/Day		
Moraga Road Pipeline	2007–2008	26,614	20,659	47,273	248	0.15	7.8
Walnut Creek WTP	2007–2010	4,100	400	4,500	46	0.04	1.5
Tice Pumping Plant	2008–2009	1,300	450	1,750	117	0.07	3.7
Highland Pipelines[a]	2007–2009	2,879	2,395	5,274	75	0.05	2.4
Tice Pipeline	2008–2009	743	635	1,378	41	0.03	1.3
Highland Reservoir	2007–2009	20,416	5,184	25,600	512	0.32	16.2
Leland Isolation Pipeline and Bypass Valves	2010	560	490	1,050	75	0.05	2.4
Combined Total	**2007–2010**	**55,934**	**30,053**	**85,987**	**1,124**	**1**	**35.2**
Upper San Leandro WTP	2011–2013	1,780	272	2,052	60	0.04	1.9
Happy Valley Pipeline	2011–2013	2,657	2,195	4,851	67	0.04	2.1
Glen Pipeline Improvements	2011–2012	702	580	1,282	64	0.04	2.0
Happy Valley Pumping Plant	2011–2013	0	0	0	0	0.00	0.0
Sunnyside Pumping Plant	2011–2013	0	0	0	0	0.00	0.0
Sobrante WTP[b]	2011–2013	37,047	15,464	52,511	263	0.16	8.3
Withers Pumping Plant	2011–2013	780	260	1,040	35	0.02	1.1
Lafayette WTP – Alternative 1	2012–2018	167,174	66,711	233,885	394	0.24	12.5
Lafayette WTP – Alternative 2	2015–2017	800	900	1,700	32	0.02	1.0
Orinda WTP – Alternative 1	2011–2013	15,692	3,144	18,836	292	0.18	9.2
Orinda WTP – Alternative 2	2012–2017	295,784	144,023	439,807	673	0.42	21.3
Orinda-Lafayette Tunnel – Alternative 2	2014–2017			1,024[d]	820	0.51	25.9
Orinda-Lafayette Pipeline – Alternative 2	2015–2017	26,243	21,956	48,199	240	0.15	7.6
Ardith Reservoir	2013–2015	8,500	6,400	14,900	497	0.31	15.7
Donald Pumping Plant	2013–2015	1,200	500	1,700	113	0.07	3.6
Fay Hill Pipeline	2015–2017	230	190	420	42	0.03	1.3
Fay Hill Reservoir	2015–2017	8,400	0	8,400	112	0.07	3.5
Fay Hill Pumping Plant	2015–2017	0	0	0	0	0.00	0.0
Moraga Reservoir	2016–2018	12,700	2,580	15,280	255	0.16	8.1
Combined Total – Alternative 1	**2011–2018**	**256,862**	**98,296**	**355,157**	**2,193**	**1**	**69.38**
Combined Total – Alternative 2[c]	**2011–2018**	**396,823**	**195,320**	**593,166**	**3,271**	**2**	**103.4**
WTTIP Total – Alternative 1	**2007–2018**	**313,473**	**128,508**	**441,982**	**3,306**	**2**	**104.5**
WTTIP Total – Alternative 2	**2007–2018**	**453,435**	**225,532**	**679,991**	**4,384**	**3**	**138.6**

a Earthwork activity requirements incorporate Lafayette Reclaimed Water Pipeline project.
b Approximately 10 percent less surface disturbance would occur under Alternative 2.
c Cut and fill volumes for tunnel not included.
d Daily maximum volume.

average daily earthmoving quantities associated with each WTTIP project and correlating dust emissions. Combined construction-phase average daily dust emissions were quantified for the entire WTTIP by adding average daily volumes from WTTIP projects with overlapping schedules. Estimated dust generation levels for projects evaluated at a program level of detail are also shown in Table 3.9-4.

Table 3.9-4 indicates that combined average daily PM_{10} emissions between 2007 and 2018 generated by construction of WTTIP projects would range between 36 and 103 lbs/day. Total WTTIP-related average emissions are estimated at 105 lbs/day under Alternative 1 and 139 lbs/day under Alternative 2. Since these emission estimates average total earthmoving volumes over the projected duration of the excavation and backfilling phases for most projects, actual emissions could be higher or lower on any given day, although they would be dispersed over a fairly broad geographic area. Additional unscheduled projects included in the WTTIP would contribute further to estimated dust emissions. Given the length of time that construction-related dust emissions would occur, it is appropriate to compare estimated PM_{10} emissions to the BAAQMD's operational significance criterion (80 lbs/day) for PM_{10}. This comparison indicates that combined WTTIP construction activities (i.e., the cumulative effect of the combined WTTIP projects) would have the potential to exceed the BAAQMD's significance criterion between 2011 and 2018 under Alternative 2. Since estimated combined levels for Alternative 1 would also approach this criterion, it is possible that the criterion could be exceeded on days when peak earthmoving activities occur. Therefore, implementation of the BAAQMD's standard dust control procedures (Measure 3.9-1a) will be implemented for all WTTIP projects, while enhanced dust control procedures (Measure 3.9-1b) will be implemented on projects scheduled between 2011 and 2018, where applicable.

Equipment Exhaust Emissions

Combustion emissions from construction equipment and vehicles (i.e., heavy equipment and delivery/haul trucks, worker commute vehicles, air compressors, and generators) would be generated during project construction. Emissions from construction worker commute trips would be minor compared to the emissions generated by construction equipment. Criteria pollutant emissions of ROG and NO_x from these emission sources would incrementally add to regional atmospheric loading of ozone precursors during project construction. The *BAAQMD CEQA Guidelines* recognize that construction equipment emits ozone precursors, but indicate that such emissions are included in the emission inventory that is the basis for regional air quality plans, and that construction emissions are not expected to impede the attainment or maintenance of ozone standards in the Bay Area (BAAQMD, 1999).

As indicated in Table 3.9-5, total WTTIP-related average emissions from equipment exhaust are estimated at up to 21 lbs/day for PM_{10}, 1,334 lbs/day for CO, 89 lbs/day for ROG, 410 lbs/day for NOx, and 44 lbs/day for SOx. Since these emission estimates are based on equipment usage estimates associated with average total earthmoving volumes over the projected duration of the excavation and backfilling phases for most projects, actual emissions could be higher or lower on any given day, although widely dispersed geographically. Additional unscheduled projects in the WTTIP would contribute further to these estimated emissions. Given the length of time that

TABLE 3.9-5
CONSTRUCTION EQUIPMENT EXHAUST EMISSIONS

WTTIP Component	Expected Timeframe of Construction	Cubic Yards of Earth Moved: Cut	Fill	Total Volume	Ave./Day	Emissions Associated with Earthmoving Equipment (lbs/day): PM_{10}	CO	ROG	NOx	SOx
Moraga Road Pipeline	2007–2008	26,614	20,659	47,273	248	1	75	5	23	3
Walnut Creek WTP	2007–2010	4,100	400	4,500	46	0	14	1	4	0
Tice Pumping Plant	2008–2009	1,300	450	1,750	117	1	35	2	11	1
Highland Pipelines[a]	2007–2009	2,879	2,395	5,274	75	0	23	2	7	1
Tice Pipeline	2008–2009	743	635	1,378	41	0	12	1	4	0
Highland Reservoir	2007–2009	20,416	5,184	25,600	512	2	156	10	48	5
Lacassie (Leland Isolation) Pipeline	2010	560	490	1,050	75	0	23	2	7	1
Combined Total	**2007–2010**	**55,934**	**30,053**	**85,987**	**1,124**	**5**	**342**	**23**	**105**	**11**
Upper San Leandro WTP	2011–2013	1,780	272	2,052	60	0	18	1	6	1
Happy Valley Pipeline	2011–2013	2,657	2,195	4,851	67	0	20	1	6	1
Glen Pipeline Improvements	2011–2012	702	580	1,282	64	0	20	1	6	1
Happy Valley Pumping Plant	2011–2013	0	0	0	0	0	0	0	0	0
Sunnyside Pumping Plant	2011–2013	0	0	0	0	0	0	0	0	0
Sobrante WTP[b]	2011–2013	37,047	15,464	52,511	263	1	80	5	25	3
Withers Pumping Plant	2011–2013	780	260	1,040	35	0	11	1	3	0
Lafayette WTP – Alternative 1	2012–2018	167,174	66,711	233,885	394	2	120	8	37	4
Lafayette WTP – Alternative 2	2015–2017	800	900	1,700	32	0	10	1	3	0
Orinda WTP – Alternative 1	2011–2013	15,692	3,144	18,836	292	1	89	6	27	3
Orinda WTP – Alternative 2	2012–2017	295,784	144,023	439,807	673	3	205	14	63	7
Orinda-Lafayette Tunnel – Alternative 2	2014–2017			1,024[d]	820	4	249	17	77	8
Orinda-Lafayette Pipeline – Alternative 2	2015–2017	26,243	21,956	48,199	240	1	73	5	22	2
Ardith Reservoir	2013–2015	8,500	6,400	14,900	497	2	151	10	46	5
Donald Pumping Plant	2013–2015	1,200	500	1,700	113	1	34	2	11	1
Fay Hill Pipeline	2015–2017	230	190	420	42	0	13	1	4	0
Fay Hill Reservoir	2015–2017	8,400	0	8,400	112	1	34	2	10	1
Fay Hill Pumping Plant	2015–2017	0	0	0	0	0	0	0	0	0
Moraga Reservoir	2016–2018	12,700	2,580	15,280	255	1	77	5	24	3
Combined Total – Alternative 1	**2011–2018**	**256,862**	**98,296**	**355,157**	**2,193**	**11**	**667**	**44**	**205**	**22**
Combined Total – Alternative 2[c]	**2011–2018**	**396,823**	**195,320**	**593,166**	**3,271**	**16**	**995**	**66**	**306**	**33**
Program Total – Alternative 1	**2007–2018**	**313,473**	**128,508**	**441,982**	**3,306**	**16**	**1,006**	**67**	**309**	**34**
Program Total – Alternative 2	**2007–2018**	**453,435**	**225,532**	**679,991**	**4,384**	**21**	**1,334**	**89**	**410**	**44**

[a] Earthwork activity requirements incorporate Lafayette Reclaimed Water Pipeline project.
[b] Approximately 10 percent less surface disturbance would occur under Alternative 2.
[c] Cut and fill volumes for tunnel not included.
[d] Daily maximum volume.

construction-related equipment exhaust emissions would occur, this EIR compares estimated exhaust emissions to the BAAQMD's operational significance criteria (80 lbs/day for ROG, NOx, and PM_{10}; 550 lbs/day for CO). This comparison indicates that combined WTTIP construction activities (i.e., the cumulative effect of the combined WTTIP projects) would have the potential to exceed the BAAQMD's significance criteria for CO and NOx between 2007 and 2018. Therefore, the WTTIP's combined construction-related emissions would be a significant impact, and the BAAQMD's standard emissions control measures (Measure 3.9-1c) would be implemented for all WTTIP projects constructed during this period.

Operation of diesel-powered construction equipment at all WTTIP sites could generate nuisance diesel odors at nearby receptors. Implementation of the BAAQMD's recommended emissions control measures (see Measure 3.9-1c) as part of all WTTIP projects would help minimize the potential for this nuisance problem. Measures include using line power (where feasible), restricting the idling of construction equipment, emissions controls and minimum setbacks for stationary equipment, and regular maintenance of construction equipment.

Lafayette WTP

Alternative 1

Tables 3.9-4 and 3.9-5 estimate average daily dust and exhaust emissions associated with proposed improvements at the Lafayette WTP under this alternative. As shown in the tables, this alternative would require more extensive earthmoving activities (cut and fill). Dust and exhaust emissions would occur primarily during the excavation and backfilling stages of construction (approximately 28 months of the four- to six-year construction period). This project would require extensive excavation to accommodate new treatment facilities, including two 11.8-million-gallon (mg), below-grade clearwell tanks that would be approximately 50 feet deep. Sensitive receptors in the project vicinity include residences located as close as 800 feet south of proposed facilities (300 feet from proposed pipelines) and recreational uses at the Lafayette Reservoir Recreational Area farther to the south.

Projected average daily construction emissions associated with this project alone would not exceed the above BAAQMD operational significance criteria. However, project-related construction emissions would still be considered significant because they would contribute to significant combined emissions (listed in Tables 3.9-4 and 3.9-5). The BAAQMD considers potential construction-related impacts to be mitigated to a less-than-significant level with implementation of BAAQMD-recommended dust and equipment exhaust controls. Due to the extensive nature of earthmoving activities associated with Alternative 1, Measures 3.9-1a (standard dust control), 3.9-1b (enhanced dust control), and 3.9-1c (exhaust controls), below, would be required for this project.

Alternative 2

Proposed decommissioning and facility conversion at the Lafayette WTP would require limited earthmoving activities and would therefore have a limited potential for construction-related dust and exhaust emissions. This alternative would avoid extensive earthmoving activities at the

Lafayette WTP, but would result in greater overall dust and equipment exhaust emissions in the Lamorinda area (particularly at the Orinda WTP). The BAAQMD considers potential construction-related impacts to be mitigated to a less-than-significant level with implementation of BAAQMD-recommended dust and equipment exhaust controls. Due to the limited nature of earthmoving activities associated with Alternative 2 at this facility, Measures 3.9-1a and 3.9-1c (standard dust and exhaust controls) would be adequate to reduce this impact to a less-than-significant level.

Orinda WTP

Alternative 1

As shown in Tables 3.9-4 and 3.9-5, this alternative would entail substantially less extensive earthmoving activities (cut and fill) at the Orinda WTP than at the Lafayette WTP. Dust and exhaust emissions would occur primarily during the excavation and backfilling stages of construction (approximately three months of the one- to two-year construction period). Sensitive receptors in the project vicinity include residences located as close as 170 feet west and 250 feet east of the Alternative 1 construction boundary.

Projected average daily construction emissions associated with this project alone would not exceed the above BAAQMD operational significance criteria. However, project-related construction emissions would still be considered significant because they would contribute to significant combined emissions (listed in Tables 3.9-4 and 3.9-5). The BAAQMD considers potential construction-related impacts to be mitigated to a less-than-significant level with implementation of BAAQMD-recommended dust and equipment exhaust controls. Due to the extensive nature of earthmoving activities associated with Alternative 1, Measures 3.9-1a (standard dust controls), 3.9-1b (enhanced dust controls), and 3.9-1c (exhaust controls), below, would be required for this project.

Alternative 2

This alternative would entail significantly more extensive earthmoving activities (cut and fill) at the Orinda WTP than at the Lafayette WTP. Dust and exhaust emissions would occur primarily during the excavation and backfilling stages of construction (approximately 30 months of the four- to six-year construction period). Sensitive receptors include residences located as close as 100 feet west and 300 feet east of facility locations.

Projected average daily construction emissions associated with this project alone would not exceed the above BAAQMD operational significance criteria. However, project-related construction emissions would still be considered significant because they would contribute to significant combined emissions (listed in Table 3.9-5 for 2007 to 2010). The BAAQMD considers potential construction-related impacts to be mitigated to a less-than-significant level with implementation of BAAQMD-recommended dust and equipment exhaust controls. Due to the extensive nature of earthmoving activities associated with Alternative 2, Measures 3.9-1a (standard dust controls), 3.9-1b (enhanced dust controls), and 3.9-1c (exhaust controls), below, would be required for this project.

Walnut Creek WTP – Alternative 1 or 2

As shown in Tables 3.9-4 and 3.9-5, this project would generate considerable dust and exhaust emissions, but less than would occur at the Lafayette WTP (Alternative 1) or Orinda WTP (Alternative 2). Dust and exhaust emissions would occur primarily during the excavation and backfilling stages of construction (approximately three months of the one- to two-year construction period). Sensitive receptors in the project vicinity include residences located as close as 300 feet east of proposed facilities.

Projected average daily construction emissions associated with this project alone would not exceed the BAAQMD operational significance criteria. However, project-related construction emissions would still be considered significant because they would contribute to significant combined (cumulative) emissions (listed in Table 3.9-5 for 2007 to 2010). The BAAQMD considers potential construction-related impacts to be mitigated to a less-than-significant level with implementation of BAAQMD-recommended dust and equipment exhaust controls. Due to the extensive nature of earthmoving activities associated with this project, Measures 3.9-1a (standard dust controls), 3.9-1b (enhanced dust controls), and 3.9-1c (exhaust controls), below, would be required for this project.

Sobrante WTP – Alternative 1 or 2

As shown in Tables 3.9-4 and 3.9-5, this project would generate considerable dust and exhaust emissions, but less than would occur at the Lafayette WTP (Alternative 1) or Orinda WTP (Alternative 2). Dust and exhaust emissions would occur primarily during the excavation and backfilling stages of construction (approximately eight to nine months of the one- to two-year construction period). Sensitive receptors in the project vicinity include residences located as close as 550 feet north of facilities proposed east of Valley View Road and 150 feet west of facilities proposed west of this road.

Projected average daily construction emissions associated with this project alone would not exceed the BAAQMD operational significance criteria. However, project-related construction emissions would still be considered significant because they would contribute to significant combined (cumulative) emissions (listed in Tables 3.9-4 and 3.9-5 for 2011 to 2018). The BAAQMD considers potential construction-related impacts to be mitigated to a less-than-significant level with implementation of BAAQMD-recommended dust and equipment exhaust controls. Due to the extensive nature of earthmoving activities associated with this project, Measures 3.9-1a (standard dust controls), 3.9-1b (enhanced dust controls), and 3.9-1c (exhaust controls), below, would be required for this project.

Upper San Leandro WTP – Alternative 1 or 2

As shown in Tables 3.9-4 and 3.9-5, this project would generate substantially less dust and exhaust emissions than many other WTTIP projects planned between 2011 and 2018. Dust and exhaust emissions would occur primarily during the excavation and backfilling stages of construction (approximately seven weeks of the one- to two-year construction period). Except for the proposed filter-to-waste equalization basin, proposed facilities would be constructed within buildings or in paved areas. Sensitive receptors in the vicinity of this basin include residences located as close as 170 feet to the east.

Projected average daily construction emissions associated with this project alone would not exceed the BAAQMD operational significance criteria. However, project-related construction exhaust emissions would still be considered significant because they would contribute to significant combined emissions (listed in Table 3.9-5 for 2007 to 2010). The BAAQMD considers potential construction-related impacts to be mitigated to a less-than-significant level with implementation of BAAQMD-recommended dust and equipment exhaust controls. Due to the undeveloped nature of the site and proximity to residential receptors (both alternatives), Measures 3.9-1a (standard dust controls), 3.9-1b (enhanced dust controls), and 3.9-1c (exhaust controls), below, would be required for this project.

Orinda-Lafayette Aqueduct – Alternative 2

Tunnel and pipeline construction would account for approximately one-third of the estimated dust and exhaust emissions between 2011 and 2018 (see Tables 3.9-4 and 3.9-5). Haul and material trucks would generate dust and exhaust throughout the excavation and tunnel lining phases (approximately two to three years for the tunnel and one to two years for the pipeline). Sensitive receptors are located as close as 500 feet west and east of the tunnel entrance portal in Orinda, 100 feet west of the tunnel exit portal, and 25 to 50 feet from the pipeline alignment. Bentley School is also adjacent to a portion of the pipeline alignment.

Projected average daily construction emissions associated with this project would exceed the BAAQMD operational significance criterion for NOx and would therefore be considered significant. These emissions could be increased further by operation of generators and ventilation fans at the tunnel exit shaft and the jack-and-bore pits near Bentley School. In addition, this project would contribute substantially to the combined WTTIP construction emissions (listed in Tables 3.9-4 and 3.9-5 for 2011 to 2018). The BAAQMD considers potential construction-related impacts to be mitigated to a less-than-significant level with implementation of BAAQMD-recommended dust and equipment exhaust controls. Due to the extensive nature of earthmoving activities associated with this alternative, Measures 3.9-1a (standard dust controls), 3.9-1b (enhanced dust controls), and 3.9-1c (exhaust controls), below, would be required for this project. These controls would restrict the continuous operation of diesel equipment such as generators within 100 feet of a school or residential receptor. The proposed jack-and-bore pit near Bentley School would be located at least 200 feet from the school's parking lot, 500 feet from the school's baseball field, 800 feet from the school's classroom buildings, and 200 feet or more from the closest residential receptors. Therefore, stationary equipment operation restrictions would not apply to these jack-and-bore pits.

Ardith Reservoir and Donald Pumping Plant

While these projects would generate considerable dust and exhaust emissions, they would do so only for a short period of time. Dust and exhaust emissions would occur primarily during the excavation and backfilling stages of construction (approximately nine weeks of the one- to two-year construction period). Residential uses completely surround this site and are located a minimum of 100 feet from proposed construction.

Projected average daily construction emissions associated with this site alone would not exceed the BAAQMD operational significance criteria; however, construction exhaust emissions would still be considered significant because they would contribute to significant combined emissions (listed in Tables 3.9-4 and 3.9-5 for 2011 to 2018). The BAAQMD considers potential construction-related impacts to be mitigated to a less-than-significant level with implementation of BAAQMD-recommended dust and equipment exhaust controls. Due to the extensive nature of earthmoving activities and the proximity of sensitive receptors, Measures 3.9-1a (standard dust controls), 3.9-1b (enhanced dust controls), and 3.9-1c (exhaust controls), below, would be required for these projects.

Fay Hill Pumping Plant and Pipeline Improvements

The pumping plant portion of this project would generate low dust and exhaust emissions, since no excavation is proposed and minimal concrete work would be required. However, excavation of the pipeline within Rheem Boulevard would generate relatively low levels of dust and exhaust for approximately two weeks. There are no sensitive receptors immediately adjacent to proposed facilities, although there are residential uses as close as 100 feet south of the southern end of the pipeline alignment.

Projected average daily construction emissions associated with this project alone would not exceed the BAAQMD operational significance criteria. However, project-related construction exhaust emissions would still be considered significant because they would contribute to significant combined (cumulative) emissions (listed in Tables 3.9-4 and 3.9-5 for 2011 to 2018). The BAAQMD considers potential construction-related impacts to be mitigated to a less-than-significant level with implementation of BAAQMD-recommended dust and equipment exhaust controls. Due to the limited nature of earthmoving activities associated with this project and absence of adjacent sensitive receptors, only Measures 3.9-1a (standard dust controls) and 3.9-1c (exhaust controls, EBMUD Policy 7.05 only), below, would be required for this project.

Fay Hill Reservoir

As shown in Tables 3.9-4 and 3.9-5, this project would generate less dust and exhaust than other reservoir projects, but high levels of dust and exhaust compared to other planned projects between 2014 and 2016. Dust and exhaust emissions would occur primarily during the excavation and backfilling stages of construction (approximately 15 weeks of the one-year construction period). There are no residential uses near this site, although residences are located along Rheem Boulevard, and residential projects are proposed along the lower section of the access road (off of Rheem Boulevard) and east of the reservoir site.

Projected average daily construction emissions associated with this project alone would not exceed the BAAQMD operational significance criteria. However, project-related construction exhaust emissions would still be considered significant because they would contribute to significant combined emissions (listed in Tables 3.9-4 and 3.9-5 for 2011 to 2018). The BAAQMD considers potential construction-related impacts to be mitigated to a less-than-significant level with implementation of BAAQMD-recommended dust and equipment exhaust controls. Due to the limited duration of earthmoving activities associated with this project (the site is already developed) and the absence of adjacent sensitive receptors, only Measures 3.9-1a (standard dust controls) and 3.9-1c (exhaust controls), below, would be required for this project. However, Measure 3.9-1b (enhanced controls) would also be required if residential uses are developed before the project is constructed.

Glen Pipeline Improvements

As shown in Tables 3.9-4 and 3.9-5, excavation of the pipeline would generate relatively low levels of dust and exhaust emissions for approximately 4 weeks. There are residential uses immediately adjacent to the proposed pipeline alignment.

Projected average daily construction emissions associated with this project alone would not exceed the BAAQMD operational significance criteria. However, project-related construction exhaust emissions would still be considered significant because they would contribute to significant combined emissions (listed in Tables 3.9-4 and 3.9-5 for 2011 to 2018). The BAAQMD considers potential construction-related impacts to be mitigated to a less-than-significant level with implementation of BAAQMD-recommended dust and equipment exhaust controls. Measures 3.9-1a (standard dust controls) and 3.9-1c (exhaust controls) would be required for this project.

Happy Valley Pumping Plant and Pipeline

Construction of the pumping plant portion of this project would depend on whether it is developed as a below-grade or at-grade facility. Dust and exhaust emissions would occur primarily during the site work stage of construction (approximately two weeks of the one- to two-year construction period). Excavation of the pipeline within Miner Road and Lombardy Lane would generate relatively low levels of dust and exhaust for approximately 14 weeks. Sensitive receptors along the pipeline alignment include residential uses and the Orinda Country Club Golf Course, which are located immediately adjacent to the alignment. Single-family residences are located approximately 50 feet to the east, 100 feet to the west, 150 feet to the north, and 400 feet to the south of the pumping plant site.

Projected average daily construction emissions associated with this project alone would not exceed the BAAQMD operational significance criteria. However, project-related construction exhaust emissions would still be considered significant because they would contribute to significant combined emissions (listed in Tables 3.9-4 and 3.9-5 for 2011 to 2018). The BAAQMD considers potential construction-related impacts to be mitigated to a less-than-significant level with implementation of BAAQMD-recommended dust and equipment exhaust controls. Due to the limited nature of earthmoving activities associated with this project, but the close proximity of construction to sensitive receptors, Measures 3.9-1a (standard dust controls), 3.9-1b (enhanced dust controls, pumping plant site only), and 3.9-1c (exhaust controls), below, would be required for this project.

Highland Reservoir and Pipelines (including Lafayette Reclaimed Water Pipeline)

Construction of the reservoir and pipelines would generate considerable dust and exhaust emissions—higher than any other project scheduled between 2007 and 2010. Dust and exhaust emissions would occur primarily during the excavation and backfilling stages of reservoir construction as well as during pipeline construction (approximately 10 and 14 weeks, respectively, of the one- to two-year construction period). The closest sensitive receptors to the proposed Highland Reservoir include recreationists at Lafayette Reservoir (Lakeside Trail is approximately 300 feet to the south, while the Rim Trail extends around the reservoir and is located as close as 25 feet from the reservoir) and residential uses (approximately 1,500 feet to the east, separated by topography). The pipeline alignment is located as close as 650 feet from residences, while the proposed overflow pipeline traverses both the Lakeside and Rim Trails.

Projected average daily construction emissions associated with this project alone would not exceed the BAAQMD operational significance criteria. However, project-related construction emissions would still be considered significant because they would contribute to significant combined emissions (listed in Table 3.9-5 for 2007 to 2010). The BAAQMD considers potential construction-related impacts to be mitigated to a less-than-significant level with implementation of BAAQMD-recommended dust and equipment exhaust controls. Due to the extent of earthmoving activities associated with this project, Measures 3.9-1a (standard dust controls), 3.9-1b (enhanced dust controls), and 3.9-1c (exhaust controls), below, would be required for this project.

Leland Isolation Pipeline and Bypass Valves

As shown in Tables 3.9-4 and 3.9-5, excavation of the pipeline within Lacassie Avenue would generate minimal levels of dust and exhaust emissions due to the short length of pipeline proposed, the short timeframe of the project (three weeks), and the pipeline's location in a paved street. There are no sensitive receptors in the vicinity of the proposed pipeline alignment.

Projected average daily construction emissions associated with this project alone would not exceed the BAAQMD operational significance criteria. However, project-related construction exhaust emissions would still be considered significant because they would contribute to significant combined emissions (listed in Table 3.9-5 for 2007 to 2010). The BAAQMD considers potential construction-related impacts to be mitigated to a less-than-significant level with implementation of BAAQMD-recommended dust and equipment exhaust controls. Due to the small size of the project and the limited extent of earthmoving activities, only Measures 3.9-1a (standard dust controls) and 3.9-1c (exhaust controls, EBMUD Policy 7.05 only), below, would be required for this project.

Moraga Reservoir

As shown in Tables 3.9-4 and 3.9-5, this project would generate low dust and exhaust emissions, since minimal excavation is required for proposed facilities. Proposed excavation would generate dust and exhaust emissions for approximately two months, while material deliveries associated with demolition and reservoir construction would generate exhaust emissions over six months. Residential uses completely surround this site and are located a minimum of approximately 50 feet to the east, 100 feet to the southwest, and 150 feet to the northwest and northeast.

Projected average daily construction emissions associated with this project alone would not exceed the BAAQMD operational significance criteria. However, project-related construction exhaust emissions would still be considered significant because they would contribute to significant combined emissions (listed in Tables 3.9-4 and 3.9-5 for 2011 to 2018). The BAAQMD considers potential construction-related impacts to be mitigated to a less-than-significant level with implementation of BAAQMD-recommended dust and equipment exhaust controls. Since there would be limited excavation and material deliveries over eight months (the site is already developed), but residential uses are located in proximity to proposed construction, Measures 3.9-1a (standard dust controls) and 3.9-1c (exhaust controls), below, would be required for this project.

Moraga Road Pipeline

Excavation of the pipeline within Moraga Road and through the Lafayette Reservoir Recreation Area would generate relatively moderate levels of dust and exhaust emissions for approximately 38 weeks. Sensitive receptors include residential uses, located immediately adjacent to some pipeline segments, and Campolindo High School, located immediately west of the pipeline alignment.

Projected average daily construction emissions associated with this project alone would not exceed the BAAQMD operational significance criteria. However, project-related construction exhaust emissions would still be considered significant because they would contribute to significant combined emissions (listed in Table 3.9-5 for 2007 to 2010). The BAAQMD considers potential construction-related impacts to be mitigated to a less-than-significant level with implementation of BAAQMD-recommended dust and equipment exhaust controls. Due to the extent of earthmoving activities associated with this project (a portion of pipeline would traverse undeveloped areas) and the proximity of residential and school uses, Measures 3.9-1a (standard dust controls), 3.9-1b (enhanced controls), and 3.9-1c (exhaust controls), below, would be required for this project.

Sunnyside Pumping Plant

Construction of this project would generate low dust and exhaust emissions, since no excavation is proposed and minimal concrete work would be required. Relatively low levels of material deliveries (seven per day or less) would occur for approximately six weeks over the one- to two-year construction duration. There is a single-family residence approximately 175 feet to the west, and a residence is planned on the property to the south.

Projected average daily construction emissions associated with this project alone would not exceed the BAAQMD operational significance criteria. However, project-related construction exhaust emissions would still be considered significant because they would contribute to significant combined emissions (listed in Tables 3.9-4 and 3.9-5 for 2011 to 2018). The BAAQMD considers potential construction-related impacts to be mitigated to a less-than-significant level with implementation of BAAQMD-recommended dust and equipment exhaust controls. Due to the undeveloped nature of the pumping plant site and the presence of nearby residential uses, Measures 3.9-1a (standard dust controls), 3.9-1b (enhanced dust controls) and 3.9-1c (exhaust controls), below, would be required for this project.

Tice Pumping Plant and Pipeline

Construction of the pumping plant and pipeline would generate moderate dust and exhaust emissions (see Tables 3.9-4 and 3.9-5). Dust and exhaust emissions would occur primarily during the excavation and backfilling stages of pumping plant construction (approximately three weeks of the one- to two-year construction period). Pipeline construction would occur over approximately seven weeks. There is a single-family residence located 200 feet west of the pumping plant, and residential uses immediately adjacent to the proposed pipeline alignment.

Projected average daily construction emissions associated with this project alone would not exceed the BAAQMD operational significance criteria. However, project-related construction exhaust emissions would still be considered significant because they would contribute to significant combined emissions (listed in Table 3.9-5 for 2007 to 2010). The BAAQMD considers potential construction-related impacts to be mitigated to a less-than-significant level with implementation of BAAQMD-recommended dust and equipment exhaust controls. Due to the undeveloped nature of the pumping plant site and the presence of nearby sensitive receptors, Measures 3.9-1a (standard dust controls), 3.9-1b (enhanced dust control, pumping plant site only), and 3.9-1c (exhaust controls), below, would be required for this project.

Withers Pumping Plant

Construction of this project would generate low dust and exhaust emissions, since no excavation is proposed and minimal concrete work would be required. Relatively low levels of material deliveries (seven per day or less) would occur over the 18-week construction duration. Single-family residences surround the site, approximately 150 feet to the south, 200 feet to the northeast (across Reliez Valley Road), and 300 feet to the northwest.

Projected average daily construction emissions associated with this project alone would not exceed the BAAQMD operational significance criteria. However, project-related construction exhaust emissions would still be considered significant because they would contribute to significant combined emissions (listed in Tables 3.9-4 and 3.9-5 for 2011 to 2018). The BAAQMD considers potential construction-related impacts to be mitigated to a less-than-significant level with implementation of BAAQMD-recommended dust and equipment exhaust controls. Due to the undeveloped nature of the pumping plant site and the presence of nearby sensitive receptors, Measures 3.9-1a (standard dust controls), 3.9-1b (enhanced dust controls), and 3.9-1c (exhaust controls), below, would be required for this project.

Mitigation Measures

Measure 3.9-1a: The District will incorporate into the contract specifications the following requirements:

BAAQMD Basic Control Measures

- Maintain dust control within the site and provide adequate measures to prevent a dust problem for neighbors. Use water sprinkling, temporary enclosures, and other suitable methods to limit the rising of dust and dirt. Dust control will be adequate to ensure that no visible dust clouds extend beyond the project boundaries or extend more than 50 feet from the source of any onsite project construction activities.
- Load trucks in a manner that will prevent materials or debris from dropping on streets. Trim loads and remove all material from shelf areas of vehicles to prevent spillage. Take precautions when necessary to avoid cresting dust and littering by watering the load after trimming and by promptly sweeping the pavement to remove dirt and dust.
- Cover all trucks hauling soil, sand, and other loose materials.
- Pave, apply water, or apply nontoxic soil stabilizers or rock on all unpaved access roads, parking areas, and staging areas at construction sites.
- Sweep daily with water sweepers all paved access roads, parking areas, and staging areas at construction sites.
- Sweep streets daily with water sweepers if visible soil material is carried onto adjacent public streets.

Measure 3.9-1b: The District will incorporate into the contract specifications the following requirements:

BAAQMD Enhanced Control Measures

- Hydroseed or apply nontoxic soil stabilizers to inactive construction areas (previously graded areas inactive for 10 days or more).
- Enclose, cover, water, or apply nontoxic soil binders to exposed stockpiles (dirt, sand, etc.).
- Limit traffic speeds on unpaved roads to 15 miles per hour.
- Install sandbags or other erosion control measures to prevent silt runoff to public roadways.
- Replant vegetation in disturbed areas as quickly as possible.

Measure 3.9-1c: To limit exhaust emissions, the District will incorporate into the contract specifications the following requirements:

<u>BAAQMD Exhaust Controls</u>

- Use line power instead of diesel generators at all construction sites where line power is available. Line power will be used at the tunnel entry and exit shafts for the Orinda-Lafayette Aqueduct project.

- As specified in EBMUD Policy 7.05, limit the idling of all mobile and stationary construction equipment to five minutes; as specified in Sections 2480 and 2485, Title 13, California Code of Regulations, limit the idling of all diesel-fueled commercial vehicles (weighing over 10,000 pounds, both California- or non-California-based trucks) to 30 seconds at a school or five minutes at any location. In addition, limit the use of diesel auxiliary power systems and main engines to five minutes when within 100 feet of homes or schools while driver is resting.

- For operation of any stationary, diesel-fueled, compression-ignition engines as part of construction of WTTIP facilities, comply with Section 93115, Title 17, California Code of Regulations, Airborne Toxic Control Measure for Stationary Compression Ignition Engines, which specifies fuel and fuel additive requirements as well as emission standards.

- If stationary equipment (such as generators for ventilation fans) must be operated continuously, locate such equipment at least 100 feet from homes or schools where possible.

- Require low-emissions tuneups and perform such tuneups regularly for all equipment, particularly for haul and delivery trucks. Submit a log of required tuneups to EBMUD on a quarterly basis for review.

Impact 3.9-2: Exposure of sensitive receptors to short-term increases in diesel particulates along truck haul routes during project construction.

Combustion emissions from construction equipment and vehicles (i.e., heavy equipment and delivery/haul trucks, worker commute vehicles, air compressors, and generators) would be generated during project construction. Diesel trucks would be used to transport excavated materials from WTTIP facility sites. Emissions from construction worker commute trips would be minor compared to the emissions generated by construction equipment. Construction emissions would result in an increase in $PM_{2.5}$ emissions in addition to PM_{10} and ozone precursors. $PM_{2.5}$ emissions would mainly result from diesel exhaust particulate matter (DPM) emitted by vehicles and equipment. Excavation, grading, and other soil-disturbance particulates are normally larger in diameter. Diesel exhaust particulates contain substances that are suspected carcinogens. Diesel exhaust contains both pulmonary irritants and hazardous compounds that may affect sensitive receptors such as young children, senior citizens, or those susceptible to respiratory disease.

In 2000, the CARB approved a comprehensive *Diesel Risk Reduction Plan* to reduce diesel emissions from both new and existing diesel-fueled engines. The plan focuses on reducing emissions through new standards and retrofitting and on reducing the sulfur content of diesel fuel to enable the use of advanced DPM emission controls. The plan's goals are to achieve a 75 percent reduction in DPM by 2010 and an 85 percent reduction by 2020 (from the 2000 baseline). While many of the new regulations are source-based controls, in 2005 the CARB approved a regulatory measure to reduce emissions of toxic and criteria pollutants by limiting the idling of new heavy-duty diesel vehicles. The BAAQMD also encourages the consideration of available measures to reduce public exposure.

WTTIP implementation would generate varying levels of truck traffic on local streets in the Lamorinda area, and many of these streets have adjacent residential uses. Wagner Ranch Elementary School is adjacent to the ballfields where Orinda WTP facilities are proposed, while Campolindo High School is adjacent to the Moraga Road Pipeline alignment. Table 3.9-6 lists estimated maximum daily and hourly truck volumes that could occur along haul routes on any given day for each project.

The BAAQMD does not yet have a methodology for estimating impacts from diesel exhaust or determining the significance of a project's contribution. However, EBMUD conducted a DPM air study (URS Corporation, 2004) during construction activities at the Walnut Creek WTP. There was only one access route for haul trucks. DPM was measured at five locations (upwind, downwind, and background) to evaluate whether truck traffic along the haul route generated unhealthful DPM levels.

DPM samples were collected on two separate days; DPM levels, measured as elemental carbon, ranged from below detectable levels (laboratory reporting limit of 0.63 micrograms per square meter [$\mu g/m^3$]) in upwind samples to 1.5 to 2.59 $\mu g/m^3$ in downwind samples most affected by construction-related traffic. There were 82 haul truck trips on the corresponding sampling day, and no haul truck trips on the second sampling day. A comparison of data collected on two sampling days (with and without haul truck traffic) indicated a small difference in DPM concentrations (within 1 $\mu g/m^3$).

Measured levels were well below the federal maximum 24-hour $PM_{2.5}$ standard of 65 $\mu g/m^3$; however, measured levels are not strictly comparable, since this is a general particulate standard and since DPM samples were collected simultaneously over a nine-hour period (7 a.m. to 4 p.m.) when project construction traffic occurred. A more comparable standard for DPM may be the American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV) for DPM measured as elemental carbon. This TLV is defined as the level of exposure that the typical worker can experience over an extended period without an unreasonable risk of disease or injury. The ACGIH TLV for DPM is set a 20 $\mu g/m^3$.

This study determined that ambient concentrations of DPM in the vicinity of the Walnut Creek WTP were well below the ACGIH TLV level set for the protection of human health. Maximum downwind concentrations (with 84 one-way truck trips) were more than seven times lower than the ACGIH TLV. Based on the results of this study, it is estimated that up to 600 one-way truck trips per day could occur along a given haul route without causing an exceedance of the ACGIH TLV.

TABLE 3.9-6
MAXIMUM ONE-WAY TRUCK TRIPS BY PROJECT

WTTIP Component	Expected Timeframe of Construction	Maximum One-Way Truck Trips	
		Daily	Hourly
Projects Scheduled for 2007 to 2010			
Moraga Road Pipeline	2007–2008	76	10
Walnut Creek WTP	2007–2010	24	4
Tice Pumping Plant	2008–2009	76	10
Highland Pipeline/Lafayette Reclaimed Water Pipeline	2007–2009	34	4
Tice Pipeline	2008–2009	36	4
Highland Reservoir	2007–2009	168	24
Leland Isolation Pipeline	2010	24	3
Combined Total	**2007–2010**	**438**	**59**
Projects Scheduled for 2011 to 2018			
Upper San Leandro WTP	2011–2013	72	10
Happy Valley Pipeline	2011–2013	22	3
Glen Pipeline Improvements	2011–2012	11	3
Happy Valley Pumping Plant	2011–2013	14	2
Sunnyside Pumping Plant	2011–2013	14	2
Sobrante WTP (Alternative 1 or 2)	2011–2013	72	10
Withers Pumping Plant	2011–2013	98	12
Alternative 1			
▪ Lafayette WTP	2012–2018	72	12
▪ Orinda WTP	2011–2013	72	10
Alternative 2			
▪ Lafayette WTP	2015–2017	12	2
▪ Orinda WTP	2012–2017	144	21
▪ Orinda-Lafayette Aqueduct (Tunnel)	2014–2017	158	16
▪ Orinda-Lafayette Aqueduct (Pipeline)	2015–2017	84	10
Ardith Reservoir	2013–2015	168	24
Donald Pumping Plant	2013–2015	76	10
Fay Hill Pipeline	2015–2017	22	3
Fay Hill Reservoir	2015–2017	232	24
Fay Hill Pumping Plant	2015–2017	6	1
Moraga Reservoir	2016–2018	168	24
Combined Total – Alternative 1	2011–2012	**447**	**64**
Combined Total – Alternative 2	2011–2012	**447**	**63**
Combined Total – Alternative 1	2013–2014	**316**	**46**
Combined Total – Alternative 2	2013–2014	**546**	**71**
Combined Total – Alternative 1	2015–2018	**500**	**64**
Combined Total – Alternative 2	2015–2018	**826**	**101**
PROGRAM TOTAL – Alternative 1	2007–2018	**1,557**	**209**
PROGRAM TOTAL – Alternative 2	2007–2018	**1,799**	**234**

SOURCE: Table compiled by Orion Environmental Associates.

As Table 3.9-6 indicates, none of the maximum truck trip estimates for an individual WTTIP project would exceed 600 vehicles per day. When overlapping project schedules are considered (listed as “combined totals” in Table 3.9-6), the maximum combined truck trip estimate for both alternatives could exceed 600 vehicles per day between 2015 and 2018. When daily volumes are added for any given year under both alternatives, combined volumes range between 316 and 546 trips per day, with one exception. Daily combined volumes between 2015 and 2018 under Alternative 2 could exceed the 600 vehicles per day threshold. However, in order for such combined volumes to occur, the construction phases generating maximum haul and material trucks would have to occur at the same time and trucks associated with all the projects within those timeframes would have to use the same haul route, which is highly unlikely for this number of projects.

Most likely, projects scheduled during this three-year period would be in different construction phases on any given day, and therefore peak truck volumes would not occur at the same time. In addition, haul routes would be different (e.g., haul routes for most Alternative 2 projects would be on roads north of Highway 24, while haul routes for the Fay Hill and Moraga projects would be on roads south of Highway 24). On the basis of the DPM study for the Walnut Creek WTP and the maximum daily truck trip estimates prepared for the WTTIP, the ACGIH TLV for diesel is not expected to be exceeded along haul routes. In any event, when determining haul routes for each WTTIP project, EBMUD will consider all other scheduled WTTIP projects in the area that would use this route and will coordinate project schedules to ensure that the combined daily truck volume does not exceed 600 trips per day. Therefore, the impact is not considered significant, and no mitigation is necessary.

Impact 3.9-3: Air pollutant emissions from ventilation fans.

Methane gas could be encountered during proposed tunneling. Methane and hydrogen sulfide gases are generated by anaerobic processes associated with the decomposition of organic material. Methane is odorless and therefore is not expected to generate nuisance odor problems. However, if hydrogen sulfide gas is encountered, it could cause nuisance odor problems at nearby receptors. Diesel exhaust odors would be generated by tunnel boring equipment as well as the muck train and would be released into the atmosphere through the tunnel ventilation system. Calculated dispersion rates from the vent to the property boundary would be greater than 10-fold, which would reduce the potential for nuisance odors. In addition, exposure of the nearby residential receptors to these gases is expected to be less than significant, since Occupational Health and Safety Administration standards would limit the levels of these gases within the tunnel for worker safety. Dispersion into the atmosphere from the tunnel ventilation system would reduce levels by more than 10-fold, ensuring that receptor exposure would be well below levels occurring within the tunnel.

If ultramafic rock deposits are encountered during tunneling, there would be a potential for asbestos (chrysotile) emissions from the tunnel ventilation system. However, geologic mapping indicates a low potential for encountering such rock along the tunnel alignment. Therefore, this alternative would not pose health hazards associated with the release of asbestos.

Mitigation Measure

> **Measure 3.9-3:** For any projects that would require a tunnel ventilation system, if hydrogen sulfide gas or any other odorous gases are encountered during tunnel excavation and become a nuisance odor problem (including diesel exhaust), water scrubbers will be added to the ventilation system and appropriate chemicals will be added to remove the nuisance odors.

Table 3.9-7 provides an overview of mitigation measures by WTTIP project for Impacts 3.9-1 and 3.9-3, above.

Operational Impacts

Impact 3.9-4: Long-term increases in criteria pollutants during operation of upgraded treatment facilities.

Water treatment facilities are not generally associated with "traditional" air pollution emissions, such as pollutants with state and federal standards, or those that might cause a localized nuisance due to odors, fumes, mist, etc. (Section 3.11, Hazards and Hazardous Materials, evaluates the potential for accidental release of treatment chemicals). The proposed modifications to treatment processes at WTTIP treatment facilities would result in minimal increases in air emissions, as described below. Other WTTIP pumping plant, reservoir, pipeline, chemical feed, and electrical facilities would be closed systems with no associated criteria pollutant emissions.

Operation of the project would also result in a nominal increase in the number of employee trips per day, but such minimal increases in traffic would have a less-than-significant impact on local and regional air quality.

Lafayette WTP

Alternative 1

The only proposed project improvement that has the potential to generate criteria pollutants would be the addition of a new 500-kilowatt, diesel-fueled emergency generator to serve proposed WTP facilities. The proposed generator would supplement the existing emergency generator at this facility and would be located adjacent to the proposed electrical substation. Like the existing generator, the proposed generator would be used infrequently (only during power outages and for periodic testing during the day). The proposed addition of the emergency generator would be subject to BAAQMD review and would require BAAQMD permitting before construction could occur. The permit review process would ensure that air emissions associated with the facility comply with applicable federal and state standards, and therefore the impact on air quality would be less than significant.

TABLE 3.9-7
SUMMARY OF APPLICABLE MITIGATION MEASURES – IMPACTS 3.9-1 AND 3.9-3

Facility	Measure 3.9-1a BAAQMD Standard Dust Control Measures	Measure 3.9-1b BAAQMD Enhanced Dust Control Measures[a]	Measure 3.9-1c BAAQMD Exhaust Controls	Measure 3.9-3 Tunnel Emissions Controls
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	✓	–	✓[b]	–
Fay Hill Reservoir	✓	✓[c]	✓	–
Glen Pipeline Improvements	✓	–	✓	–
Happy Valley Pumping Plant and Pipeline	✓	✓	✓	–
Highland Reservoir and Pipelines	✓	✓	✓	–
Lafayette Reclaimed Water Pipeline	✓	✓	✓	–
Leland Isolation Pipeline and Bypass Valves	✓	–	✓[b]	–
Moraga Reservoir	✓	–	✓	–
Moraga Road Pipeline	✓	✓	✓	–
Sunnyside Pumping Plant	✓	✓	✓	–
Tice Pumping Plant and Pipeline	✓	✓	✓	–
Withers Pumping Plant	✓	✓	✓	–

a These measures would apply only to projects where soils are stockpiled, construction equipment/trucks travel on unpaved roads, site runoff drains to a public roadway, or disturbed areas would remain unpaved.
b Under this measure, only EBMUD Policy 7.05 would be required for this project.
c Required if residential uses are developed before the project is constructed.

✓ = Applicable Impact
– = No Impact

Alternative 2

No increase in criteria pollutant emissions would occur as a result of proposed project- or program-level improvements under this alternative.

Orinda WTP – Alternative 1 or 2

The only proposed project improvement that has the potential to generate criteria pollutants would be the addition of a new 200-kilowatt, diesel-fueled emergency generator to serve proposed WTP facilities. The proposed generator would be located adjacent to the proposed backwash water recycle system building and the proposed electrical substation and would supplement the existing emergency generator located at this facility. Like the existing generator, the proposed generator would be used infrequently (only during power outages and for brief periodic testing during the day [typically once per month]). The proposed addition of an emergency generator would be subject to BAAQMD review and would require BAAQMD permitting before construction could occur. The permit review process would ensure that air emissions associated with the facility comply with applicable federal and state standards, and therefore the impact on air quality would be less than significant.

Walnut Creek WTP – Alternative 1 or 2

No increase in criteria pollutant emissions would occur as a result of proposed project improvements.

Sobrante WTP – Alternative 1 or 2

The only proposed improvement at this facility that has the potential to generate criteria pollutants would be the new ozone destruct system. New ozonation systems would be constructed within existing buildings on the main part of this site (east of Valley View Road). Liquid oxygen is proposed to be used at this facility and would be transported by truck and stored in above-ground tanks in the northeastern portion of the facility site. Ozone production via high-voltage electrical discharge would occur in a sealed system with no atmospheric release. The only atmospheric pathway for any emissions would be through a small vent on the ozone destruct unit. Residual ozone in the destruct unit vent is currently in the sub-parts-per-million range, and emissions from the new system would be similar to the existing system. Dilution with the free atmosphere typically reduces the destruct unit exhaust to undetectable levels within 100 feet from the unit. The proposed ozone destruct system would be located at least 600 feet from existing residences to the west, and 900 or more feet from homes to the east and north. Air pollution emissions associated with ozonation systems are expected to be less than significant at the closest residential receptors.

Any modified air emission sources and water treatment processes (such as ozonation) would be subject to BAAQMD review and could require BAAQMD permitting before construction could occur. The permit review process would ensure that air emissions associated with the facility comply with applicable federal and state standards.

Upper San Leandro WTP – Alternative 1 or 2

As with the Sobrante WTP, the only proposed improvement at this facility that has the potential to generate criteria pollutants would be the new ozone destruct system. New ozonation systems would be constructed within existing buildings. Liquid oxygen is proposed to be used at this facility and would be stored in above-ground tanks in the southern portion of the facility site. As described for the Sobrante WTP, residual ozone would be emitted from the ozone destruct unit vent and would be at undetectable levels within 100 feet from the unit. The proposed ozone destruct system would replace the existing ozone destruct system, which is located within a building that is approximately 50 to 150 feet southeast of existing residences. The vent location would not change, and system emissions are expected to remain generally the same with the proposed project. However, any modified air emission sources and water treatment processes (such as ozonation) would be subject to BAAQMD review and could require revision of the existing BAAQMD permit before construction could occur. The permit review process would ensure that air emissions associated with the facility comply with applicable federal and state standards, and therefore the impact on air quality would be less than significant.

Impact 3.9-5: Generation of odors during operation of project facilities.

Nuisance odor problems are not expected to result from operation of the proposed WTTIP water facilities due to the low biological content (and consequent anaerobic activity) in the water as well as the enclosed nature of most proposed facilities. With the exception of filters and some basins at water treatment facilities, existing treatment, conveyance, and storage facilities are enclosed.

Filters at water treatment facilities are not typically a source of odors; odors associated with anaerobic activity do not occur since the water is aerated. Therefore, proposed upgrade/expansion of filters under Alternative 1 at the Lafayette and Walnut Creek WTPs is not expected to increase the potential for nuisance odors.

Implementation of the WTTIP would result in the relocation of existing flocculation/ sedimentation basins at the Lafayette WTP (Alternative 1) and Orinda WTP (both alternatives). The existing basins are currently a minor source of odors, and the potential for nuisance odors is not expected to change significantly with the proposed minor relocation of these basins within the WTP facility sites.

Impact 3.9-6: Secondary emissions at power plants due to the generation of electricity to operate pumps and other facilities, and short-term increases in criteria air pollutants during power outages requiring the use of emergency generators.

Construction of the WTTIP facilities would result in an irretrievable and irreversible commitment of natural resources through direct consumption of fossil fuels and use of materials. That commitment of resources would end when construction is completed. Over the long term, the WTTIP would result in an increase in emissions primarily through energy consumption. Operation of new or expanded facilities (both project- and program-level projects) at water treatment facilities and pumping plants would result in secondary emissions associated with electricity generation. Electricity generation related to fossil-fuel combustion generates air pollutants. However, approximately 30 percent of PG&E's electricity is derived from renewable energy resources, and PG&E plans to increase this amount by 8 percent by 2010. In addition, power generation and transmission within the PG&E service area is part of the regional power grid (controlled the California Independent System Operator). Since emissions associated with power generation are regional in nature and could occur outside the air basin or outside California, the project's incremental increase in operational power demand is not expected to create a significant secondary air quality impact within the air basin.

To help reduce future energy demand, EBMUD actively seeks to minimize fossil fuel use through its renewable energy program. EBMUD operates two hydroelectric power plants in the Sierra Nevada foothills and also implemented a 30-kilowatt solar photovoltaic project in Oakland. Projects being planned by EBMUD include a 420-kilowatt solar photovoltaic facility at the Sobrante WTP.

Program-Level Elements

Lafayette WTP

Operation of heavy equipment during construction of proposed program facilities at the Lafayette WTP would generate dust and exhaust emissions, primarily during earthmoving activities. Earthmoving activities for the Walter Costa Trail and relocation would likely be minimal. The closest sensitive receptors are private residences approximately 500 feet to the south. The BAAQMD considers potential construction-related impacts to be mitigated to a less-than-significant level with implementation of BAAQMD-recommended dust and equipment exhaust controls. Measures similar to Measures 3.9-1a (standard dust control) and 3.9-1c (exhaust controls), described above for project-level elements, would be required for this program-level project. Measures similar to Measure 3.9-1b (enhanced dust control), above, could be required depending on the extent of earthmoving activities for certain facilities (e.g., high-rate sedimentation units).

Orinda WTP

Operation of heavy equipment during construction of proposed program-level facilities would generate dust and exhaust emissions. Dust and exhaust emissions (including diesel particulate matter) would occur primarily during earthmoving activities, which would generally be extensive when clearwells are constructed. Sensitive receptors in the vicinity of these projects include private residences approximately 200 feet to the west and 300 feet to the east of proposed facilities under both alternatives. In addition, the southern boundary of Wagner Ranch Elementary School is approximately 15 feet north of the northernmost clearwell under both alternatives. Since the proposed clearwell would be located adjacent to a school, construction-related truck operations could be subject to idling limits (EBMUD Policy 7.05, as specified in Measure 3.9-1c) to maintain acceptable diesel particulate matter levels at this school. The BAAQMD considers potential construction-related impacts to be mitigated to a less-than-significant level with implementation of BAAQMD-recommended dust and equipment exhaust controls. Due to the extensive nature of earthmoving activities that would likely be associated with clearwell excavation, measures similar to Measures 3.9-1a (standard dust control), 3.9-1b (enhanced dust control), and 3.9-1c (exhaust controls), described above for project-level elements, would be required for this program-level project under either alternative.

Walnut Creek WTP

Program-level improvements would include the addition of high-rate sedimentation units, post-filtration UV treatment, and ozonation systems by 2022. Air pollution emissions associated with ozonation systems are expected to be minimal. Pure oxygen would likely be transported onsite by large tanker trucks. Ozone production via high-voltage electrical discharge would occur in a sealed system with no atmospheric release. The only atmospheric pathway for emissions would be a small vent on the ozone destruct unit. Residual ozone in the destruct unit vent is in the sub-parts-per-million range. Dilution with the free atmosphere typically reduces the destruct unit exhaust to undetectable levels within 100 feet of the unit.[2] The ozone destruct system would likely be located at least 300 feet from existing residences to the east. Therefore, air pollution emissions associated with ozonation systems are expected to be less than significant at the closest residential receptors.

Leland Reservoir Replacement

Operation of heavy equipment during demolition and construction of the proposed reservoir would generate dust and exhaust emissions, primarily during earthmoving activities. Sensitive receptors include residential uses as close as 120 feet to the west and 400 feet to the east (across Leland Drive). White Pony-Meher Elementary School is immediately to the south, with the classroom building approximately 150 feet from the reservoir. The BAAQMD considers potential construction-related impacts to be mitigated to a less-than-significant level with implementation of BAAQMD-recommended dust and equipment exhaust controls. Given the site’s proximity to sensitive receptors, measures similar to Measures 3.9-1a (standard dust control), 3.9-1b

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[2] Based on the design specifications for other destruct units, the allowable ozone emission concentration is typically less than 0.35 ppm. Calculated dispersion rates from the rooftop vent to the fenceline would be greater than 10-fold. Therefore, fenceline ozone concentrations would be less than 0.035 ppm, which is below the ambient level.

(enhanced dust control), and 3.9-1c (exhaust controls), described above for the project-level elements, would likely be required for this program-level project.

New Leland Pressure Zone Reservoir and Pipeline

Operation of heavy equipment during demolition and construction of the proposed reservoir and pipeline would generate dust and exhaust emissions, primarily during earthmoving activities. Sensitive receptors include residential uses as close as 200 feet to the north and 60 feet to the east of proposed grading limits for the reservoir. Residential uses are also located in proximity to the pipeline alignments west of Danville Boulevard. The BAAQMD considers potential construction-related impacts to be mitigated to a less-than-significant level with implementation of BAAQMD-recommended dust and equipment exhaust controls. Given the site's proximity to sensitive receptors and the extensive earthmoving activities that could be required, measures similar to Measures 3.9-1a (standard dust control), 3.9-1b (enhanced dust control), and 3.9-1c (exhaust controls), described above for the project-level elements, would likely be required for this program-level project.

St. Mary's Road/Rohrer Drive Pipeline

Operation of heavy equipment during construction of the proposed replacement pipeline extension would generate dust and exhaust emissions. Dust and exhaust emissions would occur primarily during excavation and backfilling activities. Residential uses are located immediately adjacent to the road along some sections of the proposed pipeline alignment. St. Mary's College is adjacent to the alignment, although the campus is set back from the road. Campolindo High School is also located near to the pipeline alignment. The BAAQMD considers potential construction-related impacts to be mitigated to a less-than-significant level with implementation of BAAQMD-recommended dust and equipment exhaust controls. Measures similar to Measures 3.9-1a (standard dust control) and 3.9-1c (exhaust controls), described above for project-level elements, would be required for this program-level project. A measure similar to Measure 3.9-1b (enhanced dust control), above, could be required depending on the extent of earthmoving activities.

San Pablo Pipeline

Operation of heavy equipment during construction of the proposed pipeline would generate dust and exhaust emissions, primarily during excavation and backfilling activities. Most of the proposed alignment crosses undeveloped lands adjacent to San Pablo Reservoir and Tilden Park. However, the north and south ends would be adjacent to or near residential uses. Wagner Ranch Elementary School in Orinda is located east of the pipeline alignment. The BAAQMD considers potential construction-related impacts to be mitigated to a less-than-significant level with implementation of BAAQMD-recommended dust and equipment exhaust controls. Measures similar to Measures 3.9-1a (standard dust control) and 3.9-1c (exhaust controls), described above for project-level elements, would likely be required for this program-level project. A measure similar to Measure 3.9-1b (enhanced dust control), above, could be required depending on the extent of earthmoving activities.

References – Air Quality

Bay Area Air Quality Management District (BAAQMD), *BAAQMD CEQA Guidelines*, *Assessing the Air Quality Impacts of Projects and Plans*, revised, December 1999.

______, Ambient Air Quality Standards & Bay Area Attainment Status, available online at http://www.baaqmd.gov/pln/air_quality/ambient_air_quality.htm, December 2005a.

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California Air Resources Board (CARB), California Ambient Air Quality Data, 2005, PTSD-05-020-CD, available online at http://www.arb.ca.gov/aqd/aqdcd/aqdcddld.htm, 2005.

URS Corporation, *Diesel Particulate Matter Air Study*, *Walnut Creek Water Treatment Plant*, Walnut Creek, California, October 22, 2004.

3.10 Noise and Vibration

3.10.1 Approach to Analysis

This analysis uses two approaches to evaluate temporary construction-phase noise impacts. To evaluate short-term effects of noise peaks, typical construction equipment noise levels were used to estimate corresponding noise levels at the nearest residences. These estimates were then compared against a speech interference criterion. For projects where construction activities would occur at varying levels 24 hours per day and seven days per week, the analysis also evaluates the consistency of construction-related noise with the daytime and nighttime noise ordinance limits and compares them to the speech interference criterion. Noise measurements were taken in various neighborhoods in order to characterize ambient noise. Measurements were also taken at two existing pump stations to characterize the representative noise generation potential of such facilities. The terms defined below are used throughout this section.

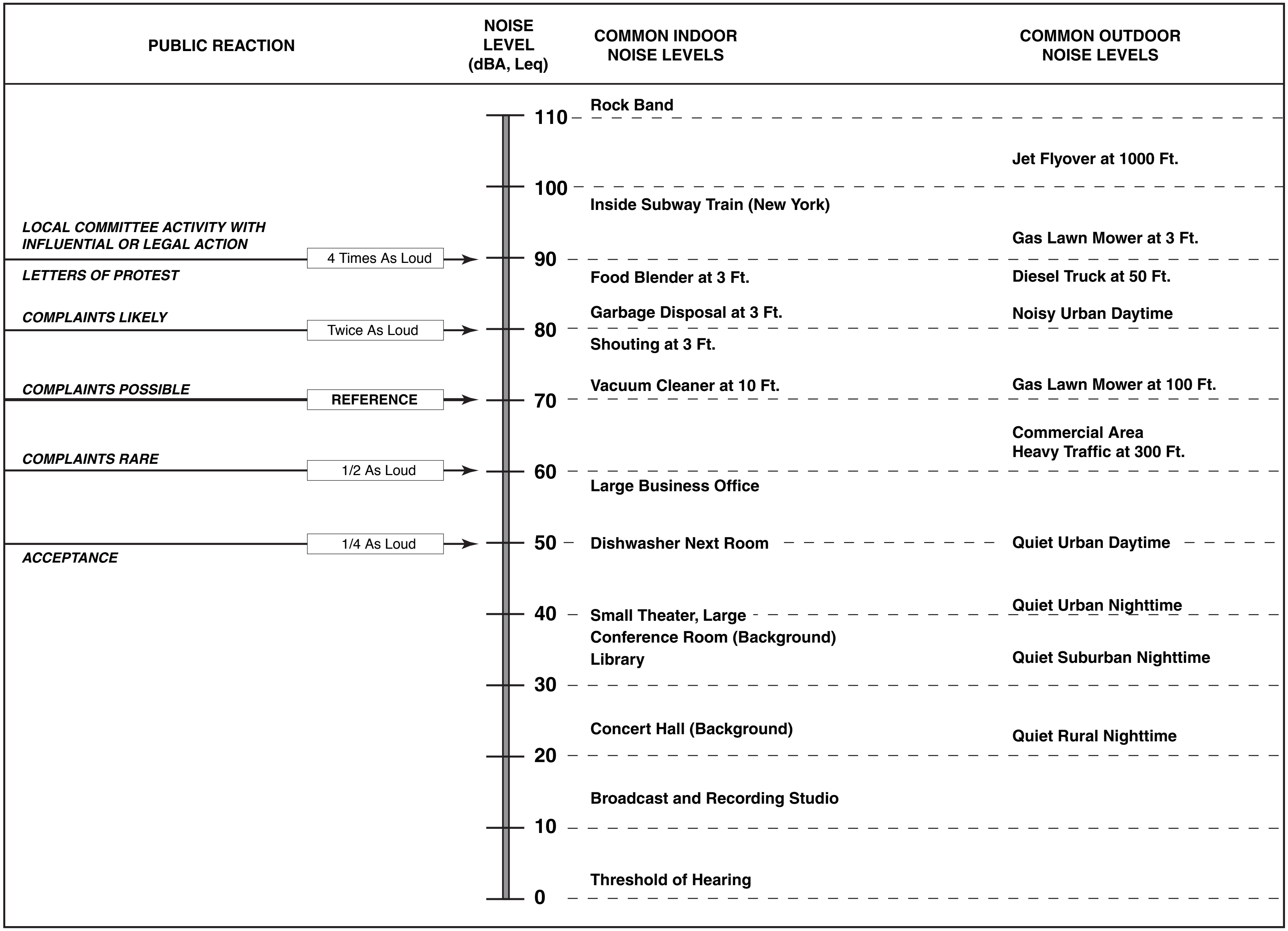
Noise Descriptors

dB, dBA

Sound is characterized by various parameters that describe the rate of oscillation of sound waves, the distance between successive troughs or crests, the speed of propagation, and the pressure level or energy content of a given sound. The sound pressure level has become the most common descriptor used to characterize the loudness of an ambient sound. The decibel (dB) scale is used to quantify sound intensity. Because sound can vary in intensity by over one million times within the range of human hearing, a logarithmic loudness scale is used to keep sound intensity numbers at a convenient and manageable level. Since the human ear is not equally sensitive to all sound frequencies within the entire spectrum, human response is factored into sound descriptions in a process called “A-weighting,” expressed as “dBA.” The dBA, or A-weighted decibel, refers to a scale of noise measurement that approximates the range of sensitivity of the human ear to sounds of different frequencies. On this scale, the normal range of human hearing extends from about 0 dBA to about 140 dBA. A 10-dBA increase in the level of a continuous noise represents a perceived doubling of loudness. The noise levels presented herein are expressed in terms of dBA, unless otherwise indicated. Figure 3.10-1 shows some representative noise sources and their corresponding noise levels in dBA.

Leq, CNEL, Ldn

Time variations in noise exposure are typically expressed in terms of a steady-state energy level (called Leq) that represents the acoustical energy of a given measurement. Leq (24) is the steady-state energy level measured over a 24-hour period. L_{10} is the noise level that is exceeded 10 percent of the measurement period. Lmax refers to peak noise levels. Because community receptors are more sensitive to unwanted noise intrusion during the evening and at night, state law requires that, for planning purposes, an artificial dBA increment be added to “quiet time” noise levels to form a 24-hour noise descriptor called the Community Noise Equivalent Level (CNEL). CNEL adds a 5-dBA “penalty” during the evening hours (7:00 p.m. to 10:00 p.m.) and a 10-dBA



SOURCE: Caltrans Transportation Laboratory Noise Manual, 1982; and Modification by Environmental Science Associates

Figure 3.10-1
Noise Sources and Effects on People

penalty during the night hours (10:00 p.m. to 7:00 a.m.). Another 24-hour noise descriptor, called the day-night noise level (Ldn), is similar to CNEL. While both add a 10-dBA penalty to all nighttime noise events between 10:00 p.m. and 7:00 a.m., Ldn does not add the evening 5-dBA penalty. In practice, Ldn and CNEL usually differ by less than 1 dBA at any given location for transportation noise sources.

Vibration

Vibrations caused by construction activities can be interpreted as energy transmitted in waves through the soil mass. These energy waves generally dissipate with distance from the vibration source (e.g., pile driving or sheetpile driving). Since energy is lost during the transfer of energy from one particle to another, vibration that is distant from a source is usually less perceptible than vibration closer to the source. However, actual human and structure response to different vibration levels is influenced by a combination of factors, including soil type, distance between source and receptor, duration, and the number of perceived events.

If great enough, the energy transmitted through the ground as vibration can result in structural damage. To assess the potential for structural damage associated with vibration, the vibratory ground motion in the vicinity of the affected structure is measured in terms of peak particle velocity (PPV) in the vertical and horizontal directions (vector sum), typically in units of inches per second (in/sec). A freight train passing at 100 feet can cause vibrations of 0.1 in/sec PPV, while a strong earthquake can produce vibration in the range of 10 in/sec PPV.

3.10.2 Setting

Regulatory Framework

Local noise issues are addressed by assessing consistency with applicable noise ordinance standards or general plan guidelines (if there is no noise ordinance). Noise ordinances regulate such sources as mechanical equipment and amplified sounds as well as prescribe hours of heavy equipment operation. Although ordinances do not strictly apply to EBMUD projects, it is the practice of EBMUD to work with host jurisdictions and neighboring communities during project planning and to conform to local environmental protection policies to the extent possible. For this project, noise regulations and standards of Orinda, Lafayette, Moraga, Walnut Creek, Oakland, or Contra Costa County would apply to proposed facilities. Noise ordinance standards that are relevant to the construction of WTTIP facilities are incorporated into the significance criteria and summarized in Table 3.10-1.

Existing Noise Environment and Sensitive Receptors

Human response to noise varies from individual to individual and depends on the ambient environment in which the noise is perceived. The same noise that would be highly intrusive to a sleeping person or in a quiet park might be barely perceptible at an athletic event or in the middle of a freeway at rush hour. Effects of noise at various levels can include interference with sleep, concentration, and communication; physiological and psychological stress; and hearing loss. Given

TABLE 3.10-1
APPLICABLE ORDINANCE TIME LIMITS AND NOISE STANDARDS

	Construction Time Limits			Ordinance Noise Limits for Various Activities in Single-Family Residential Zones (dBA)	
				Day (Leq)	Night (Leq)
Jurisdiction	**Weekdays**	**Saturdays**	**Sundays and Holidays**	**7 a.m. to 10 p.m.**	**10 p.m. to 7 a.m.**
Orinda[a]	8 a.m. to 6 p.m.	10 a.m. to 5 p.m.	Not Allowed	60 (Ldn)	55
Lafayette[b]	Allowed 8 a.m. to 8 p.m. if <83 dBA at 50 feet or 80 dBA at affected property	Same as weekday limits	Allowed 10 a.m. to 6 p.m. if <83 dBA at 50 feet or 80 dBA at affected property	58	53
Moraga[c]	8 a.m. to 5 p.m.	–	–	–	–
Walnut Creek[d]	7 a.m. to 6 p.m.	City permit required	City permit required	Increase of 3 dBA or more	
Contra Costa County[e]	Daytime work hours	–	–	–	–
Oakland[f]	7 a.m. to 7 p.m. with 80 dBA limit for <10 days and 65 dBA limit for >10 days	9 a.m. to 8 p.m. with 65 dBA limit for <10 days and 55 dBA limit for >10 days	9 a.m. to 8 p.m. with 65 dBA limit for <10 days and 55 dBA limit for >10 days	68	53

– not specified

[a] Time Limits: Orinda Municipal Code, Chapter 17.39.3 specifies construction time limits. Operation of heavy construction equipment is not allowed on Saturdays or Sundays. Noise Limits: To account for duration and timing, the Orinda Municipal Code, Chapter 17.15.2, stipulates a noise limit of 60 dBA (Ldn) in residential districts. The ordinance further reduces noise levels by 5 dB between 10 p.m. and 7 a.m. relative to the 60 Ldn. The ordinance suggests that the energy-averaged sound level between 10 p.m. and 7 a.m. should be 55 dBA. Noise that is produced for cumulative periods of no more than 5 minutes and 1 minute in any hour may exceed the standards by 5 dB and 10 dB, respectively. Presumably, these noise levels would be limited to 65 and 70 dBA, respectively. Construction activities are exempt from the daytime limits if they occur during specified construction time limits (Shunitzer, 2006). Title 17, Section 17.39.9 of Orinda Municipal Code specifies a maximum noise level of 45 dBA for mechanical equipment which is permanently affixed to a structure or on the ground (but not limited to air conditioners, pool equipment, spa equipment), except for emergency backup power generators.

[b] Time Limits: Lafayette Municipal Code, Section 5-208 (Special Provisions) allows construction between 8:00 a.m. and 8:00 p.m. on weekdays and between 10:00 a.m. and 6:00 p.m. on Sundays and holidays with a permit if noise is less than 83 dBA at 50 feet (25 feet if enclosed) or the noise level at the nearest affected property shall not exceed 80 dBA. Section 5-209 provides exceptions if compliance would be impractical or unreasonable. Noise Limits: Lafayette Municipal Code, Section 5-205, stipulates that between 7 a.m. and 10 p.m., noise must not exceed 50 dBA more than 30 minutes in any hour, 55 dBA more than 15 minutes in any hour, 60 dBA more than 5 minutes in any hour, 65 dBA more than 1 minute in any hour, and 70 dBA for any period of time. These limits are reduced by 5 dBA between 10 p.m. and 7 a.m. These standards result in a converted Leq noise limit equivalent of 58 dBA between 7 a.m. and 10 p.m. and 53 dBA between 10 p.m. and 7 a.m. If the existing ambient exceeds these standards, the allowable noise exposure standard shall be increased at 5 dB increments as appropriate to reflect the ambient. Noise limits apply to operational noise (Sinnette, 2006).

[c] Time Limits: Moraga Municipal Code, Chapter 7.12, Article 3, specifies nighttime hourly restrictions for any construction work within 500 feet of a residential zone. Article 2, Section 7.12.080, limits noise from fans or equipment to a level that disturbs the peace, quiet and comfort of neighboring residents or a reasonable person of normal sensitiveness residing in the area in the quiet and peaceful enjoyment of his property.

[d] Time Limits: Walnut Creek Municipal Code, Chapter 6, Article 2, specifies hourly restrictions for construction work. For operational noise, the City of Walnut Creek Noise Element requires mitigation for projects resulting in noise increases of 3 dB or more.

[e] Time Limits: Policy 11-8 of the Contra Costa County General Plan (Contra Costa County, 2005) states that construction activities shall be concentrated during the hours of the day that are not noise-sensitive for adjacent land uses and should be commissioned to occur during normal work hours of the day to provide relative quiet during the more sensitive evening and early morning periods.

[f] Noise Limits: Section 17.120.050 of the Oakland Planning Code stipulates that the noise level between 7 a.m. and 10 p.m. at the property line of any legal residential activity, school, child care, health care or nursing home, public open space, and similarly sensitive land use must not exceed 60 dBA more than 20 minutes in any hour, 65 dBA more than 10 minutes in any hour, 70 dBA more than 5 minutes in any hour, 75 dBA more than 1 minute in any hour, and 80 dBA for any period of time. These limits are reduced by 15 dBA between 10 p.m. and 7 a.m. These standards result in a converted Leq noise limit equivalent of 68 dBA between 7 a.m. and 10 p.m. and 53 dBA between 10 p.m. and 7 a.m.

these effects, some land uses are considered more sensitive to ambient noise levels than others. In general, residences and schools are among the uses considered to be the most sensitive to noise.

The project area primarily encompasses the communities of Orinda, Lafayette, Moraga, and Walnut Creek. However, the WTTIP also includes facilities in unincorporated areas of Contra Costa County and in southeast Oakland. In the Lamorinda/Walnut Creek area, Highway 24 is the predominant source of noise. However, arterials including Camino Pablo, Moraga Way, Rheem Boulevard, Moraga Road, and Mt. Diablo Boulevard also generate traffic noise. Camino Pablo becomes San Pablo Dam Road and is the primary source of traffic noise in El Sobrante. In the Walnut Creek area, Highway 24 and I-680 are the primary sources of noise; arterials near facility sites include Reliez Valley Road to the north and Danville Boulevard to the south. The I-580 freeway dominates the noise environment in southeast Oakland.

Weekday and weekend, 24-hour noise measurements were collected in the Orinda area to characterize the range of noise environments in the Lamorinda area. Noise measurements are summarized in Table 3.10-2. Noise measurement locations are shown on Figure 3.10-2. As indicated in the table, noise levels along Highway 24 exceed 72 to 75 dBA (Ldn) within approximately 350 feet of the centerline. Noise levels along Camino Pablo exceed 61 to 63 dBA (Ldn) within 65 feet from the centerline. Noise levels adjacent to two residential streets, Lombardy Lane and Manzanita Drive, range between 54 and 56 dBA (Ldn) at 40 to 50 feet from the roadway centerline. These measurements generally indicate that noise levels near freeways range between 70 and 80 dBA (Ldn), while noise levels near arterials range between 60 and 70 dBA (Ldn). Noise levels in quiet neighborhoods away from freeways and arterials range between 50 and 60 dBA (Ldn), depending on the distance to the street. Measurements also indicate that weekend noise levels are generally lower than weekday levels, ranging between 1 and 3 dB less. It should be noted that noise levels exceed the Orinda noise limits along Camino Pablo and Highway 24.

3.10.3 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 substantially increase the ambient noise levels for adjoining areas. This analysis uses the following criteria to define the significance of a predicted increase in noise levels:

- *Speech Interference*. Speech interference is an indicator of impact on typical daytime and evening activities. A speech interference criterion, in the context of impact duration and time of day, was used to identify "substantial" increases in noise from temporary construction activities. Noise peaks generated by construction equipment could result in speech interference in adjacent buildings if the noise level in the interior of the building exceeds 45 to 60 dBA.[1] A

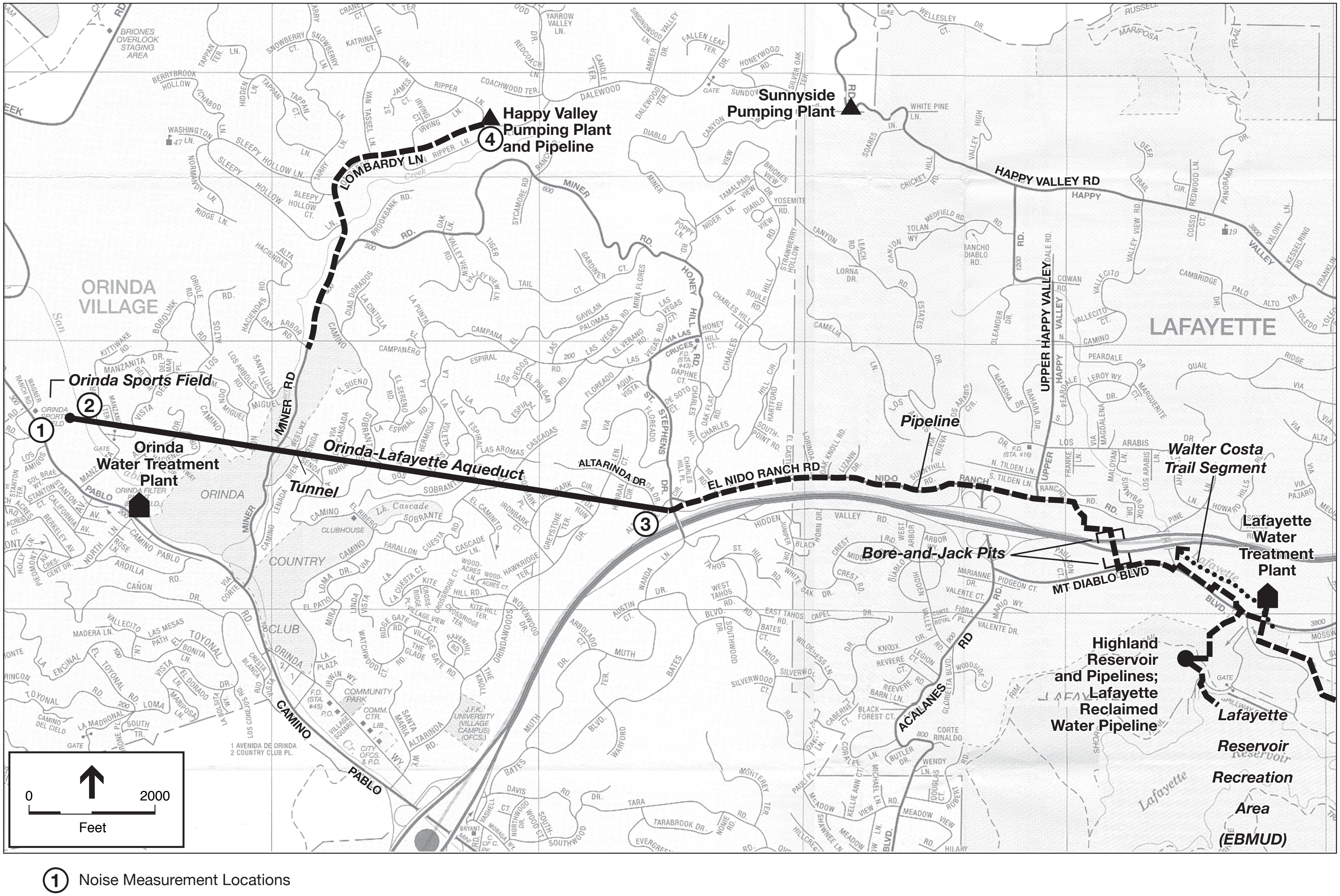
[1] For indoor noise environments, the highest noise level that permits relaxed conversation with 100 percent intelligibility throughout the room is 45 dBA. Speech interference is considered to become intolerable when normal conversation is precluded at 3 feet, which occurs when background noise levels exceed 60 dBA. For outdoor environments, the highest noise level that permits normal conversation at 3 feet with 95 percent sentence intelligibility is 66 dBA (U.S. EPA, 1974).

TABLE 3.10-2
EXISTING AMBIENT NOISE ENVIRONMENT IN PROJECT AREA

	Average Leq Noise Level (in dBA)													
	Site 1 – West of Orinda WTP (Camino Pablo)				Site 2 – Neighborhood East of Orinda WTP (Manzanita Drive)				Site 3 – Near Highway 24 (Altarinda Drive)				Site 4 – Orinda (Lombardy Lane)	
	Weekday		Weekend		Weekday		Weekend		Weekday		Weekend		Weekend	
Noise Descriptor	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
Hourly Leq														
12:00–1:00	51.3	60.0	51.6	58.2	43.5	52.8	45.9	51.8	65.5	69.3	65.8	68.5	52.5	55.8
1:00–2:00	48.8	60.0	50.9	67.7	43.6	57.2	41.5	52.4	62.0	70.8	63.7	68.1	49.1	52.7
2:00–3:00	47.5	61.6	49.3	62.1	44.2	54.9	45.9	51.1	60.9	70.8	63.1	68.6	48.5	53.2
3:00–4:00	47.1	62.4	50.2	59.5	44.1	54.3	44.7	53.7	61.1	71.1	61.2	68.8	47.5	51.4
4:00–5:00	51.2	62.6	45.8	59.1	45.8	53.6	45.3	50.4	65.1	70.8	60.7	69.8	42.0	52.5
5:00–6:00	56.0	64.1	46.5	60.1	48.9	54.4	42.7	53.9	69.8	69.0	62.2	69.4	47.8	51.7
6:00–7:00	61.6	61.7	51.0	59.6	51.4	55.8	42.5	50.8	71.7	68.8	64.7	69.0	49.5	51.0
7:00–8:00	61.0	58.7	54.2	57.8	52.1	51.0	45.1	49.2	71.9	70.6	65.8	68.8	51.6	49.9
8:00–9:00	59.9	57.7	55.4	56.5	53.3	51.9	46.0	54.3	70.5	69.5	66.9	68.1	53.0	49.6
9:00–10:00	60.9	55.8	56.4	55.5	53.3	50.7	48.0	46.6	69.0	69.8	68.3	67.7	53.3	51.3
10:00–11:00	60.6	54.3	57.3	54.3	54.7	49.7	42.0	46.7	67.8	68.9	68.9	67.6	55.5	53.1
11:00–12:00	59.7	52.4	58.1	53.0	58.1	48.5	54.5	46.3	68.6	66.9	69.2	66.8	56.2	52.4
CNEL	63		61		56		55		75		72		58	
Ldn	63		61		56		54		74		72		57	
Average Daytime (7 a.m. to 7 p.m.)	61		61		55		54		70		69		54	
Average Evening (7 p.m. to 10 p.m.)	58		57		51		51		70		68		50	
Average Night (10 p.m. to 7 a.m.)	55		51		48		45		67		65		50	

NOTES: Noise measurements were taken on eight occasions from October 27, 2005 through December 17, 2005 using Metrosonics db-308 noise meters. Measurement locations are indicated on **Figure 3-10.2**. Site #1 is approximately 65 feet from the centerline of Camino Pablo between the sports field and Orinda WTP. Site #2 is approximately 50 feet from the centerline of Manzanita Drive and about 1,165 feet east of Camino Pablo. Site #3 is approximately 50 feet south of East Altarinda Drive centerline and 350 feet north of the Highway 24 centerline. Site #4 is approximately 40 feet south of the centerline of Lombardy Lane near its intersection with Van Ripper Lane.

SOURCE: Table compiled by Orion Environmental Associates.



SOURCE: ESA

EBMUD Water Treatment and Transmission Improvements Program . 204369

Figure 3.10-2
Noise Measurement Locations

typical building can reduce noise levels by 25 dBA with the windows closed (U.S. EPA, 1974). This noise reduction could be maintained only on a temporary basis in some cases, since it assumes windows must remain closed at all times. Since a typical building can reduce noise levels by 25 dBA (with closed windows), an exterior noise level of 70 dBA at receptors, would maintain an acceptable interior noise environment of 45 dBA. It should be noted that such noise levels would be sporadic rather than continuous in nature, because different types of construction equipment would be used throughout the construction process.

For outdoor recreation uses such as Lafayette Reservoir Recreation Area, there would be no building attenuation (i.e., noise reduction) benefits. Normal speech at a distance of a few feet generates about 65 dBA. In quiet outdoor environments (noise levels of 45 to 50 dBA), normal speech can occur at distances up to approximately 16 feet (U.S. EPA, 1974). If background noise levels exceed 60 dBA, speech interference can occur at distances greater than 7 to 10 feet. Therefore, the speech interference criterion applied to recreationists is 60 dBA (Leq).

- *Local Noise Ordinances*. WTTIP projects are located in Orinda, Lafayette, Moraga, Walnut Creek, and Oakland as well as in Contra Costa County. Therefore, project-related noise increases and proposed construction hours were compared to the noise level and construction time limits contained in applicable city noise ordinances for consistency. Where proposed construction activities extend beyond specified time limits, noise level limits contained in applicable city noise ordinances were applied in the analysis (listed in Table 3.10-1). The Contra Costa County Code does not specify construction or operational noise levels or construction time limits.

  Based on available sleep criteria data, an interior nighttime level of 35 dBA is considered acceptable (U.S. EPA, 1974). The exterior shell of a house can reduce exterior noise levels by 25 dBA with the windows closed and 15 dBA with the windows open. Due to the long-term nature of project construction, it is expected that affected residents would have their windows open at times during warm weather periods for ventilation. Therefore, exterior noise levels of 50 dBA (windows open) or 60 dBA (windows closed) would maintain an acceptable interior noise environment of 35 dBA. Local ordinance limits of 53 to 55 dBA (Leq) would allow windows to be open partially during the night.

Impacts and Mitigation Measures

Table 3.10-3 summarizes the significance determinations of identified noise impacts for each WTTIP facility.

Construction Impacts

Impact 3.10-1: Intermittent and temporary noise above existing ambient levels during construction.

Construction activities associated with implementation of the WTTIP would result in temporary noise increases at sensitive receptors near facility sites. Construction noise levels would fluctuate at any given receptor depending on the type of project, construction phasing, equipment type/duration of use, distance between the noise source and receptor, and the presence or absence of barriers between the noise source and receptor. Typical construction equipment generates noise levels ranging from about 76 to 88 dBA at a distance of 50 feet from the source, with slightly higher levels of about 88 to 91 dBA for certain types of earthmoving and impact equipment. The

TABLE 3.10-3
SUMMARY OF POTENTIAL PROJECT-LEVEL NOISE IMPACTS

Facility	Impact 3.10-1 Construction Noise Increases	Impact 3.10-2 Noise Increases Along Haul Routes	Impact 3.10-3 Construction-Related Vibration Effects	Impact 3.10-4 Operational Noise Increases
Lafayette WTP				
Alternative 1	SM	LTS	SM	SM
Alternative 2	SM	LTS	SM	LTS
Orinda WTP				
Alternative 1	SM	LTS	SM	LTS
Alternative 2	SM	LTS	SM	SM
Walnut Creek WTP				
Alternative 1 or 2	SM	LTS	SM	SM
Sobrante WTP				
Alternative 1 or 2	SM	LTS	SM	LTS
Upper San Leandro WTP				
Alternative 1 or 2	SM	LTS	SM	LTS
Orinda-Lafayette Aqueduct				
Alternative 2	SM	LTS	SM	LTS
Ardith Reservoir/ Donald Pumping Plant	SM	LTS	LTS	SM
Fay Hill Pumping Plant and Pipeline Improvements	SM	LTS	LTS	SM
Fay Hill Reservoir	SM	LTS	LTS	LTS
Glen Pipeline Improvements	SM	LTS	LTS	LTS
Happy Valley Pumping Plant and Pipeline	SM	LTS	LTS	SM
Highland Reservoir and Pipelines	SM	LTS	LTS	LTS
Lafayette Reclaimed Water Pipeline	SM	LTS	LTS	LTS
Leland Isolation Pipeline and Bypass Valves	SM	LTS	LTS	LTS
Moraga Reservoir	SM	LTS	SM	LTS
Moraga Road Pipeline	SM	LTS	SM	LTS
Sunnyside Pumping Plant	SM	LTS	LTS	SM
Tice Pumping Plant and Pipeline	SM	LTS	SM	SM
Withers Pumping Plant	SM	LTS	LTS	SM

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

rate of attenuation (i.e., reduction) is about 6 dBA for every doubling of distance from a point source. Noise levels from pile drivers can generate noise peaks of approximately 101 dBA at 50 feet. Table 3.10-4 indicates noise levels at 25, 50, and 100 feet from the noise source for typical construction equipment.

When these typical noise levels are consolidated and applied to each facility site, worst-case, project-related, temporary noise increases can be estimated based on the minimum distance to the closest sensitive receptor. Estimated maximum construction noise levels are presented by facility

TABLE 3.10-4
NOISE LEVELS AND ABATEMENT POTENTIAL OF CONSTRUCTION EQUIPMENT NOISE AT 25, 50 AND 100 FEET (IN DBA)

	Noise Level at 25 Feet		Noise Level at 50 Feet		Noise Level at 100 Feet	
Equipment	Without Controls[a]	With Controls[a]	Without Controls[a]	With Control[a]	Without Controls[a]	With Controls[a]
Earthmoving						
Front Loaders	85	81	79	75	73	69
Backhoes	91	81	85	75	79	69
Dozers	86	81	80	75	74	69
Tractors	86	81	80	75	74	69
Graders	91	81	85	75	79	69
Trucks[b]	97	81	91	75	85	69
Materials Handling						
Concrete Mixers	91	81	85	75	79	69
Concrete Pumps	88	81	82	75	76	69
Cranes	89	81	83	75	77	69
Derricks	94	81	88	75	82	69
Stationary						
Pumps	82	81	76	75	70	69
Generators	84	81	78	75	72	69
Compressors	87	81	81	75	75	69
Impact						
Pile Drivers	107	101	101	95	95	89
Rock Drills	104	86	98	80	92	74
Jack Hammers	94	81	88	75	82	69
Pneumatic Tools	92	86	86	80	80	74
Other						
Saws	84	81	78	75	72	69
Vibrators	82	81	76	75	70	69

[a] Estimated levels can be obtained by selecting quieter procedures or machines and implementing noise-control features that do not require major redesign or extreme cost (e.g., improved mufflers, equipment redesign, use of silencers, shields, shrouds, ducts, and engine enclosures).
[b] This noise level represents the maximum noise level (Lmax) associated with a single passing truck.

SOURCE: U.S. Environmental Protection Agency, 1971.

site in Table 3.10-5 (identified as "adjusted Leq"). Maximum noise levels listed in this table are intended to depict worst-case conditions at the closest receptor; noise levels would vary at each receptor during construction, with the highest noise levels occurring during heavy equipment operation in proximity to the closest receptors. Noise level estimates at residential receptors may be conservatively high, since they do not account for noise attenuation from existing development or topography between a site and receptors. Buildings located between a noise source and receptors can act as noise barriers wherever they interrupt direct lines-of-sight, helping to reduce noise levels at receptors.

The significance of these temporary increases is evaluated by comparing estimated noise levels with the 70-dBA speech interference criterion (daytime noise), the 60-dBA sleep interference criterion (nighttime noise at tunnel shafts only) (see Table 3.10-6 for estimated nighttime noise

TABLE 3.10-5
ESTIMATED DAYTIME CONSTRUCTION NOISE LEVELS AT THE CLOSEST SENSITIVE RECEPTORS AND CONSISTENCY WITH SIGNIFICANCE CRITERIA

Project and Receptor Location	Construction Hours and Duration / Jurisdiction	Maximum Noise Source	Reference Hourly Leq in dBA @ 50 feet[a]	Distance between Closest Project and Receptor[b]	Distance Adjustment[c]	Adjusted Leq	Exterior Speech Interference Criterion	Unmitigated Leq Exceeds Criterion?	Applicable Noise Limit	Unmitigated Leq Exceeds Limit?	Reduction due to Controls[d]	Mitigated Leq with Controls	Exterior Speech Interference Criterion	Mitigated Leq Exceeds Criterion?	Applicable Noise Limit	Mitigated Leq Exceeds Limit?
Water Treatment Facilities																
Lafayette WTP – Alternative 1 Facilities	7 a.m. to 6 p.m.	Earthmoving Equipment	85	800	-24	61	70	No	83 @ 50'	**Yes**	-10	51	70	No	83 @ 50'	No
	4 to 6 years	Truck (Lmax, single passing truck)	91	800	-24	67	70	No	83 @ 50'	**Yes**	-16	51	70	No	83 @ 50'	No
Closest residential receptors are	Lafayette	Materials Handling	85	800	-24	61	70	No	83 @ 50'	**Yes**	-10	51	70	No	83 @ 50'	No
800 feet from proposed facilities.		Stationary Equipment	80	800	-24	56	70	No	83 @ 50'	No	-6	50	70	No	83 @ 50'	No
		Impact Equipment	87	800	-24	63	70	No	83 @ 50'	**Yes**	-6	57	70	No	83 @ 50'	No
Lafayette WTP – Alternative 1 or 2	7 a.m. to 6 p.m.	Earthmoving Equipment	85	300	-16	69	70	No	83 @ 50'	**Yes**	-10	59	70	No	83 @ 50'	No
Pipeline	4 to 6 years	Truck (Lmax, single passing truck)	91	300	-16	75	70	**Yes**	83 @ 50'	**Yes**	-16	59	70	No	83 @ 50'	No
	Lafayette	Materials Handling	85	300	-16	69	70	No	83 @ 50'	**Yes**	-10	59	70	No	83 @ 50'	No
Closest residential receptors are		Stationary Equipment	80	300	-16	64	70	No	83 @ 50'	No	-6	58	70	No	83 @ 50'	No
300 feet from pipeline alignment.		Impact Equipment	87	300	-16	71	70	**Yes**	83 @ 50'	**Yes**	-6	65	70	No	83 @ 50'	No
Lafayette WTP – Alternative 2	7 a.m. to 6 p.m.	Earthmoving Equipment	85	1,200	-28	57	70	No	83 @ 50'	**Yes**	-10	47	70	No	83 @ 50'	No
	1 to 2 years	Truck (Lmax, single passing truck)	91	1,200	-28	63	70	No	83 @ 50'	**Yes**	-16	47	70	No	83 @ 50'	No
Closest residential receptors are	Lafayette	Materials Handling	85	1,200	-28	57	70	No	83 @ 50'	**Yes**	-10	47	70	No	83 @ 50'	No
1,200 feet away from closest		Drilling/Stationary Equipment	80	1,200	-28	52	70	No	83 @ 50'	No	-6	46	70	No	83 @ 50'	No
construction.		Impact Equipment	87	1,200	-28	59	70	**Yes**	83 @ 50'	**Yes**	-6	53	70	No	83 @ 50'	No
Orinda WTP– Alternative 1	7 a.m. to 6 p.m.	Earthmoving Equipment	85	170	-11	74	70	**Yes**	NA	NA	-10	64	70	No	NA	NA
	1 to 2 years	Truck (Lmax, single passing truck)	91	170	-11	80	70	**Yes**	NA	NA	-16	64	70	No	NA	NA
Closest residential receptors are	Orinda	Materials Handling	85	170	-11	74	70	**Yes**	NA	NA	-10	64	70	No	NA	NA
170 feet to the west		Drilling/Stationary Equipment	80	170	-11	69	70	No	NA	NA	-6	63	70	No	NA	NA
and 250 feet to the east.		Impact Equipment	87	170	-11	76	70	**Yes**	NA	NA	-6	70	70	No	NA	NA
Orinda WTP – Alternative 2	7 a.m. to 6 p.m.	Earthmoving Equipment	85	170	-11	74	70	**Yes**	NA	NA	-10	64	70	No	NA	NA
	4 to 6 years	Truck (Lmax, single passing truck)	91	170	-11	80	70	**Yes**	NA	NA	-16	64	70	No	NA	NA
Closest residential receptors are	Orinda	Materials Handling	85	170	-11	74	70	**Yes**	NA	NA	-10	64	70	No	NA	NA
170 feet to the west		Drilling/Stationary Equipment	80	170	-11	69	70	No	NA	NA	-6	63	70	No	NA	NA
and 250 feet to the east.		Impact Equipment	87	170	-11	76	70	**Yes**	NA	NA	-6	70	70	No	NA	NA
Walnut Creek WTP –	7 a.m. to 6 p.m.	Earthmoving Equipment	85	300	-16	69	70	No	NA	NA	-10	59	70	No	NA	NA
Alternative 1 or 2	1 to 2 years	Truck (Lmax, single passing truck))	91	300	-16	75	70	**Yes**	NA	NA	-16	59	70	No	NA	NA
	Walnut Creek	Materials Handling	85	300	-16	69	70	No	NA	NA	-10	59	70	No	NA	NA
Closest residential receptors are		Drilling/Stationary Equipment	80	300	-16	64	70	No	NA	NA	-6	58	70	No	NA	NA
300 feet away.		Impact Equipment	87	300	-16	71	70	**Yes**	NA	NA	-6	65	70	No	NA	NA
Sobrante WTP – Alternative 1 or 2	7 a.m. to 6 p.m.	Earthmoving Equipment	85	150	-10	75	70	**Yes**	NA	NA	-10	65	70	No	NA	NA
	1 to 2 years	Truck (Lmax, single passing truck)	91	150	-10	81	70	**Yes**	NA	NA	-16	65	70	No	NA	NA
Closest residential receptors are	El Sobrante–	Materials Handling	85	150	-10	75	70	**Yes**	NA	NA	-10	65	70	No	NA	NA
150 feet away.	Unincorp. Contra	Drilling/Stationary Equipment	80	150	-10	70	70	No	NA	NA	-6	64	70	No	NA	NA
	Costa County	Impact Equipment	87	150	-10	77	70	**Yes**	na	NA	-6	71	70	**Yes**	NA	NA
Upper San Leandro WTP –	7 a.m. to 6 p.m.	Earthmoving Equipment	85	170	-11	74	70	**Yes**	65	**Yes**	-10	64	70	No	65	No
Alternative 1 or 2	1 to 2 years	Truck (Lmax, single passing truck)	91	170	-11	80	70	**Yes**	65	**Yes**	-16	64	70	No	65	No
	Oakland	Materials Handling	85	170	-11	74	70	**Yes**	65	**Yes**	-10	64	70	No	65	No
Closest residential receptors are		Drilling/Stationary Equipment	80	170	-11	69	70	No	65	**Yes**	-6	63	70	No	65	No
170 feet away.		Impact Equipment	87	170	-11	76	70	**Yes**	65	**Yes**	-6	70	70	No	65	**Yes**

TABLE 3.10-5 (Continued)
ESTIMATED DAYTIME CONSTRUCTION NOISE LEVELS AT THE CLOSEST SENSITIVE RECEPTORS AND CONSISTENCY WITH SIGNIFICANCE CRITERIA

Project and Receptor Location	Construction Hours and Duration / Jurisdiction	Maximum Noise Source	Reference Hourly Leq in dBA @ 50 feet[a]	Distance between Closest Project and Receptor[b]	Distance Adjustment[c]	Adjusted Leq	Exterior Speech Interference Criterion	Unmitigated Leq Exceeds Criterion?	Applicable Noise Limit	Unmitigated Leq Exceeds Limit?	Reduction due to Controls[d]	Mitigated Leq with Controls	Exterior Speech Interference Criterion	Mitigated Leq Exceeds Criterion?	Applicable Noise Limit	Mitigated Leq Exceeds Limit?
Pipeline and Tunnel Facilities																
Orinda-Lafayette Aqueduct – Tunnel Entrance Portal	Day & night (24	Tunnel Activities (includes loader,	75[e]	500	-20	55	70	No	NA (day only)	NA	0	55	70	No	NA (day only)	NA
	hours per day)	crane, muck train, ventilation fan)														NA
	7 days per week	Earthmoving Equipment	85	500	-20	65	70	No	NA (day only)	NA	-10	55	70	No	NA (day only)	NA
Closest residential receptors are		Truck (Lmax, single passing truck)	91	500	-20	71	70	**Yes**	NA (day only)	NA	-16	55	70	No	NA (day only)	NA
500 feet from tunnel entrance portal.		Materials Handling	85	500	-20	65	70	No	NA (day only)	NA	-10	55	70	No	NA (day only)	NA
	2 to 3 years Orinda	Drilling/Stationary Equipment (including compressors, generators)	80	500	-20	60	70	No	NA (day only)	NA	-6	54	70	No	NA (day only)	NA
		Impact Equipment	87	500	-20	67	70	No	NA (day only)	NA	-6	61	70	No	NA (day only)	NA
Orinda-Lafayette Aqueduct – Tunnel Exit Portal	Day & night (24	Tunnel Activities	75	100	-6	69	70	No	NA (day only)	NA	-0	69	70	No	NA (day only)	NA
	hours per day)	Earthmoving Equipment	85	100	-6	79	70	**Yes**	NA (day only)	NA	-10	69	70	No	NA (day only)	NA
Closest residential receptors are	7 days per week	Truck (Lmax, single passing truck)	91	100	-6	85	70	**Yes**	NA (day only)	NA	-16	69	70	No	NA (day only)	NA
100 feet from portal.		Drilling/Stationary Equipment (including compressors, generators)	80	100	-6	74	70	**Yes**	NA (day only)	NA	-6	68	70	No	NA (day only)	NA
	2 to 3 Years Orinda	Impact Equipment	87	100	-6	81	70	**Yes**	NA (day only)	NA	-6	75	70	**Yes**	NA (day only)	NA
Orinda-Lafayette Aqueduct – Pipeline	8:30 a.m. to	Earthmoving Equipment	85	25	6	91	70	**Yes**	83 @ 50'	**Yes**	-10	81	70	**Yes**	83 @ 50'	No
	4:30 p.m.	Truck (Lmax, single passing truck)	91	25	6	97	70	**Yes**	83 @ 50'	**Yes**	-16	81	70	**Yes**	83 @ 50'	No
Closest residential receptors are	1 to 2 years	Materials Handling	85	25	6	91	70	**Yes**	83 @ 50'	**Yes**	-10	81	70	**Yes**	83 @ 50'	No
25 feet away.	Lafayette and	Drilling/Stationary Equipment	80	25	6	86	70	**Yes**	83 @ 50'	No	-6	80	70	**Yes**	83 @ 50'	No
	Orinda	Impact Equipment	87	25	6	93	70	**Yes**	83 @ 50'	**Yes**	-6	87	70	**Yes**	83 @ 50'	No
Fay Hill Pipeline	8:30 a.m. to	Earthmoving Equipment	85	100	-6	79	70	**Yes**	NA	NA	-10	69	70	No	NA	NA
	4:30 p.m.	Truck (Lmax, single passing truck)	91	100	-6	85	70	**Yes**	NA	NA	-16	69	70	No	NA	NA
Closest residential receptors are	1 to 2 years	Materials Handling	85	100	-6	79	70	**Yes**	NA	NA	-10	69	70	No	NA	NA
100 feet away.	Moraga	Drilling/Stationary Equipment	80	100	-6	74	70	**Yes**	NA	NA	-6	68	70	No	NA	NA
		Impact Equipment	87	100	-6	81	70	**Yes**	NA	NA	-6	75	70	**Yes**	NA	NA
Glen Pipeline Improvements	8:30 a.m. to	Earthmoving Equipment	85	25	6	91	70	**Yes**	83 @ 50'	**Yes**	-10	81	70	**Yes**	83 @ 50'	No
	4:30 p.m.	Truck (Lmax, single passing truck)	91	25	6	97	70	**Yes**	83 @ 50'	**Yes**	-16	81	70	**Yes**	83 @ 50'	No
Closest residential receptors are	1 year	Materials Handling	85	25	6	91	70	**Yes**	83 @ 50'	**Yes**	-10	81	70	**Yes**	83 @ 50'	No
25 feet away.	Lafayette	Drilling/Stationary Equipment	80	25	6	86	70	**Yes**	83 @ 50'	No	-6	80	70	**Yes**	83 @ 50'	No
		Impact Equipment	87	25	6	93	70	**Yes**	83 @ 50'	**Yes**	-6	87	70	**Yes**	83 @ 50'	No
Happy Valley Pipeline	8:30 a.m. to	Earthmoving Equipment	85	50	0	85	70	**Yes**	NA	NA	-10	75	70	**Yes**	NA	NA
	4:30 p.m.	Truck (Lmax, single passing truck)	91	50	0	91	70	**Yes**	NA	NA	-16	75	70	**Yes**	NA	NA
Closest residential receptors are	1 to 2 years	Materials Handling	85	50	0	85	70	**Yes**	NA	NA	-10	75	70	**Yes**	NA	NA
50 feet away.	Orinda	Drilling/Stationary Equipment	80	50	0	80	70	**Yes**	NA	NA	-6	74	70	**Yes**	NA	NA
		Impact Equipment	87	50	0	87	70	**Yes**	NA	NA	-6	81	70	**Yes**	NA	NA
Highland Inlet/Outlet Pipeline and	Daytime with	Earthmoving Equipment	85	620	-22	63	70	No	83 @ 50'	**Yes**	-10	53	70	No	83 @ 50'	No
Lafayette Reclaimed Water Pipeline	limited night	Truck (Lmax, single passing truck)	91	620	-22	69	70	No	83 @ 50'	**Yes**	-16	53	70	No	83 @ 50'	No
	construction	Materials Handling	85	620	-22	63	70	No	83 @ 50'	**Yes**	-10	53	70	No	83 @ 50'	No
Closest residential receptors are	1 to 2 years	Drilling/Stationary Equipment	80	620	-22	58	70	No	83 @ 50'	No	-6	52	70	No	83 @ 50'	No
620 feet away.	Lafayette	Impact Equipment	87	620	-22	65	70	No	83 @ 50'	**Yes**	-6	59	70	No	83 @ 50'	No
Lacassie (Leland Isolation) Pipeline	8:30 a.m. to	Earthmoving Equipment	85	300	-16	69	70	No	NA	NA	-10	59	70	No	NA	NA
	4:30 p.m.	Truck (Lmax, single passing truck)	91	300	-16	75	70	**Yes**	NA	NA	-16	59	70	No	NA	NA
Closest residential receptors are	1 year	Materials Handling	85	300	-16	69	70	No	NA	NA	-10	59	70	No	NA	NA
300 feet away.	Walnut Creek	Drilling/Stationary Equipment	80	300	-16	64	70	No	NA	na	-6	58	70	No	na	NA

TABLE 3.10-5 (continued)
ESTIMATED DAYTIME CONSTRUCTION NOISE LEVELS AT THE CLOSEST SENSITIVE RECEPTORS AND CONSISTENCY WITH SIGNIFICANCE CRITERIA

Project and Receptor Location	Construction Hours and Duration / Jurisdiction	Maximum Noise Source	Reference Hourly Leq in dBA @ 50 feet[a]	Distance between Closest Project and Receptor[b]	Distance Adjustment[c]	Adjusted Leq	Exterior Speech Interference Criterion	Unmitigated Leq Exceeds Criterion?	Applicable Noise Limit	Unmitigated Leq Exceeds Limit?	Reduction due to Controls[d]	Mitigated Leq with Controls	Exterior Speech Interference Criterion	Mitigated Leq Exceeds Criterion?	Applicable Noise Limit	Mitigated Leq Exceeds Limit?
		Impact Equipment	87	300	-16	71	70	**Yes**	NA	na	-6	65	70	No	na	NA
Moraga Road Pipeline	8:30 a.m. to	Earthmoving Equipment	85	50	0	85	70	**Yes**	83 @ 50'	**Yes**	-10	75	70	**Yes**	83 @ 50'	No
	4:30 p.m.	Truck (Lmax, single passing truck)	91	50	0	91	70	**Yes**	83 @ 50'	**Yes**	-16	75	70	**Yes**	83 @ 50'	No
Most residential receptors are	1 to 2 years	Materials Handling	85	50	0	85	70	**Yes**	83 @ 50'	**Yes**	-10	75	70	**Yes**	83 @ 50'	No
50 feet away; a few are as close as	Lafayette and	Drilling/Stationary Equipment	80	50	0	80	70	**Yes**	83 @ 50'	No	-6	74	70	**Yes**	83 @ 50'	No
25 feet.	Moraga	Impact Equipment	87	50	0	87	70	**Yes**	83 @ 50'	**Yes**	-6	81	70	**Yes**	83 @ 50'	No
Tice Pipeline	8:30 a.m. to	Earthmoving Equipment	85	25	6	91	70	**Yes**	NA	NA	-10	81	70	**Yes**	NA	NA
	4:30 p.m.	Truck (single passing truck)	91	25	6	97	70	**Yes**	NA	NA	-16	81	70	**Yes**	NA	NA
Closest residential receptors are	1 to 2 years	Materials Handling	85	25	6	91	70	**Yes**	NA	NA	-10	81	70	**Yes**	NA	NA
25 feet away.	Unincorp. Contra	Drilling/Stationary Equipment	80	25	6	86	70	**Yes**	NA	NA	-6	80	70	**Yes**	NA	NA
	Costa County	Impact Equipment	87	25	6	93	70	**Yes**	NA	NA	-6	87	70	**Yes**	NA	NA
Reservoir Facilities																
Ardith Reservoir	7 a.m. to 6 p.m.	Earthmoving Equipment	85	100	-6	79	70	**Yes**	NA	NA	-10	69	70	No	NA	NA
	1 to 2 years	Truck (Lmax, single passing truck)	91	100	-6	85	70	**Yes**	NA	NA	-16	69	70	No	NA	NA
Closest residential receptors are	Orinda	Materials Handling	85	100	-6	79	70	**Yes**	NA	NA	-10	69	70	No	NA	NA
100 feet away.		Drilling/Stationary Equipment	80	100	-6	74	70	**Yes**	NA	NA	-6	68	70	No	NA	NA
		Impact Equipment	87	100	-6	81	70	**Yes**	NA	NA	-6	75	70	**Yes**	NA	NA
Fay Hill Reservoir	7 a.m. to 6 p.m.	Earthmoving Equipment	85	100[f]	-6	79	70	**Yes**	NA	NA	-10	69	70	No	NA	NA
	1 to 2 years	Truck (Lmax, single passing truck)	91	100[f]	-6	85	70	**Yes**	NA	NA	-16	69	70	No	NA	NA
No existing residential receptors.	Moraga	Materials Handling	85	100[f]	-6	79	70	**Yes**	NA	NA	-10	69	70	No	NA	NA
		Drilling/Stationary Equipment	80	100[f]	-6	74	70	**Yes**	NA	NA	-6	68	70	No	NA	NA
		Impact Equipment	87	100[f]	-6	81	70	**Yes**	NA	NA	-6	75	70	**Yes**	NA	NA
Highland Reservoir	7 a.m. to 6 p.m.	Earthmoving Equipment	85	25	6	91	60	**Yes**	83 @ 50'	**Yes**	-10	81	60	**Yes**	83 @ 50'	No
	1 to 2 years	Truck (Lmax, single passing truck)	91	25	6	97	60	**Yes**	83 @ 50'	**Yes**	-16	81	60	**Yes**	83 @ 50'	No
Closest recreational receptors are	Lafayette	Materials Handling	85	25	6	91	60	**Yes**	83 @ 50'	**Yes**	-10	81	60	**Yes**	83 @ 50'	No
250 feet from Lakeside Trail and		Drilling/Stationary Equipment	80	25	6	86	60	**Yes**	83 @ 50'	No	-6	80	60	**Yes**	83 @ 50'	No
25 feet from Rim Trail.		Impact Equipment	87	25	6	93	60	**Yes**	83 @ 50'	**Yes**	-6	87	60	**Yes**	83 @ 50'	No
Moraga Reservoir	7 a.m. to 6 p.m.	Earthmoving	85	50	0	85	70	**Yes**	NA	NA	-10	75	70	**Yes**	NA	NA
	1 to 2 years	Truck (Lmax, single passing truck)	91	50	0	91	70	**Yes**	NA	NA	-16	75	70	**Yes**	NA	NA
Closest residential receptor is	Moraga	Materials Handling	85	50	0	85	70	**Yes**	NA	NA	-10	75	70	**Yes**	NA	NA
50 feet away.		Drilling/Stationary Equipment	80	50	0	80	70	**Yes**	NA	NA	-6	74	70	**Yes**	NA	NA
		Impact Equipment	87	50	0	87	70	**Yes**	NA	NA	-6	81	70	**Yes**	NA	NA
Pumping Plants																
Donald Pumping Plant	7 a.m. to 6 p.m.	Earthmoving Equipment	85	100	-6	79	70	**Yes**	NA	NA	-10	69	70	No	NA	NA
	1 to 2 years	Truck (Lmax, single passing truck)	91	100	-6	85	70	**Yes**	NA	NA	-16	69	70	No	NA	NA
Closest residential receptors are	Orinda	Materials Handling	85	100	-6	79	70	**Yes**	NA	NA	-10	69	70	No	NA	NA
100 feet away.		Drilling/Stationary Equipment	80	100	-6	74	70	**Yes**	NA	NA	-6	68	70	No	NA	NA
		Impact Equipment	87	100	-6	81	70	**Yes**	NA	NA	-6	75	70	**Yes**	NA	NA
Fay Hill Pumping Plant	7 a.m. to 6 p.m.	Earthmoving Equipment	85	100	-6	79	70	**Yes**	NA	NA	-10	69	70	No	NA	NA
	1 to 2 years	Truck (Lmax, single passing truck)	91	100	-6	85	70	**Yes**	NA	NA	-16	69	70	No	NA	NA
Closest residential receptors are	Moraga	Materials Handling	85	100	-6	79	70	**Yes**	NA	NA	-10	69	70	No	NA	NA
100 feet away.		Drilling/Stationary Equipment	80	100	-6	74	70	**Yes**	NA	NA	-6	68	70	No	NA	NA
		Impact Equipment	87	100	-6	81	70	**Yes**	NA	NA	-6	75	70	**Yes**	NA	NA

TABLE 3.10-5 (Continued)
ESTIMATED DAYTIME CONSTRUCTION NOISE LEVELS AT THE CLOSEST SENSITIVE RECEPTORS AND CONSISTENCY WITH SIGNIFICANCE CRITERIA

Project and Receptor Location	Construction Hours and Duration / Jurisdiction	Maximum Noise Source	Reference Hourly Leq in dBA @ 50 feet[a]	Distance between Closest Project and Receptor[b]	Distance Adjustment[c]	Adjusted Leq	Exterior Speech Interference Criterion	Unmitigated Leq Exceeds Criterion?	Applicable Noise Limit	Unmitigated Leq Exceeds Limit?	Reduction due to Controls[d]	Mitigated Leq with Controls	Exterior Speech Interference Criterion	Mitigated Leq Exceeds Criterion?	Applicable Noise Limit	Mitigated Leq Exceeds Limit?
Happy Valley Pumping Plant	7 a.m. to 6 p.m.	Earthmoving Equipment	85	50	0	85	70	**Yes**	NA	NA	-10	75	70	**Yes**	NA	NA
	1 to 2 years	Truck (Lmax, single passing truck)	91	50	0	91	70	**Yes**	NA	NA	-16	75	70	**Yes**	NA	NA
Closest residential receptors are	Orinda	Materials Handling	85	50	0	85	70	**Yes**	NA	NA	-10	75	70	**Yes**	NA	NA
50 feet away.		Drilling/Stationary Equipment	80	50	0	80	70	**Yes**	NA	NA	-6	74	70	**Yes**	NA	NA
		Impact Equipment	87	50	0	87	70	**Yes**	NA	NA	-6	81	70	**Yes**	NA	NA
Sunnyside Pumping Plant	7 a.m. to 6 p.m.	Earthmoving Equipment	85	175	-11	74	70	**Yes**	83 @ 50'	**Yes**	-10	64	70	No	83 @ 50'	No
	1 to 2 years	Truck (Lmax, single passing truck)	91	175	-11	80	70	**Yes**	83 @ 50'	**Yes**	-16	64	70	No	83 @ 50'	No
Closest residential receptors are	Lafayette and	Materials Handling	85	175	-11	74	70	**Yes**	83 @ 50'	**Yes**	-10	64	70	No	83 @ 50'	No
175 feet away in Orinda.	Orinda	Drilling/Stationary Equipment	80	175	-11	69	70	No	83 @ 50'	No	-6	63	70	No	83 @ 50'	No
		Impact Equipment	87	175	-11	76	70	**Yes**	83 @ 50'	**Yes**	-6	70	70	No	83 @ 50'	No
Tice Pumping Plant	7 a.m. to 6 p.m.	Earthmoving Equipment	85	200	-12	73	70	**Yes**	NA	NA	-10	63	70	No	NA	NA
	1 to 2 years	Truck (Lmax, single passing truck)	91	200	-12	79	70	**Yes**	NA	NA	-16	63	70	No	NA	NA
Closest residential receptors are	Unincorp. Contra	Materials Handling	85	200	-12	73	70	**Yes**	NA	NA	-10	63	70	No	NA	NA
200 feet away.	Costa County	Drilling/Stationary Equipment	80	200	-12	68	70	**Yes**	NA	NA	-6	62	70	No	NA	NA
		Impact Equipment	87	200	-12	75	70	**Yes**	NA	NA	-6	69	70	No	NA	NA
Withers Pumping Plant	7 a.m. to 6 p.m.	Earthmoving Equipment	85	150	-10	75	70	**Yes**	NA	NA	-10	65	70	No	NA	NA
	1 to 2 years	Truck (Lmax, single passing truck)	91	150	-10	81	70	**Yes**	NA	NA	-16	65	70	No	NA	NA
Closest residential receptors are	Unincorp. Contra	Materials Handling	85	150	-10	75	70	**Yes**	NA	NA	-10	65	70	No	NA	NA
150 feet away.	Contra County	Drilling/Stationary Equipment	80	150	-10	70	70	No	NA	NA	-6	64	70	No	NA	NA
		Impact Equipment	87	150	-10	77	70	**Yes**	NA	NA	-6	71	70	**Yes**	NA	NA
Bypass Valves																
Leland Pressure Zone Isolation Bypass	8:30 a.m. to	Earthmoving Equipment	85	50	0	85	70	**Yes**	NA	NA	-10	75	70	**Yes**	NA	NA
Valves	4:30 p.m.	Truck (Lmax, single passing truck)	91	50	0	91	70	**Yes**	NA	NA	-16	75	70	**Yes**	NA	NA
	1 week	Materials Handling	85	50	0	85	70	**Yes**	NA	NA	-10	75	70	**Yes**	NA	NA
Closest residential receptors could be		Drilling/Stationary Equipment	80	50	0	80	70	**Yes**	NA	NA	-6	74	70	**Yes**	NA	NA
50 feet away.	Walnut Creek	Impact Equipment	87	50	0	87	70	**Yes**	NA	NA	-6	81	70	**Yes**	NA	NA

NA = not applicable or no applicable standard

a Reference noise levels represent the highest noise level by equipment type (without controls) listed in Table 3.10-4 at 50 feet.
b The distances represent the minimum distance between the receptor and the closest facility location.
c Distance adjustment accounts for the rate of noise attenuation that occurs with distance from a noise source. The rate of attenuation (i.e., reduction) is about 6 dBA for every doubling of distance from a point source.
d Noise control reductions represent the difference between the highest noise levels listed in Table 3.10-4 with controls versus without controls.
e Reference noise level for tunneling activities under the Orinda-Lafayette Tunnel project is based on noise measurements taken at the Hollywood Hills Tunnel project, which included a crane and involved similar tunneling construction techniques.
f No sensitive receptors currently exist within 100 feet of the site, but residential projects are proposed along the lower section of the access road (off Rheem Boulevard) and east of the reservoir site.

SOURCE: Table compiled by Orion Environmental Associates.

TABLE 3.10-6
ESTIMATED NIGHTTIME CONSTRUCTION NOISE LEVELS AT THE CLOSEST SENSITIVE RECEPTORS AND CONSISTENCY WITH SIGNIFICANCE CRITERIA

Project and Receptor Location	Construction Hours and Duration / Jurisdiction	Maximum Noise Source	Reference Hourly Leq in dBA @ 50 feet	Distance between Closest Project and Receptor	Distance Adjustment	Adjusted Leq	Applicable Noise Ordinance Noise Limit[a]	Unmitigated Leq Exceeds Applicable Limit?	Reduction due to Engine Controls[b]	Mitigated Leq with Engine Controls	Mitigated Leq Exceeds Applicable Limit?	Noise Reduction due to Sound Barrier[c]	Mitigated Leq with Sound Barrier	Mitigated Leq Exceed Applicable Noise Limits?
Orinda-Lafayette Aqueduct – Tunnel Entrance Portal	Day & night (24 hours per day)	Tunnel Activities (includes crane, muck train, ventilation fan in shaft)	75	500	-20	55	55	No	0	55	No	-6	49	No
Closest residential receptors are 500 feet from tunnel entrance portal.	7 days per week	Earthmoving Equipment					NA (limited to daytime operation only)							
		Truck (Lmax, single passing truck)					NA (limited to daytime operation only)							
		Materials Handling					NA (limited to daytime operation only)							
	2 to 3 years Orinda	Drilling/Stationary Equipment (including compressor, generator)	80	500	-20	60	55	**Yes**	-6	54	No	-6	48	No
		Impact Equipment					NA (limited to daytime operation only)							
Orinda-Lafayette Aqueduct – Tunnel Exit Portal	Day & night (24 hours per day)	Tunnel Activities (ventilation fan in shaft only)	55	100	-6	49	55	No	0	55	No	-6	49	No
Closest residential receptors are 100 feet from tunnel exit portal.	7 days per week	Earthmoving Equipment					NA (limited to daytime operation only)							
		Truck (Lmax, single passing truck)					NA (limited to daytime operation only)							
	2 to 3 years	Drilling/Stationary Equipment (including pump)	80	100	-6	74	55	**Yes**	-6	68	**Yes**	-6	62	**Yes**
	Orinda	Impact Equipment					NA (limited to daytime operation only)							
Highland Inlet/Outlet Pipeline and Lafayette Reclaimed Water Pipeline	Daytime with limited night construction	Earthmoving Equipment	85	700	-23	62	53	**Yes**	-10	52	No	-6	46	No
		Truck (Lmax, single passing truck)	91	700	-23	68	53	**Yes**	-16	52	No	-6	46	No
		Materials Handling	85	700	-23	62	53	**Yes**	-10	52	No	-6	46	No
Closest residential receptors are	1 to 2 years	Drilling/Stationary Equipment	80	700	-23	57	53	**Yes**	-6	51	No	-6	45	No
700 feet from nighttime pipeline work.	Lafayette	Impact Equipment	87	700	-23	64	53	**Yes**	-6	58	**Yes**	-6	52	No

NA = not applicable or no applicable standard

[a] The applicable noise standard is the Orinda Noise Ordinance limit of 61 dBA Leq for day (7:00 a.m. to 10:00 p.m.) and 56 dBA night (10:00 p.m. to 7:00 a.m.).
[b] Noise control reductions represent the difference between the highest noise levels listed in Table 3.10-4 with controls versus without controls.
[c] Noise barriers reduce noise levels by 6 to 10 decibels if located near the noise source. Barrier effectiveness can be increased by as much as 5 decibels by applying sound-absorbing material to the inner surface of the barrier (Federal Transit Administration, 1995).

SOURCE: Table compiled by Orion Environmental Associates.

levels), and applicable noise ordinance standards (time and noise limits depending on the jurisdiction). Estimated noise levels were compared to these criteria (see Table 3.10-5). Each project's consistency with the applicable criteria at the closest sensitive receptors is discussed below by facility.

In general, construction noise would exceed the speech interference criterion when heavy equipment is operated within 150 to 500 feet of a sensitive receptor (distance depends on the type of equipment operated). If feasible noise controls are implemented (see recommended measures), most construction noise levels could be reduced to below this criterion. For pipelines, sensitive receptors are located closer to construction activities than would be the case at other facility sites (as close as 25 feet), and construction noise levels would exceed the speech interference criterion with or without feasible noise controls. However, pipeline construction progresses along an alignment (rather than persisting at one location) so that any given sensitive receptor is typically subject to construction noise for approximately two weeks (and not for the entire duration of project construction indicated in Table 3.10-5), followed later by a couple of additional days for paving the trench. Refer to Figure 2-9 in Chapter 2, Project Description, for a description of pipeline construction.

Most project facilities are proposed to be constructed during daytime, weekday hours, which would be generally consistent with the time restrictions specified in local noise ordinances. There would be some minor inconsistencies in the time limits and construction hours, as identified below and in Table 3.10-5. The only exceptions to the daytime weekday hours for construction would be the Orinda-Lafayette Aqueduct (Alternative 2) and the pipeline segment that crosses the Lafayette Reservoir Recreation Area entrance/exit road for the Highland Inlet/Outlet Pipeline and Lafayette Reclaimed Water Pipeline projects. The pipeline crossing construction work would occur for two to four nights and would be performed at night to minimize conflicts with recreation traffic. Tunnel construction would occur 24 hours per day, 7 days per week, at tunnel shafts (primarily the entry shaft at the Orinda Sports Field north of the Orinda WTP), and limited maintenance and inspection work would occur on weekend days. Ordinance noise limits listed in Table 3.10-1 are applied only where construction is proposed to occur outside the hours specified by local ordinances (e.g., at night) or if the applicable noise ordinance specifies construction noise limits.

The construction impacts identified for each project facility below have been developed to allow a general assessment of the nature and magnitude of potential construction impacts associated with each individual facility. The final construction scheduling of specific facility projects could result in overlapping impacts due to simultaneous construction for more than one facility. Since most construction noise impacts would be specific to each facility site, overlapping noise impacts would be limited to impacts along haul routes, where overlapping construction schedules for two or more facilities with a common haul route could result in combined noise increases. Overlapping noise impacts along haul routes are discussed under Impact 3.10-2 and in Chapter 5, Cumulative Impacts.

Lafayette WTP

Alternative 1

The nearest sensitive receptors in the project vicinity include residences located 800 feet south of proposed facilities, and recreational uses at the Lafayette Reservoir Recreational Area farther to the south. As indicated in Table 3.10-5, construction-related noise increases would occur over a four- to six-year period, but would occur during the daytime hours only. Therefore, construction noise levels were compared to Lafayette's daytime construction noise and time limits. Construction noise would exceed the Lafayette Noise Ordinance noise limit of 83 dBA at 50 feet for any equipment operated between 8 a.m. and 8 p.m. However, since the closest homes are a minimum of 800 feet from project construction, construction noise would not exceed the 70-dBA speech interference criterion at the closest residential receptors or the 80-dBA noise ordinance limit at the closest affected property. As shown in Table 3.10-5, implementation of noise controls (see Measure 3.10-1a, below) would reduce construction noise levels to below the noise ordinance limit of 83 dBA at 50 feet, thereby reducing any potential construction noise impacts to a less-than-significant level.

This alternative would include construction of new pipelines along the north side of Mt. Diablo Boulevard as well as across this road. Construction would occur within 300 feet of the closest residential receptors to the south. As indicated in Table 3.10-5, operation of most types of construction equipment would exceed the Lafayette Noise Ordinance noise limit of 83 dBA at 50 feet, while operation of trucks and impact equipment could exceed the 70-dBA speech interference criterion at the closest residential receptors. The 80-dBA noise ordinance limit at the closest affected property would not be exceeded. As shown in Table 3.10-5, implementation of noise controls (see Measure 3.10-1a, below) would reduce construction noise levels to below the noise ordinance limit of 83 dBA at 50 feet and the speech interference criterion, thereby reducing any potential pipeline construction noise impacts to a less-than-significant level.

Proposed construction hours (7:00 a.m. to 6:00 p.m.) would be generally consistent with those specified by the Lafayette Noise Ordinance (8:00 a.m. to 8:00 p.m.). Implementation of Measure 3.10-1b, below, would require adjusting proposed construction hours to be consistent with those in the Lafayette Noise Ordinance, which would reduce this potential impact to a less-than-significant level. When weekend construction is required, the hours would comply with local ordinances except possibly during critical water service outages or other emergencies and special situations.

Alternative 2

Proposed decommissioning and facility conversion at the Lafayette WTP would require limited earthmoving activities and would therefore have a limited potential for construction-related noise impacts. This alternative would avoid some of the potential noise impacts at the Lafayette WTP that would be associated with Alternative 1 (significant but mitigable), but much more significant noise impacts would occur along the Orinda-Lafayette Aqueduct alignment, including the tunnel entry and exit shafts (discussed below) and along the pipeline alignment in El Nido Ranch Road. This alternative would result in the same pipeline-related construction noise impacts on

Mt. Diablo Boulevard (south of the WTP) that would occur under Alternative 1. The same feasible noise controls that would be required for Alternative 1 would also be required for Alternative 2 (but fewer of the control measures would be required since construction would be more limited in scope).

Orinda WTP

Alternative 1

The nearest sensitive receptors in the vicinity of the Orinda WTP include residences 170 feet west and 250 feet east of the Alternative 1 construction boundary. As indicated in Table 3.10-5, construction-related noise increases would occur over a one- to two-year period, but would occur during the daytime hours only. Construction noise would exceed the 70-dBA speech interference criterion at the closest residential receptors. As shown in Table 3.10-5, implementation of noise controls (see Measure 3.10-1a, below) would reduce construction noise levels to below the speech interference criterion, thereby reducing any potential construction noise impacts to a less-than-significant level. Proposed construction hours (7:00 a.m. to 6:00 p.m.) would be generally consistent with those specified by the Orinda Noise Ordinance (8:00 a.m. to 6:00 p.m.). Orinda prohibits the operation of heavy equipment on weekends, and EBMUD proposes to limit weekend construction activities to maintenance and inspections (except possibly during critical water service outages or other emergencies and special situations). Implementation of Measure 3.10-1b would require adjusting the proposed construction hours to be consistent with the Orinda Noise Ordinance and restricting the operation of heavy equipment on weekends, which would reduce this potential impact to a less-than-significant level.

Alternative 2

This alternative would entail significantly more extensive earthmoving activities at the Orinda WTP than Alternative 1; however, like Alternative 1, sensitive receptors include residences located as close as 170 feet west and 250 feet east of facility locations. As indicated in Table 3.10-5, construction-related noise increases would occur over four to six years, but during the daytime hours only. With a minimum distance of 170 feet from project construction, construction noise would exceed the 70-dBA speech interference criterion at the closest residential receptors. Implementation of noise controls (see Measure 3.10-1a) would reduce construction noise levels to below the 70-dBA speech interference criterion, thereby reducing any potential construction noise impacts to a less-than-significant level.

Under this alternative, a micro-tunnel is proposed to extend from the Los Altos Pumping Plant to the Orinda-Lafayette Aqueduct tunnel portal (using the tunnel portal’s shaft). The micro-tunnel would require a shaft at the south end, adjacent to the pumping plant. If the micro-tunnel requires a pump, residential receptors located 400 feet to the southeast and 500 feet to the west could be subject to nighttime noise associated with operation of this equipment. Implementation of noise controls specified in Measures 3.10-1a, 3.10-1d (including compliance with ordinance noise limits listed in Table 3.10-1, use of line power instead of generators, and noise controls on pile drivers), and possibly Measure 3.10-1e (erection of temporary sound barriers), if necessary, would help minimize the effects of such construction noise.

Proposed construction hours (7:00 a.m. to 6:00 p.m.) would be generally consistent with those specified by the Orinda Noise Ordinance (8:00 a.m. to 6:00 p.m.). Orinda prohibits the operation of heavy equipment on weekends, and EBMUD proposes to limit weekend construction activities to maintenance and inspections (except possibly during critical water service outages or other emergencies and special situations). Implementation of Measure 3.10-1b would require adjusting the proposed construction hours to be consistent with the Orinda Noise Ordinance and restricting the operation of heavy equipment on weekends, which would reduce this potential impact to a less-than-significant level.

Walnut Creek WTP – Alternative 1 or 2

Residences are as close as 300 feet east of proposed facilities. As indicated in Table 3.10-5, construction-related noise increases would occur over a one- to two-year period, but during the daytime hours only. At 300 feet, construction noise would not exceed the 70-dBA speech interference criterion, except when trucks and impact equipment are operated. As shown in Table 3.10-5, implementation of noise controls (see Measure 3.10-1a) would reduce construction noise levels to below the speech interference criterion, thereby reducing any potential construction noise impacts to a less-than-significant level.

Proposed construction hours (7:00 a.m. to 6:00 p.m.) would be generally consistent with those specified by the Walnut Creek Noise Ordinance (7:00 a.m. to 6:00 p.m.). Implementation of Measure 3.10-1b would require adjusting the proposed construction hours to be consistent with the Walnut Creek Noise Ordinance, which would reduce this potential impact to a less-than-significant level.

Sobrante WTP – Alternative 1 or 2

Although residential receptors are 600 feet or more from existing WTP facilities east of Valley View Road, they are as close as 150 feet from facilities that would be west of Valley View Road. As indicated in Table 3.10-5, construction-related noise increases would occur over a one- to two-year period, but during the daytime hours only. Proposed construction hours of 7:00 a.m. to 6:00 p.m. on weekdays would be consistent with daytime work hours specified by the Contra Costa County General Plan. At 150 feet, construction noise would exceed the 70-dBA speech interference criterion. Contra Costa County does not specify construction noise limits. As shown in Table 3.10-5, implementation of noise controls (see Measure 3.10-1a) would reduce construction noise levels to below the speech interference criterion (although this criterion could be exceeded by 1 dB at the closest receptor if impact equipment is operated), thereby reducing any potential construction noise impacts to a less-than-significant level.

Upper San Leandro WTP – Alternative 1 or 2

Sensitive receptors in the vicinity of proposed construction include residences as close as 170 feet to the east and south. As indicated in Table 3.10-5, construction-related noise increases would occur over a one- to two-year period, but during the daytime hours only. Proposed construction hours of 7:00 a.m. to 6:00 p.m. on weekdays would be consistent with those specified by the Oakland Noise Ordinance (7:00 a.m. to 7:00 p.m.). At 170 feet, construction noise would exceed the 70-dBA speech interference criterion as well as the 65-dBA weekday noise limit specified by the Oakland Noise Ordinance for construction occurring for more than 10 days. As shown in Table 3.10-5, implementation of noise controls (see Measure 3.10-1a) would reduce construction noise levels to below the speech interference criterion and Oakland noise limit (although this criterion could be exceeded by 5 dB at the closest receptor if impact equipment is operated), thereby reducing any potential construction noise impacts to a less-than-significant level. Implementation of Measure 3.10-1c would limit the operation of impact equipment to less than 10 days, which would maintain impact equipment at levels consistent with the Oakland Noise Ordinance weekday noise limit of 80 dBA for less than 10 days.

Orinda-Lafayette Aqueduct – Alternative 2

Tunnel

Under this alternative, a tunnel would be constructed from the Orinda WTP to a location approximately 9,950 feet to the east near the Orinda-Lafayette boundary. The tunnel entry shaft would be located at the Orinda WTP (southeast corner of the Orinda Sports Field), while the tunnel exit shaft would be located at the southwest corner of the Altarinda Drive/St. Stephens Drive/ El Nido Ranch Road intersection. From the exit tunnel shaft, this facility would extend eastward to the Lafayette WTP as a pipeline. Tunnel construction would occur over two to three years.

Since the tunnel would be 75 to 400 feet below surface elevations, noise generated within the tunnel by the tunnel boring machine or tunnel muck removal system (conveyor belt and rail cars) would not be audible at the surface. The primary sources of noise associated with tunnel construction would be:

- Excavation of a 75-foot-deep entry shaft and 220-foot deep exit shaft, which could include pile driving
- Handling and removal of excavated materials (shaft and tunnel spoils) at the tunnel entry shaft, which would include operation of a crane at the surface, a skip hoist system that moves muck from the bottom of the shaft to the surface, and front loaders that load muck into haul trucks
- Operation of a crane to lower tunnel support segments into the shaft
- Continuous operation of a ventilation fan (which could be located at the bottom of the shaft or at the surface) and dewatering pumps (at the bottom of the shaft) at the entry shaft site (24 hours per day, seven days per week)
- Continuous operation of ventilation equipment and possibly dewatering pumps at the exit shaft (24 hours per day, seven days per week)
- Operation of compressors or generators at night at the entry shaft and possibly at the exit shaft
- Possible controlled detonations during shaft construction

Unlike construction of all other WTTIP facilities, tunnel construction would take place 24 hours per day, 7 days per week.

Although work in the tunnel entry shaft would typically take place 24 hours per day, construction activities at the surface (around the tunnel shaft) would be limited to operation of the crane and skip hoist during the more noise-sensitive nighttime hours. The crane would periodically lower tunnel support segments into the shaft and would also power the skip hoist (lifting muck bins along steel guide rails up the shaft). Muck handling would be limited to operation of the skip hoist (to transport muck from the bottom of the tunnel shaft to the surface) and the crane. Operation of front loaders and haul trucks would be limited to the daytime hours, although limited operation of a front loader could be required during the evening hours to stockpile muck until the next morning. The muck train, ventilation fan, and dewatering pumps would operate continuously, but would be in the tunnel and the bottom of the entry shaft; therefore, operation of this equipment would not contribute significantly to tunnel-related noise increases at the closest receptors.

Construction activities at the tunnel exit shaft would include limited worker access, daytime operation of a crane, and continuous operation of a ventilation fan and possibly dewatering pumps at the bottom of the shaft.

The nearest sensitive receptors are about 500 feet west of and 550 feet east of the tunnel entry shaft and 100 feet west of the tunnel exit shaft, both in Orinda. As indicated in Table 3.10-5, construction-related noise increases would occur over two to three years. At 500 feet from the tunnel entry shaft, daytime operation of trucks would exceed the 70-dBA speech interference criterion, but daytime operation of other types of equipment would not exceed this criterion. As shown in Table 3.10-5, implementation of noise controls (see Measure 3.10-1a) would reduce construction noise levels to below the speech interference criterion.

Table 3.10-6 indicates that nighttime construction at the tunnel entrance portal would not exceed the Orinda Noise Ordinance 55-dBA nighttime noise limit at the closest residential receptors, although operation of pumps, compressors, or generators could exceed this limit. Implementation of noise controls (see Measure 3.10-1a) would reduce construction noise levels to below the 55-dBA nighttime noise limit. However, since estimated noise levels could approach this limit, provision of a temporary sound barrier (see Measure 3.10-1e) around the portal would help ensure that construction noise levels are maintained below this limit.

Tunnel construction activities at the exit portal also would not exceed the 55-dBA limit, but operation of dewatering pumps or other stationary equipment could exceed this limit, depending the location of this equipment relative to the closest residential receptor. Implementation of noise controls (see Measure 3.10-1a) and a temporary sound barrier (see Measure 3.10-1e) might not be adequate to reduce these noise levels to below the Orinda Noise Ordinance nighttime noise limit. However, noise measurements collected at this location indicate that nighttime ambient noise levels range between 65 and 67 dBA (the nighttime standard would be adjusted to reflect ambient levels, as described in Measure 3.10-1b), and mitigated construction noise levels would be well below ambient noise levels. Therefore, implementation of Measures 3.10-1a, 3.10-1b, 3.10-1d, and 3.10-1e would maintain tunnel-related noise at a less-than-significant level.

Although noise level estimates demonstrate that Leq noise levels (i.e., all noises occurring during the measurement period) would not exceed the speech and sleep interference criteria or the applicable Orinda noise limits (see Tables 3.10-5 and 3.10-6), disturbance of the closest residential receptors could still occur, particularly if residents open windows at night. Operation of some types of equipment at both the entry and exit shafts could exceed existing nighttime ambient noise levels at the closest residential receptors. Pile-driving activities, if required during shaft construction, would be audible. Operation of generators and ventilation fans during the nighttime hours could also be audible. Implementation of noise controls specified in Measures 3.10-1a, 3.10-1d (including compliance with ordinance noise limits listed in Table 3.10-1 for ventilation fans, use of line power instead of generators, and noise controls on pile drivers), and Measure 3.10-1e (erection of temporary sound barriers) would help minimize the effects of such construction noise to a less-than-significant level, although the potential for occasional sleep disturbance cannot be completely eliminated.

During the nighttime hours, operation of the crane could generate peak noise levels (Lmax) that exceed the ambient noise levels at the closest residential receptors. When the muck bins reach the top of the shaft and are tipped to unload the muck, a clanging or booming noise can occur. These and other incidental, sudden noise peaks (as opposed to continuous noise that is more typical of traffic noise) could cause sleep disturbance, particularly if residents open windows at night. Construction of a temporary sound barrier around the tunnel shaft staging area would help reduce the adverse effects of these noise peaks.

During shaft construction, it is possible that controlled detonation could be required in areas of hard rock. Controlled detonation near the surface would be audible at adjacent receptors, resembling the sound of a very short succession of thunder claps, but noise generated by any underground controlled detonations would be somewhat attenuated by surrounding rock. Implementation of hourly limits and delay times, as specified in Measure 3.10-1d, would help to maintain the effects of controlled detonation activities at a less-than-significant level.

Proposed construction hours (24 hours per day, 7 days per week) would not be consistent with the hourly limits for construction activities specified by the Orinda Noise Ordinance (8 a.m. to 6 p.m.). Orinda prohibits the operation of heavy equipment on weekends; proposed tunnel construction would be inconsistent with this restriction. However, EBMUD generally intends (but would not be limited to) weekday construction and weekend maintenance and inspections for this project. In addition, construction noise beyond the ordinance time limits would be restricted to the ordinance's nighttime noise standards.

Pipeline

The nearest sensitive receptors are located about 25 feet from the pipeline alignment. Bentley School is also adjacent to the pipeline alignment. Pipeline construction would occur over approximately one to two years. As indicated in Table 3.10-5, construction-related noise increases would occur during the daytime hours only. However, some equipment (e.g., pumps and generators for dewatering, if needed) associated with jack-and-bore construction would operate 24 hours per day in the vicinity of Bentley School. If a ventilation fan is required for the jack-and-bore pit and the fan must operate 24 hours per day, fan operation would need to be consistent with the noise ordinance limits listed in Table 3.10-1 (see Measure 3.10-1d, second bullet). Other noise control measures under Measure 3.10-1a, such as the bullet addressing pile driving, would also be applied for noise associated with pit construction.

At setback distances of 25 feet or less, construction noise would exceed the 70-dBA speech interference criterion and the City's 80-dBA noise ordinance limit at the closest affected property both without and with implementation of noise controls (see Measure 3.10-1a). Although noise levels would exceed these criteria, it should be noted that mitigated construction levels of 75 dBA or less (80 dBA for impact equipment) at 50 feet would be consistent with noise levels allowed by the Lafayette Noise Ordinance (83 dBA at 50 feet), as long as such noise occurs within specified construction times. Section 5-209 of the Lafayette Municipal Code also provides exceptions if compliance would be impractical or unreasonable (Sinnette, 2006). In addition, pipeline construction would not affect any one receptor for more than about two weeks (plus a couple of additional days for paving the trench), reducing the potential for significant noise impacts. Therefore, implementation of noise and time controls (see Measures 3.10-1a and 3.10-1b) would help maintain the potential effects of this temporary noise impact at a less-than-significant level.

Proposed pipeline construction hours (8:30 a.m. to 4:30 p.m.) would be consistent with construction time limits specified by the Lafayette and Orinda Noise Ordinances (8 a.m. to 8 p.m. and 8 a.m. to 6 p.m., respectively).

Ardith Reservoir and Donald Pumping Plant

Residences surround this site and are located as close as 100 feet from proposed construction. As indicated in Table 3.10-5, construction-related noise increases would occur over a one- to two-year period for construction of the Ardith Reservoir and Donald Pumping Plant, but during the daytime hours only. With a minimum distance of 100 feet from project construction, construction noise would exceed the 70-dBA speech interference criterion at the closest residential receptors. Implementation of noise controls (see Measure 3.10-1a) would reduce construction noise levels to below the 70-dBA speech interference criterion, except for impact equipment. However, impact-equipment-related noise would exceed the speech interference criterion by only 5 dB, and it is expected that the Leq noise level could be reduced by 5 dB by erecting a temporary sound barrier between the impact equipment and affected residential receptors (see Measure 3.10-1e), thereby reducing any potential construction noise impacts to a less-than-significant level.

Proposed construction hours (7:00 a.m. to 6:00 p.m.) would be generally consistent with those specified by the Orinda Noise Ordinance (8:00 a.m. to 6:00 p.m.). Implementation of Measure 3.10-1b would require adjusting the proposed construction hours to be consistent with the Orinda Noise Ordinance, which would reduce this potential impact to a less-than-significant level.

Fay Hill Pumping Plant and Pipeline Improvements

There are no sensitive receptors immediately adjacent to proposed facilities, although there are residential uses as close as 100 feet south of the southern end of the pipeline alignment. As indicated in Table 3.10-5, construction-related noise increases would occur over a one- to two-year period for both the pumping plant and pipeline. At 100 feet, construction noise would exceed the 70-dBA speech interference criterion. Implementation of noise controls (see Measure 3.10-1a) would reduce construction noise levels to below the 70-dBA speech interference criterion, except for impact equipment. However, impact equipment-related noise would exceed the speech interference criterion by only 5 dB, and the Leq noise level could be reduced by 5 dB by erecting a temporary sound barrier between the impact equipment and affected residential receptors (see Measure 3.10-1e), thereby reducing any potential construction noise impacts to a less-than-significant level.

Proposed pumping plant construction hours (7:00 a.m. to 6:00 p.m.) and pipeline construction hours (8:30 a.m. to 4:30 p.m.) would be generally consistent with those specified by the Moraga Noise Ordinance (8:00 a.m. to 5:00 p.m.). Although there are no sensitive receptors in the vicinity of the pumping plant, adjusting the proposed construction hours to be consistent with the Moraga Noise Ordinance (Measure 3.10-1b) would reduce this potential impact to a less-than-significant level.

Fay Hill Reservoir

There are no existing residential uses near this site, but there are residences along Rheem Boulevard, and residential projects are proposed along the lower section of the access road (off Rheem Boulevard) and east of the reservoir site. As indicated in Table 3.10-5, construction-related noise increases would occur over a one- to two-year period, but during the daytime hours only. If there are any future residences constructed within 100 feet of this site, construction noise would exceed the 70-dBA speech interference criterion, and implementation of noise controls (see Measure 3.10-1a) would be required. At 100 feet, these measures would reduce construction noise levels to below the 70-dBA speech interference criterion, except for impact equipment. However, impact-equipment-related noise would exceed the speech interference criterion by only 5 dB, and the Leq noise level could be reduced by 5 dB by erecting a temporary sound barrier between the impact equipment and affected residential receptors (see Measure 3.10-1e), thereby reducing any potential construction noise impacts to a less-than-significant level.

Proposed construction hours (7:00 a.m. to 6:00 p.m.) would be generally consistent with those specified by the Moraga Noise Ordinance (8:00 a.m. to 5:00 p.m.). If there are any future residences constructed in the vicinity of this reservoir, Measure 3.10-1b (adjusting the proposed construction hours to be consistent with the Moraga Noise Ordinance) would need to be implemented to reduce this potential impact to a less-than-significant level.

Glen Pipeline Improvements

There are residential uses immediately adjacent to the proposed pipeline alignment (setbacks vary from 25 to 75 feet). As indicated in Table 3.10-5, construction-related noise increases would occur over a one-year period, but during the daytime hours only. Proposed construction hours (8:30 a.m. to 4:30 p.m.) would be consistent with those specified by the Lafayette Noise Ordinance (8 a.m. to 8 p.m.). At 25 feet, construction noise would exceed the 70-dBA speech interference criterion and the City's 80-dBA noise ordinance limit at the closest affected property both without and with implementation of noise controls (see Measure 3.10-1a). Although noise levels would exceed these criteria, it should be noted that mitigated construction levels of 75 dBA or less (80 dBA for impact equipment) at 50 feet would be consistent with noise levels allowed by the Lafayette Noise Ordinance (83 dBA at 50 feet), as long as such noise occurs within specified construction times. Section 5-209 of the Lafayette Municipal Code also provides exceptions if compliance would be impractical or unreasonable (Sinnette, 2006). In addition, pipeline construction would not affect any one receptor for more than about two weeks (plus a couple of additional days for paving the trench), reducing the potential for significant noise impacts. Residential setbacks vary from 25 to over 100 feet; noise levels at residences set back 100 feet or more would be reduced to a less-than-significant level. Therefore, implementation of noise and time controls (see Measures 3.10-1a and 3.10-1b) would help maintain the potential effects of this temporary noise impact at a less-than-significant level.

Happy Valley Pumping Plant and Pipeline

Sensitive receptors along the pipeline alignment include residential uses and the Orinda Country Club Golf Course, which are located as close as 50 feet from the pipeline alignment. Single-family residences are located approximately 50 feet to the east, 180 feet to the west, 200 feet to the north, and 350 feet to the south of the pumping plant site. As indicated in Table 3.10-5, pumping plant and pipeline construction would occur over one to two years. At 50 feet, construction noise would exceed the 70-dBA speech interference criterion both without and with implementation of noise controls (see Measure 3.10-1a). With noise controls, construction noise levels would still exceed the speech interference criterion by approximately 5 dB for most types of construction equipment and 11 dB for impact equipment (e.g., jackhammers). Provision of a temporary noise barrier between the pumping plant construction site and the closest residence to the east (any residence less than 100 feet from the construction site), as specified in Measure 3.10-1e, would be adequate to reduce construction noise to a less-than-significant level.

Proposed pipeline construction hours (8:30 a.m. to 4:30 p.m.) and pumping plant construction hours (7:00 a.m. to 6:00 p.m.) would be generally consistent with those specified by the Orinda Noise Ordinance (8 a.m. to 6 p.m.). Implementation of Measure 3.10-1b would require adjusting the proposed construction hours to be consistent with the Orinda Noise Ordinance, which would reduce this potential impact to a less-than-significant level.

Highland Reservoir and Pipelines

The closest sensitive receptors to the reservoir include recreationists at the Lafayette Reservoir (the Lakeside Trail is approximately 250 feet to the south, while the Rim Trail is located as close as 25 feet) and residential uses (approximately 1,500 feet to the east and separated by topography). The pipeline alignment is located as close as 620 feet from residences. As indicated in Table 3.10-5, reservoir and pipeline construction-related noise increases would occur over a one- to two-year period. At 25 and 250 feet, reservoir construction would exceed the 60-dBA speech interference criterion for outdoor uses at the Rim Trail as well as the Lakeside Trail. However, existing topography between the reservoir site and Lakeside Trail would reduce construction noise to below the 60-dBA outdoor speech interference criterion. As shown in Table 3.10-5, at 25 feet, noise levels at the Rim Trail would still exceed this criterion with implementation of noise controls (see Measure 3.10-1a). However, Rim Trail users would be subject to noise levels above the 60-dBA speech interference criterion only briefly, while they are walking past the reservoir site. Therefore, implementation of noise controls (see Measure 3.10-1a) would reduce construction noise impacts on Rim Trail users to a less-than-significant level.

At 620 feet, daytime construction noise associated with pipeline construction would not exceed the 70-dBA speech interference criterion or the City's noise ordinance limit of 80 dBA at the closest affected residential property. However, noise levels would exceed the Lafayette Noise Ordinance limit of 83 dBA at 50 feet. As shown in Table 3.10-5, implementation of noise controls (see Measure 3.10-1a) would reduce construction noise levels to below the 83-dBA noise ordinance limit, thereby reducing any potential daytime pipeline construction noise impacts to a less-than-significant level.

The section of pipeline that crosses under the Lafayette Reservoir Recreation Area's access road would be constructed at night to minimize conflicts with daytime recreation traffic. Nighttime construction would occur over two to four nights. Since construction would occur beyond the Lafayette Noise Ordinance's time limits (8 a.m. to 6:00 p.m.), the ordinance's nighttime noise limit of 53 dBA would apply (see Table 3.10-1). Table 3.10-6 indicates that pipeline-related construction noise levels at the closest residences would exceed the 53-dBA noise limit. Table 3.10-6 also indicates that implementation of noise controls (see Measure 3.10-1a) would reduce construction noise levels to below the 53-dBA noise ordinance limit, except for impact equipment. However, impact-equipment-related noise would exceed this criterion by only 5 dB, and the Leq noise level could be reduced to below this criterion (see Table 3.10-6) by erecting a temporary sound barrier between the impact equipment and affected residential receptors (see Measure 3.10-1e), thereby reducing any potential construction noise impacts to a less-than-significant level. Proposed daytime reservoir and pipeline construction hours (7:00 a.m. to 6:00 p.m.) would be generally consistent with those specified by the Lafayette Noise Ordinance (8:00 a.m. to 8:00 p.m.), but nighttime pipeline construction would occur beyond these ordinance time limits. Implementation of Measure 3.10-1b would require adjusting the proposed daytime construction hours to be consistent with the Lafayette Noise Ordinance, which would reduce this potential impact to a less-than-significant level. Nighttime construction would be subject to ordinance nighttime noise limits, as discussed above.

Lafayette Reclaimed Water Pipeline

The closest sensitive receptors to the pipeline alignment include recreationists at the Lafayette Reservoir (the Lakeside Trail is approximately 150 feet to the south, while the Rim Trail is located adjacent to the south end of this pipeline) and residential uses (as close as 620 feet to the east). As indicated in Table 3.10-5, pipeline construction-related noise increases would occur over a one- to two-year period (occurring in conjunction with the Highland Reservoir and Pipelines project). At 620 feet, daytime construction noise associated with pipeline construction would not exceed the 70-dBA speech interference criterion or the City's noise ordinance limit of 80 dBA at the closest affected residential property. However, noise levels would exceed the Lafayette Noise Ordinance limit of 83 dBA at 50 feet. As shown in Table 3.10-5, implementation of noise controls (see Measure 3.10-1a) would reduce construction noise levels to below the 83-dBA noise ordinance limit, thereby reducing any potential daytime pipeline construction noise impacts on residential uses to a less-than-significant level.

Since the pipeline ends at the Rim Trail, there would be a brief period of construction adjacent to this trail when pipeline construction noise would exceed the 60-dBA speech interference criterion for outdoor uses. Topography would likely reduce pipeline construction noise at the Lakeside Trail to below the 60-dBA outdoor speech interference criterion. Although pipeline construction noise would exceed the 60-dBA criterion where it is located in proximity to the Rim Trail, it would only occur briefly, while people are walking past the pipeline construction area. Therefore, implementation of noise controls (see Measure 3.10-1a) would reduce construction noise impacts on Rim Trail users to a less-than-significant level.

Like the Highland Inlet/Outlet Pipeline, the section of pipeline that crosses under the Lafayette Reservoir Recreation Area's access road would be constructed at night to minimize conflicts with daytime recreation traffic. Nighttime construction would occur over two to four nights. Since construction would occur beyond the Lafayette Noise Ordinance's time limits (8 a.m. to 8:00 p.m.), the ordinance's nighttime noise limit of 53 dBA would apply (see Table 3.10-1). As indicated in Table 3.10-6, pipeline-related construction noise levels at the closest residences would exceed the 53-dBA noise limit. The table also indicates that implementation of noise controls (see Measure 3.10-1a) would reduce construction noise levels to below the 53-dBA noise ordinance limit, except for impact equipment. However, impact-equipment-related noise would exceed this criterion by only 5 dB, and the Leq noise level could be reduced to below this criterion (see Table 3.10-6) by erecting a temporary sound barrier between the impact equipment and affected residential receptors (see Measure 3.10-1e), thereby reducing any potential construction noise impacts to a less-than-significant level.

Leland Isolation Pipeline and Bypass Valves

Sensitive receptors in the pipeline vicinity include residences along Lacassie Avenue, west of North California Boulevard, which are as close as 300 feet to the west. Sensitive receptors are located as close as 50 feet from the proposed bypass valves. As indicated in Table 3.10-5, construction-related noise increases would occur over a one-year period for the pipeline and a one-week period for the bypass valves, but during the daytime hours only. Proposed construction hours (8:30 a.m. to 4:30 p.m.) would be consistent with those specified by the Walnut Creek Noise Ordinance (7 a.m. to 6 p.m.). At 300 feet, pipeline construction noise would not exceed the 70-dBA speech interference criterion, except when trucks and impact equipment are operated. As shown in Table 3.10-5, implementation of noise controls (see Measure 3.10-1a) would reduce construction noise levels to below the speech interference criterion, thereby reducing any potential construction noise impacts to a less-than-significant level. At 50 feet, bypass valve construction noise would exceed the 70-dBA speech interference criterion both with and without noise controls (see Measure 3.10-1a). However, implementation of noise controls is considered to reduce construction noise impacts to a less-than-significant level due to the short duration of project construction (one week).

Moraga Reservoir

Residential uses completely surround this project site and are located a minimum of approximately 50 feet to the east, 100 feet to the southwest, and 150 feet to the northwest and northeast. As indicated in Table 3.10-5, construction-related noise increases would occur over a one- to two-year period, but during the daytime hours only. At 50 feet, construction noise would exceed the 70-dBA speech interference criterion both with and without implementation of noise controls (see Measure 3.10-1a). With noise controls, construction noise levels would still exceed the speech interference criterion by approximately 5 dB for most types of construction equipment and 11 dB for impact equipment (e.g., jackhammers). Provision of a temporary noise barrier between the reservoir construction site and the closest residences to the east (any residence less than 100 feet from the construction site), as specified in Measure 3.10-1e, would be adequate to reduce construction noise to a less-than-significant level.

While reservoir construction would occur during the daytime hours only, some equipment (e.g., pumps and generators for dewatering, if needed) associated with jack-and-bore construction would operate 24 hours per day. Equipment operation would be mitigated so as not to cause noise disturbance at adjacent residences, as required by the Moraga Municipal Code (see Table 3.10-1 and Measure 3.10-1d, second bullet). Proposed construction hours (7:00 a.m. to 6:00 p.m.) on weekdays only would not be entirely consistent with those specified by the Moraga Noise Ordinance (8:00 a.m. to 5:00 p.m.). Implementation of Measure 3.10-1b would require adjusting the proposed construction hours to be consistent with the Moraga Noise Ordinance, which would reduce this potential impact to a less-than-significant level.

Moraga Road Pipeline

Sensitive receptors include residential uses immediately adjacent to some pipeline segments (mostly within about 50 feet, with a few homes as close as 25 feet), and Campolindo High School, which is as close as 100 feet west of the pipeline alignment. As indicated in Table 3.10-5, construction-related noise increases would occur over a one- to two-year period, but during the daytime hours only. At 50 feet or less, construction noise would exceed the 70-dBA speech interference criterion both without and with implementation of noise controls (see Measure 3.10-1a). Although noise levels would exceed this criterion, mitigated construction levels of 75 dBA or less (80 dBA for impact equipment) at 50 feet would be consistent with noise levels allowed by the Lafayette Noise Ordinance (83 dBA at 50 feet or 80 dBA at the closest affected property), as long as such noise occurs within specified construction times. At 100 feet (such as Campolindo High School), these measures would reduce construction noise levels to below the 70-dBA speech interference criterion, except for impact equipment. Despite potential exceedance of the speech interference criterion by 5 dB due to impact equipment, pipeline construction would not affect any one receptor for more than about two weeks (plus a couple of additional days for paving the trench), reducing the potential for significant noise impacts. Therefore, implementation of noise controls (see Measures 3.10-1a) and conformance with applicable ordinance time limits would help maintain the potential effects of this temporary noise impact at a less-than-significant level.

Proposed pipeline construction hours (8:30 a.m. to 4:30 p.m.) would be consistent with construction time limits specified by the Lafayette and Moraga Noise Ordinances (8 a.m. to 8 p.m. and 8 a.m. to 5 p.m., respectively).

Sunnyside Pumping Plant

There is a single-family residence approximately 175 feet to the north of this proposed facility, and a residence is planned on the property to the south. As indicated in Table 3.10-5, construction-related noise increases would occur over a one- to two-year period, during the daytime hours only. At 175 feet, construction noise would exceed the 70-dBA speech interference criterion and Lafayette Noise Ordinance limits of 83 dBA at 50 feet, but not the 80-dBA limit at the closest affected property. Implementation of noise controls (see Measure 3.10-1a) would reduce construction noise levels to below the noise ordinance limits and 70-dBA speech interference criterion, thereby reducing any potential construction noise impacts to a less-than-significant level. Proposed construction hours (7:00 a.m. to 6:00 p.m.) would be generally consistent with those specified by the Lafayette or Orinda Noise Ordinances (8:00 a.m. to 8:00 p.m. and 8:00 a.m. to 6:00 p.m., respectively). Implementation of Measure 3.10-1b would require adjusting the proposed construction hours to be consistent with the Lafayette and Orinda Noise Ordinances, which would reduce this potential impact to a less-than-significant level.

Tice Pumping Plant and Pipeline

A single-family residence is about 200 feet west of the pumping plant site, and multiple residences are immediately adjacent to the proposed pipeline alignment (potentially as close as 25 feet). As indicated in Table 3.10-5, pumping plant and pipeline construction-related noise increases would occur over a one- to two-year period. At 200 feet, pumping plant construction noise would exceed the 70-dBA speech interference criterion. Implementation of noise controls (see Measure 3.10-1a) would reduce construction noise levels to below the noise ordinance limit and 70-dBA speech interference criterion. Therefore, this potential impact would be reduced to less-than-significant. At 25 feet, pipeline construction noise would exceed the 70-dBA speech interference criterion both without and with implementation of noise controls (see Measure 3.10-1a). However, pipeline construction would not affect any one receptor for more than about two weeks (plus a couple of additional days for paving the trench), reducing the potential for significant noise impacts. Contra Costa County does not specify construction noise limits.

Proposed pumping plant construction hours (7:00 a.m. to 6:00 p.m.) and pipeline construction hours (8:30 a.m. to 4:30 p.m. on weekdays) would be consistent with daytime work hours specified by the Contra Costa County General Plan.

Withers Pumping Plant

Single-family residences surround the project site, approximately 150 feet to the south, 200 feet to the northeast (across Reliez Valley Road), and 300 feet to the northwest. As indicated in Table 3.10-5, construction-related noise increases would occur over a one- to two-year period, during the daytime hours only. At 150 feet, construction noise would exceed the 70-dBA speech interference criterion. Contra Costa County does not specify construction noise limits. As shown in Table 3.10-5, implementation of noise controls (see Measure 3.10-1a) would reduce construction noise levels to below the speech interference criterion (although this criterion could be exceeded by 1 dB at the closest receptor if impact equipment is operated), thereby reducing any potential construction noise impacts to a less-than-significant level.

Proposed construction hours (7:00 a.m. to 6:00 p.m.) would be consistent with daytime work hours specified by the Contra Costa County General Plan.

Mitigation Measures

Measure 3.10-1a: The District will incorporate into contract specifications a requirement that construction activities at the construction site not cause daytime noise levels to exceed the 70-dBA speech interference criterion at the closest affected sensitive receptors, as well as that noise levels are consistent with local ordinances (see Table 3.10-1). Measures that would be implemented to reduce noise levels (as demonstrated in Table 3.10-5) to meet this criterion include the following:

- Truck operations (haul trucks and concrete delivery trucks) will be limited to the daytime hours, as described in Measure 3.10-1b.

- Best available noise control techniques (including mufflers, intake silencers, ducts, engine enclosures, and acoustically attenuating shields or shrouds) will be used for all equipment and trucks as necessary.

- If impact equipment (e.g., jack hammers, pavement breakers, and rock drills) is used during project construction, hydraulically or electric-powered equipment will be used wherever possible to avoid the noise associated with compressed-air exhaust from pneumatically powered tools. However, where use of pneumatically powered tools is unavoidable, an exhaust muffler on the compressed-air exhaust will be used (a muffler can lower noise levels from the exhaust by up to about 10 dB). External jackets on the tools themselves will be used, where feasible, which could achieve a reduction of 5 dB. Quieter procedures, such as drilling rather than impact equipment, will be used whenever feasible.

- Wherever pile driving is required (possibly at tunnel shafts, jack-and-bore pit shafts, Moraga Reservoir, and Tice Pumping Plant), pile holes will be predrilled to minimize the duration of pile driving.

- Stationary noise sources will be located as far from sensitive receptors as possible. If they must be located near receptors, adequate muffling (with enclosures) will be used to ensure local noise ordinance limits are met. Enclosure opening or venting will face away from sensitive receptors. Enclosures will be designed by a registered engineer regularly involved in noise control analysis and design. Operation of any stationary equipment beyond the time limits specified will meet applicable noise ordinance noise limits (see Measure 3.10-1b).

- Material stockpiles as well as maintenance/equipment staging and parking areas will be located as far as practicable from residential and school receptors.

- If any pipeline construction zones are located within 50 feet of school classrooms or childcare facilities, pipeline construction activities (or at least the noisier phases of construction) will be scheduled on weekend or school vacation days to the extent feasible, avoiding weekday hours when schools are in session. If construction must occur when school is in session, construction noise will comply with applicable noise ordinance noise limits (e.g., 83 dBA at 50 feet in Lafayette, etc.).

- An EBMUD contact person will be designated for responding to construction-related issues, including noise. The name and phone number of the liaison will be conspicuously posted at construction areas, on all advanced notifications, and on the EBMUD project website. This person will take steps to resolve complaints, including periodic noise monitoring, if necessary.

Measure 3.10-1b: Construction at the WTTIP project sites will be restricted to the hours of operation specified by each jurisdiction's noise ordinance (as listed in Table 3.10-1, including restrictions provided in footnotes and any other ordinance exceptions and provisions in effect at the time of EIR publication), except during critical water service outages or other emergencies and special situations. Any equipment operating beyond these hours will be subject to the day and night noise limits of each jurisdiction (as listed in Table 3.10-1) for various activities in single-family residential zones. To ensure that these standards could be met at the closest sensitive receptors, EBMUD will conduct a noise monitoring program prior to implementation of any project where construction would extend beyond ordinance time limits to accurately determine baseline ambient noise levels at the closest residential receptors and to measure noise levels at these receptors during a test run of equipment proposed to be operated on the site during the more noise-sensitive nighttime hours. Project noise limits will be adjusted appropriately depending on the existing ambient noise levels[2] to ensure noise disturbance is maintained at a less-than-significant level at the closest residential receptors. Measures that could be implemented to reduce noise levels (as demonstrated in Table 3.10-6) to meet local nighttime standards include engine controls listed in Measure 3.10-1a, tunnel-related measures listed in Measure 3.10-1c, and temporary sound barriers listed in Measure 3.10-1e.

Measure 3.10-1c: At the Upper San Leandro WTP, EBMUD will make a reasonable effort to limit operation of impact construction equipment to less than 10 days to be consistent with Oakland Noise Ordinance construction noise limits. However, if this limit cannot be achieved, construction at this site will occur in a manner consistent with the Oakland City

[2] If baseline noise levels already exceed standards at the closest residential receptors, the standards will be increased appropriately so that construction noise levels do not result in a noticeable increase in ambient noise levels at these receptors.

Council Adopted Construction Noise Mitigation Measures to the extent feasible (included as Appendix G).

Measure 3.10-1d: The District will incorporate into the contract specifications the following requirements to reduce construction-related noise levels associated with the Orinda-Lafayette Aqueduct and any other WTTIP projects that involve construction of tunnel shafts (including any jack-and-bore pits where equipment would operate 24 hours per day):

- The construction contractor will be required to retain an acoustical engineer to design sound abatement measures that will meet the local ordinance limits. Among other things, the acoustical engineer will provide design specifications for the sound barrier design and the specific ventilation fan to be used (based on type, size, orientation, location, exhaust, etc.) at tunnel portals.
- Quiet tunnel ventilation fans will be used and will be directed away from sensitive receptors. Since they would operate 24 hours per day, the fans must meet the noise ordinance limits listed in Table 3.10-1. Additional measures that could be employed to reduce fan noise, if necessary, include enclosing fans, treating the interior surface of the enclosure for acoustical absorption, or using silencers or acoustically lined inlet plena to control the inlet noise.
- Prior to construction, baseline noise measurements will be taken at the entry and exit shafts. If baseline ambient noise levels already exceed applicable noise ordinance limits at the closest residential receptors, the standards will be increased appropriately so that construction noise levels do not result in a noticeable increase in ambient noise levels at these receptors.
- Loader operations at the surface (the area outside the tunnel shaft) in the tunnel portal vicinities will cease at 6 p.m. on weekdays and not operate on weekends in accordance with the Orinda Noise Ordinance, except during critical water service outages or other emergencies and special situations.
- Other measures will be implemented wherever possible to reduce impact noise. For example, bins used to transport spoils, including rocks and debris, will be constructed of nonmetallic material or have a nonmetallic liner (such as cardboard), if feasible, to reduce impact noise. Muck box tipping/dumping at the surface will be performed in a manner that minimizes clanging, banging, or booming noises (metal to metal contact) during the evening and nighttime hours (6 p.m. to 8:00 a.m. on weekdays).
- Underground controlled detonation in the tunnel shaft areas will be restricted to the hours of 8:00 a.m. to 6:00 p.m. (in accordance with the Orinda Noise Ordinance). In addition, the amount of explosive and the delay times of any explosive charges used will be limited so as to produce a maximum noise level at the closest adjacent receptor of 60 dBA (Ldn).
- Backup alarms on any equipment will not be operated during nighttime hours (10:00 p.m. to 7:00 a.m.).
- Sound barriers will be erected around the tunnel entry and exit shafts to minimize noise impacts on adjacent receptors, as specified in Measure 3.10-1e.

- Proposed jack-and-bore pits will be located as far from sensitive receptors as technically feasible.

Measure 3.10-1e: Wherever a sensitive receptor is located within 150 feet of a construction site at a treatment plant, reservoir, or pumping plant, and at both tunnel shafts, temporary sound barriers will be provided between the construction site and the closest receptors to reduce noise levels to below the speech interference criterion at the closest receptor. The applicable ordinance nighttime noise standard will also be applied at tunnel portals where nighttime activities are proposed. As a rule, the elevation of the barrier should be sufficient to interrupt the line-of-sight between the residential receptors and the tops of stacks (exhaust pipes) of construction equipment by about 5 to 10 feet. Sound-absorbing blankets can also be used at appropriate locations as necessary to protect nearby residents.

Any openings in sound barriers that are provided for truck/vehicle access will be located away from sensitive receptors. For example, sound barriers could be constructed around the entrance tunnel shaft, and the opening to the tunnel staging area could be located on the south side so that tunnel-related noise would be oriented to the south, toward the existing WTP rather than toward residential receptors to the west and east and school receptors to the north.

It should be noted that although mitigation measures would reduce construction noise levels to meet local ordinance criteria (as indicated in Tables 3.10-5 and 3.10-6), mitigated construction noise could still cause occasional disturbance at the closest noise-sensitive receptors.

Impact 3.10-2: Increased noise levels along truck haul routes.

Truck noise levels depend on vehicle speed, load, terrain, and other factors. The effects of construction-related truck traffic would depend on the level of background noise already occurring at a particular receptor site. In quiet noise environments (Leq averaging 50 dBA), one truck per hour would be noticeable, even though such a low volume would not measurably increase noise levels. In slightly noisier environments (Leq averaging 60 dBA), the threshold level is higher, and it would take 10 trucks per hour to noticeably increase the noise exposure. In moderately noisy environments (Leq averaging 70 dBA), a noise increase would be perceptible with the addition of 100 trucks per hour.

In quiet environments or during quieter times of the day, truck noise is mainly a single-event disturbance; although the hourly average associated with short, single events is not very high, individual noise peaks of up to 91 dBA at 50 feet can occur during a single truck passage. In noisy environments or during less noise-sensitive hours, truck noise is perceived as a part of the total noise environment rather than as an individual disturbance. It is important to note that haul truck volumes would vary from day to day, and the maximum volumes listed in Table 3.10-7 would primarily occur during the excavation, concrete placement, and backfilling stages of construction.

TABLE 3.10-7
ESTIMATED MAXIMUM TRUCK TRIPS ALONG HAUL ROUTES

WTTIP Component	Maximum One-Way Truck Trips		Leq[a] (in dBA)
	Daily	Hourly	
Water Treatment Facilities			
Lafayette WTP			
Alternative 1	72	12	61
Alternative 2	12	2	53
Orinda WTP			
Alternative 1	72	10	60
Alternative 2	144	21	63
Walnut Creek WTP			
Alternative 1 or 2	24	4	56
Sobrante WTP			
Alternative 1 or 2	72	10	60
Upper San Leandro WTP			
Alternative 1 or 2	72	10	60
Pipeline and Tunnel Facilities			
Orinda-Lafayette Aqueduct (Tunnel)	158	16	62
Orinda-Lafayette Aqueduct (Pipeline)	84	10	60
Fay Hill Pipeline	22	3	55
Glen Pipeline Improvements	11	3	55
Happy Valley Pipeline	14	2	53
Highland Inlet/Outlet Pipeline and Lafayette Reclaimed Water Pipeline	34	4	56
Leland Isolation Pipeline	24	3	55
Moraga Road Pipeline	76	10	60
Tice Pipeline	36	4	56
Reservoir Facilities			
Ardith Reservoir	168	24	64
Fay Hill Reservoir	232	24	64
Highland Reservoir	168	24	64
Moraga Reservoir	168	24	64
Pumping Plants			
Donald Pumping Plant	76	10	60
Fay Hill Pumping Plant	6	1	50
Happy Valley Pumping Plant	14	2	53
Sunnyside Pumping Plant	14	2	53
Tice Pumping Plant	76	10	60
Withers Pumping Plant	98	12	61

[a] Leq noise levels for trucks are hourly Leq noise levels based on maximum overlapping haul truck and materials truck estimates for each project (see Appendix B), which occur primarily during the excavation or backfilling construction phases.

The hours for hauling excavated materials and for deliveries would be limited to 9:00 a.m. to 4:00 p.m.), and night and evening truck trips would not normally occur. Thus, there would be little or no contribution of truck noise to the CNEL during the more sensitive evening and nighttime hours. Haul routes that would be used during implementation of the WTTIP would vary from local residential streets with quiet noise environments to arterials with moderately noisy environments. In most cases, off-hauling of spoils from facility sites would require haul trucks to travel to/from the sites along local residential streets to arterial streets, and then to regional freeways. Table 3.10-7 presents the estimated maximum hourly one-way truck trips associated with construction of each WTTIP facility and corresponding hourly noise levels. When overlapping project schedules are considered, collective haul truck noise increases could occur if the same haul routes are used. These collective noise increases are discussed in Chapter 5, Cumulative Impacts.

Based on noise measurements collected in the Lamorinda area, most residential streets located away from freeways and major arterials are generally subject to daytime noise levels between 50 and 60 dBA (Leq). Daytime noise levels along arterials (such as Camino Pablo) are generally between 60 and 70 dBA (Leq). Areas adjacent to Highway 24 are generally subject to daytime noise levels of 70 dBA or higher. Based on a comparison of the haul truck noise levels shown in Table 3.10-7 with the ambient noise environments, project-related haul truck volumes would be noticeable on the quiet residential streets (average Leq of 50 to 60 dBA), since even one truck per hour may be noticeable. Along arterials (average Leq of 60 to 70 dBA), haul truck volumes would also be noticeable on days when peak truck volumes of 10 or more trips per hour occur. Peak hourly truck volumes would not be noticeable in areas adjacent to freeways (average Leq of 70 dBA or more).

Lafayette WTP

Alternative 1

As indicated in Table 3.10-7, the maximum hourly truck volume would generate a maximum noise level of 61 dBA (Leq). This increase over existing conditions could be noticeable[3] on arterials and residential streets. The primary access route to this site would be Highway 24 and Mt. Diablo Boulevard, a four-lane arterial roadway. Since no residential streets would be subject to haul truck noise increases, and no sensitive receptors are adjacent to this section of Mt. Diablo Boulevard, temporary increases in truck traffic along this route are not expected to significantly affect any sensitive receptors. Estimated maximum hourly truck noise levels would not exceed the 70-dBA speech interference criterion, and therefore short-term maximum noise increases that could result from project-related trucks would be less than significant. In addition, offsite truck trips to or from project sites will be restricted to the hours of 9:00 a.m. until 4:00 p.m., Monday through Friday, which would further reduce the potential for noise impacts.

3 The use of the term “noticeable” in this EIR section typically refers to an increase of 3 to 5 dB.

Alternative 2

As indicated in Table 3.10-7, the maximum hourly truck volume would generate a maximum noise level of 53 dBA (Leq). This increase over existing conditions would not be noticeable on arterials streets providing access to the Lafayette WTP. Under this alternative, no residential streets would be subject to haul truck noise increases, and no sensitive receptors are adjacent to this section of Mt. Diablo Boulevard. In addition, offsite truck trips to or from project sites will be restricted to the hours of 9:00 a.m. until 4:00 p.m., Monday through Friday, which would further reduce the potential for noise impacts.

Orinda WTP – Alternative 1 or 2

As indicated in Table 3.10-7, the maximum hourly truck volumes would generate maximum noise levels of 60 and 63 dBA (Leq). This increase over existing conditions could be noticeable on arterials and residential streets. The primary access route to this site from Highway 24 would be Camino Pablo, a two- and four-lane arterial roadway. Residential receptors along Camino Pablo could be subject to noise increases of 3 to 4 dB during the daytime hours. Although such increases could be noticeable to some residents, the estimated maximum hourly truck noise levels would not exceed the 70-dBA speech interference criterion. Therefore, short-term maximum noise increases due to project-related trucks would be less than significant. In addition, offsite truck trips to or from project sites will be restricted to the hours of 9:00 a.m. until 4:00 p.m., Monday through Friday, which would further reduce the potential for noise impacts.

Walnut Creek WTP – Alternative 1 or 2

As indicated in Table 3.10-7, the maximum hourly truck volume would generate a maximum noise level of 56 dBA (Leq). This increase over existing conditions would be noticeable on residential streets providing access to this site. The primary access route to this site would be Larkey Lane and San Luis Road. Residential receptors located along these roads would be subject to noticeable increases in truck traffic noise, but the estimated maximum hourly truck noise levels would not exceed the 70-dBA speech interference criterion. Therefore, short-term maximum noise increases due to project-related trucks would be less than significant. In addition, offsite truck trips to or from project sites will be restricted to the hours of 9:00 a.m. until 4:00 p.m., Monday through Friday, which would further reduce the potential for noise impacts.

Sobrante WTP – Alternative 1 or 2

As indicated in Table 3.10-7, the maximum hourly truck volume would generate a maximum noise level of 60 dBA (Leq). This increase over existing conditions would be noticeable on arterial and residential streets providing access to this site. The primary access route to this site would be San Pablo Dam Road, Valley View Road, and Amend Road. Residential receptors located along these roads would be subject to noticeable increases in truck traffic noise, but the estimated maximum hourly truck noise levels would not exceed the 70-dBA speech interference criterion. Therefore, short-term maximum noise increases due to project-related trucks would be less than significant. In addition, offsite truck trips to or from project sites will be restricted to the hours of 9:00 a.m. until 4:00 p.m., Monday through Friday, which would further reduce the potential for noise impacts.

Upper San Leandro WTP – Alternative 1 or 2

As indicated in Table 3.10-7, the maximum hourly truck volume would generate a maximum noise level of 60 dBA (Leq). This increase over existing conditions would be noticeable on arterial and residential streets providing access to this site. The primary access route to this site would be Keller Avenue and Greenly Drive. Residential receptors located along these roads would be subject to noticeable increases in truck traffic noise, but the estimated maximum hourly truck noise levels would not exceed the 70-dBA speech interference criterion. Therefore, short-term maximum noise increases due to project-related trucks would be less than significant. In addition, offsite truck trips to or from project sites will be restricted to the hours of 9:00 a.m. until 4:00 p.m., Monday through Friday, which would further reduce the potential for noise impacts.

Pipeline and Tunnel Facilities

As indicated in Table 3.10-7, the maximum hourly truck volumes for all pipeline and tunnel facilities would generate maximum noise levels between 53 and 62 dBA (Leq). This increase over current levels would be noticeable on residential streets providing access to these facility sites. Arterials such as Camino Pablo and Moraga Road could be subject to noticeable noise increases when the Orinda-Lafayette Aqueduct and Moraga Road Pipeline are constructed. Although residential receptors located along these roads would be subject to noticeable increases in truck traffic noise, the estimated maximum hourly truck noise levels associated with these projects would not exceed the 70-dBA speech interference criterion. Therefore, short-term maximum noise increases due to project-related trucks would be less than significant. In addition, offsite truck trips to or from project sites will be restricted to the hours of 9:00 a.m. until 4:00 p.m., Monday through Friday, which would further reduce the potential for noise impacts.

Reservoir Facilities

As indicated in Table 3.10-7, the maximum hourly truck volumes for all reservoir facilities would generate maximum noise levels of 64 dBA (Leq). This increase over current levels would be noticeable on residential and arterial streets providing access to these facility sites. Although residential receptors located along these roads would be subject to noticeable increases in truck traffic noise, the estimated maximum hourly truck noise levels associated with these projects would not exceed the 70-dBA speech interference criterion. Therefore, short-term maximum noise increases due to project-related trucks would be less than significant. In addition, offsite truck trips to or from project sites will be restricted to the hours of 9:00 a.m. until 4:00 p.m., Monday through Friday, which would further reduce the potential for noise impacts.

Pumping Plants

As indicated in Table 3.10-7, the maximum hourly truck volumes for all pumping plant facilities would generate maximum noise levels between 50 and 61 dBA (Leq). This increase over current levels would be noticeable on residential streets providing access to this site, but not likely noticeable along arterial roadways (except possibly Moraga Way near the Donald Pumping Plant site). Although residential receptors located along these roads would be subject to noticeable increases in truck traffic noise, the estimated maximum hourly truck noise levels associated with these projects would not exceed the 70-dBA speech interference criterion. Therefore, short-term maximum noise increases due to project-related trucks would be less than significant. In addition, offsite truck trips to or from project sites will be restricted to the hours of 9:00 a.m. until 4:00 p.m., Monday through Friday, which would further reduce the potential for noise impacts.

Impact 3.10-3: Construction of WTTIP facilities could cause vibration that could disturb local residents and cause cosmetic damage to buildings and structures.

Vibrations of 0.012 in/sec PPV can cause residential annoyance (similar to vibrations from a heavy truck passing at 100 feet) (Wilson, Ihrig & Associates, 2003). Monitoring data for a tunnel/pipeline project in San Francisco indicate that vibration was below the level of annoyance for most residents when vibration levels were maintained at 0.1 in/sec PPV or less (i.e., no complaints were received) (ESA, 1997).

While very low vibration levels (0.01 in/sec PPV) can cause annoyance, higher vibration levels can cause structural damage. The U.S. Bureau of Mines uses a criterion of 2.0 in/sec PPV to avoid any structural damage to buildings (Wilson, Ihrig & Associates, 2003). In general, cosmetic damage to residential buildings can occur at peak particle velocities over 0.5 in/sec, while structural damage to residential buildings can occur at peak particle velocities over 2.0 in/sec (Wilson, Ihrig & Associates, 2003).

Water Treatment Plants, Reservoirs, Pumping Plants, and Pipelines

Measurements collected during various construction activities (including pavement breaking, vibratory sheetpile driving, sheetpile driving by an excavator shovel, vibratory soil compaction, and earth excavation) at an unrelated project were found to produce vibration levels ranging between 0.03 to 0.38 in/sec PPV at 30 to 35 feet (ESA, 1997). Excavation activities associated with certain facility construction (including clearwells at treatment plants, some reservoirs, and some pipelines) could require sheetpile driving for shoring, which could generate perceptible vibration levels. Although vibration potential from sheetpile driving as well as other construction activities would depend on soil type and proximity to receptors, these measurements indicate that there are construction practices available that could minimize the potential for structural damage at the closest residential receptors. Implementation of the performance standard of 0.5 in/sec PPV, as required in Measure 3.10-3a, would preclude cosmetic or structural damage to nearby residential or other sensitive structures. However, it is possible that vibration would be perceptible and could temporarily annoy the closest residential receptors during construction of the WTTIP projects, that involve pile driving or sheetpile driving. The projects where sheetpile driving or other high-impact activities may occur include all WTP projects, the Orinda-Lafayette

Aqueduct, Moraga Reservoir, Moraga Road Pipeline, and Tice Pumping Plant. The Orinda-Lafayette Aqueduct is discussed below in more detail.

Orinda-Lafayette Aqueduct Tunnel – Alternative 2

The primary sources of vibration associated with tunnel construction would include heavy construction equipment (e.g., bulldozers, vibratory compaction equipment, impact breakers) and mining equipment (e.g., a roadheader or a tunnel boring machine), tunnel train operations, and controlled detonations. Measurements for an unrelated tunnel project indicate that a roadheader can produce vibration levels of 0.0015 to 0.0022 in/sec PPV at 100 feet, while a tunnel train (operating at an estimated 10 miles per hour) can produce vibration levels of 0.0004 to 0.0008 in/sec PPV at 100 feet (EBMUD, 2003).

The potential for vibration would depend on the excavation method, geologic conditions, and proximity to receptors. The potential for cosmetic or structural damage at overlying or nearby structures from shaft and tunnel construction would be low due to the relatively low strength of rock that is expected to be encountered and the depth of the tunnel below ground, generally in excess of 200 feet below overlying residential structures (Jacobs Associates, 2005). Implementation of the performance standard of 0.5 in/sec PPV (as required in Measure 3.10-3a) would preclude cosmetic or structural damage to overlying or nearby structures.

During tunnel construction, the potential for annoyance due to vibration would be low due to the relatively low strength of rock that is expected to be encountered and the depth of the tunnel below ground, generally in excess of 200 feet below overlying residential structures (Jacobs Associates, 2005). At 100 feet or more, it is expected that vibration levels associated with operation of tunneling equipment would remain below 0.012 in/sec PPV (the level that could cause annoyance). Since residences and school classrooms are located 500 feet or more from the tunnel entrance shaft and rock materials in this area are of relatively low strength, vibrations generated by construction of this shaft are not expected to be noticeable or cause annoyance at any nearby receptors. However, construction of the tunnel exit shaft could result in noticeable vibration, particularly during the more sensitive nighttime hours, at the adjacent residence to the west, which could be located as close as 100 feet from this shaft. If vibration complaints are received in the vicinity of the exit shaft, restriction of nighttime construction at this shaft or other operational adjustments would be employed, as required in Measure 3.10-3b.

Controlled detonations, produced by blasting techniques involving explosives, can be more noticeable to the public than mechanical excavation because of the intermittent, higher level noise and vibrations caused by blasting activities. Controlled detonation is performed by drilling holes approximately 2 inches in diameter in a specified pattern in the rock face of the tunnel excavation. The holes are packed with small amounts of explosive and primer. The explosives are detonated in one hole at a time, using a time delay between successive detonations; delay periods often range from 10 to 100 milliseconds, with the entire detonation event lasting no more than a few seconds. Detonations typically occur infrequently (once or twice per day), and the vibration produced by such detonations can be controlled by the charge per delay (the amount of explosive per delay in each hole) and delay time.

Based on review of existing geologic information, it is not anticipated that controlled detonation would be required for excavation of either the shafts or the tunnel. However, any use of controlled detonation would be subject to the performance standard of 0.5 in/sec PPV (as required in Measure 3.10-3a), which would preclude cosmetic or structural damage to overlying or nearby structures. Implementation of Measure 3.10-3b and time restrictions specified in Measure 3.10-1d (bullet 6) would also help to reduce the annoyance effects of controlled detonation, if it is employed.

Mitigation Measures

Measure 3.10-3a: To prevent cosmetic or structural damage to adjacent or nearby structures, EBMUD will incorporate into contract specifications restrictions on construction for those facilities that will or may require sheetpile driving, pile driving, or tunnel construction, whereby surface vibration will be limited to no more than 0.5 in/sec PPV, measured at the nearest residential or other sensitive structure.

Measure 3.10-3b: Contract specifications will include the following in the event that controlled detonation is required:

- Prior to controlled detonations, the contractor will be required to perform tests to determine the rock properties so that vibrations from the blast remain within the required PPV limit of 0.5 in/sec at the nearest structure. Such tests may include small test blasts in sealed borings to measure vibration attenuation (i.e., reduction). The charges used will be as small as possible to fracture the rock to be excavated. Vibration monitoring will be employed to ensure that the 0.5 in/sec PPV performance standard at the nearest structure is not exceeded.

- To the extent possible, residents in the potentially affected area will be notified in advance of controlled detonation activities, or if that is not possible, as soon as possible following the controlled detonation activity.

Operational Impacts

Impact 3.10-4: Noise increases during facility operations.

Operation of some of the WTTIP facilities would result in long-term noise increases. The primary sources of noise associated with these facilities include pumps and electrical facilities (substations, transformers, and emergency generators) at water treatment plants and pumping plants. The degree of impact would vary with each project and would depend on pump sizes, transformer sizes, proximity to sensitive receptors, and the extent of noise attenuation incorporated into the facility design. Table 3.10-8 presents the estimated maximum noise levels associated with the operation of pumps and electrical facilities at the closest sensitive receptors. Operational noise increases associated with water treatment and pumping plant facilities are described below.

TABLE 3.10-8
ESTIMATED OPERATIONAL NOISE LEVELS AT THE CLOSEST SENSITIVE RECEPTORS AND CONSISTENCY WITH SIGNIFICANCE CRITERIA

Project / Jurisdiction / Receptor Location	Size	Maximum Noise Source	Reference Hourly Leq in dBA @ 50 feet[a]	Reduction Provided by Enclosure[b]	Reduced Leq	Distance between Closest Facility and Receptor	Distance Adjustment	Adjusted Leq	Applicable Nighttime Noise Limit	Leq Exceeds Limit?	Noise Reduction with Measure 3.10-4[e]	Mitigated Leq	Mitigated Leq Exceeds Limit?
Lafayette WTP – Alternative 1 / Lafayette / Closest residential receptors are 1,500 to 2,000 feet away	Leland Pumping Plant: 350 HP per pump	3 Pumps	55	NA	55	2,000	-33	22	53	No	-20	2	No
	Bryant Pumping Plant: 1,250 HP per pump	4 Pumps	56	NA	56	2,000	-33	23	53	No	-20	3	No
	5,000 kVA	Electrical Substation	71	-10	61	1,500	-30	31	48[c]	No	NA	31	No
	500 kW	Emergency Generator	77	-25	52	1,500	-30	22	53	No	NA	22	No
Lafayette WTP – Alternative 2 / Lafayette	No new noise sources – Bryant Nos. 1 and 2 to be decommissioned												
Orinda WTP – Alternative 1 / Orinda / Closest residential receptors are 175 feet to the west	Size Not Specified	2 Pumps (Backwash Water Recycle System)	53	NA	53	175	-11	42	45[d]	No	-20	22	No
	200 kW	Emergency Generator	85	-25	60	175	-11	49	53	No	NA	49	No
Orinda WTP – Alternative 2 / Orinda / Closest residential receptors are 175 and 400 feet to the west	Los Altos Pumping Plant: 2,500 HP per pump	4 Pumps	56	NA	56	400	-18	38	45	No	-20	18	No
	7,500 kVA	Electrical Substation	73	-10	63	400	-18	45	45	No	NA	45	No
	200 kW	Emergency Generator	85	-25	60	175	-11	49	53	No	NA	49	No
Walnut Creek WTP – Alternatives 1 and 2 / Walnut Creek / Closest residential receptors are 300 feet away	Leland Pumping Plant No. 2: 150 HP per pump	3 Pumps	55	NA	55	300	-16	39	45	45	-20	19	No
Sobrante WTP Alternatives 1 and 2 / El Sobrante / Closest residential receptors are 150 feet away	No new noise sources												
Upper San Leandro WTP – Alternatives 1 and 2 / Oakland / Closest residential receptors are 200 feet away	No new noise sources												
Donald Pumping Plant / Orinda / Closest residential receptors are 100 feet away	100 HP per pump	1 Pump	50	NA	50	100	-6	44	45	No	-20	24	No
	200 kVA	Transformer	38	-10	28	100	-6	22	45	No	NA	22	No

TABLE 3.10-8 (continued)
ESTIMATED OPERATIONAL NOISE LEVELS AT THE CLOSEST SENSITIVE RECEPTORS AND CONSISTENCY WITH SIGNIFICANCE CRITERIA

Project / Jurisdiction / Receptor Location	Size	Maximum Noise Source	Reference Hourly Leq in dBA @ 50 feet[a]	Reduction Provided by Enclosure[b]	Reduced Leq	Distance between Closest Facility and Receptor	Distance Adjustment	Adjusted Leq	Applicable Nighttime Noise Limit	Leq Exceeds Limit?	Noise Reduction with Measure 3.10-4[e]	Mitigated Leq	Mitigated Leq Exceeds Limit?
Fay Hill Pumping Plant / Moraga / Closest residential receptors are 1,000 feet away	125 HP per pump	1 Pump	50	NA	50	1,000	-26	24	45	No	-20	4	No
	225 kVA	Transformer	38	-10	28	1,000	-26	2	45	No	NA	2	No
Happy Valley Pumping Plant / Orinda / Closest residential receptors are 50 and 90 feet away	200 HP per pump	2 Pumps	53	NA	53	50	0	53	45	**Yes**	-20	33	No
	300 kVA	Transformer	38	-10	28	90	-5	23	45	No	NA	23	No
Sunnyside Pumping Plant / Lafayette / Closest residential receptors are 160 to 175 feet away in Orinda	100 HP per pump	1 Pump	50	NA	50	175	-11	39	53/45	No	-20	19	No
	200 kVA	Transformer	38	-10	28	160	-10	18	48[c]/ 45	No	NA	18	No
Tice Pumping Plant / Unincorporated Contra Costa County / Closest residential receptors are 120 to 140 feet away	300 HP per pump	3 Pumps	55	NA	55	140	-9	46	45	No	-20	26	No
	750 kVA	Transformer	44	-10	34	120	-8	26	45	No	NA	26	No
Withers Pumping Plant / Unincorporated Contra Costa County / Closest residential receptors are 150 feet away	100 HP per pump	3 Pumps	55	NA	55	150	-10	45	45	No	-20	25	No
	225 kVA	Transformer	38	-10	28	150	-10	18	45	No	NA	18	No

NA = not applicable or no applicable standard
HP = horsepower
kVA = kilovolt-ampere
kW = kilowatt

[a] Pump station noise levels were estimated based on noise levels measured at other enclosed pump stations and represent the maximum exterior noise level measured at 6 feet from the louvered door, generally the only opening to the enclosure. Noise levels were measured to be 20 dB lower on the sides of the enclosure where no vents or openings were located. Transformer noise levels were estimated based on National Electrical Manufacturers Association standards (NEMA, 1994). Since distance is not specified in NEMA standards, for the purpose of this analysis, levels were conservatively applied as the minimum far-field noise level at 50 feet.

[b] For pumps, no reduction for enclosure is provided since the reference noise level for pumps already includes noise reduction provided by an enclosure (see footnote a). For emergency generators at WTPs, the noise reduction provided by an enclosure assumes that the generators would be completely enclosed with appropriately designed sound attenuation. For transformers, the 10-dB noise reduction assumes that an appropriately designed sound barrier would be provided.

[c] A 5-dB penalty was added to the nighttime noise limit, as required by Section 5-205(d) of the Lafayette Noise Ordinance, to account for people's increased sensitivity to noise containing pure tones (i.e., the "hum" component of transformer noise).

[d] Title 17, Section 17.39.9 of Orinda Municipal Code specifies a maximum noise level of 45 dBA for mechanical equipment that is permanently affixed to a structure or on the ground, except for emergency backup power generators.

[e] Noise levels are 20 dB lower on the sides of the enclosure where there are no vents or openings. Therefore, locating vents away from the closest residential receptors (so that solid walls face receptors), as required in Measure 3.10-4, would reduce the above-listed reference and estimated pump noise levels by 20 dB at these receptors.

Other types of facilities proposed at treatment plants include basins, filters, and drains, which would not be major sources of noise. Noise generated by water flowing through pipes or drains would be limited to areas in the vicinity of openings or vents; since noise levels from flowing water would generally be less than ambient noise levels, these facilities would not increase noise levels beyond the facility boundaries.

Operation of WTTIP pipelines or reservoirs would not generate noise. Pipelines would be located underground and enclosed. There would be no pumping or electrical facilities at reservoirs. Therefore, no further discussion of proposed program- or project-level pipelines and reservoirs is provided.

Lafayette WTP

Alternative 1

Alternative 1 at the Lafayette WTP would involve development of new pumping facilities, a new electrical substation, and a new emergency generator. Table 3.10-8 presents potential noise levels that could be generated at the nearest sensitive receptor by operation of these facilities. Since these facilities would be either partially or completely enclosed, noise reductions are accounted for in estimated noise levels. A 10-dB reduction was assigned to the substation since soundwalls would be constructed around it; a 25-dB reduction was assigned to emergency generators since building enclosures are proposed. The reference noise level for the pumps already includes a building enclosure. Noise would emanate from enclosure vents, so vent locations would be a factor in their effect on nearby sensitive receptors and could require additional sound attenuation.

The proposed pumping facilities (Leland and Bryant Pumping Plants) would be constructed at the west end of the WTP site. Since existing pumping facilities in the central and east ends of the site would be decommissioned, WTTIP implementation would essentially relocate pumping facilities farther away from residential receptors to the southeast (a beneficial noise impact). The proposed location for pumping facilities is away from sensitive noise receptors, with the Highway 24 embankment to the north, El Nido Ranch Road and a parking lot to the west, and Mt. Diablo Boulevard and the Lafayette Reservoir Recreational Area to the south.

A 500-kilowatt, diesel-fueled emergency generator is proposed to serve the new WTP facilities, supplementing the existing emergency generator at this facility. The new generator would be adjacent to the proposed electrical substation. Like the existing generator, the proposed generator would be used infrequently (only during power outages and for periodic testing during the day).

Table 3.10-8 indicates that estimated operational noise levels from these facilities during the nighttime hours would not exceed the Lafayette Noise Ordinance nighttime noise limits for single-family residential zones. Implementation of Measure 3.10-4 would ensure that these facilities are designed to maintain operational noise impacts at a less-than-significant level.

Alternative 2

Alternative 2 at the Lafayette WTP would decommission the Bryant Pumping Plants Nos. 1 and 2, which would result in a decrease in operational noise at this facility.

Orinda WTP

Alternative 1

Alternative 1 at the Orinda WTP would involve developing new pumping facilities as part of the backwash water recycle system and installing a new emergency generator. The reference noise level for the pump already includes a building enclosure. A 25-dB reduction was assigned to the emergency generator since a building enclosure is proposed. Noise would emanate from enclosure vents, so vent locations would be a factor in their effect on nearby sensitive receptors and could require additional sound attenuation.

Table 3.10-8 presents potential noise levels that could be generated at the nearest sensitive receptor by operation of these pumps. As shown in the table, estimated operational noise levels from these pumps during the nighttime hours would not exceed the Orinda Noise Ordinance 45-dBA noise limit for mechanical equipment. In addition, estimated noise levels would be well below ambient noise levels along Camino Pablo. Estimated noise levels would occur on the side of the building where the vent is located, while pump noise could be up to 20 dB lower on other sides of the building. Therefore, the building's vent would be located on either the north or south side of the building, not on the sides facing residential receptors to the west or east. Implementation of Measure 3.10-4 would ensure that that these facilities are designed to maintain operational noise impacts at a less-than-significant level.

A 200-kilowatt, diesel-fueled emergency generator is proposed to serve the new WTP facilities, supplementing the existing emergency generator at this facility. The new generator would be adjacent to the proposed electrical substation. Like the existing generator, the proposed generator would be used infrequently (only during power outages and for periodic testing during the day).

Alternative 2

Alternative 2 at the Orinda WTP would involve development of a new pumping plant (Los Altos No. 2) and a new electrical substation. Table 3.10-8 presents potential noise levels that could be generated at the nearest sensitive receptor by operation of these facilities. Since these facilities would be either partially or completely enclosed, noise reductions are accounted for in estimated noise levels. A 10-dB reduction was assigned to the substation since soundwalls would be constructed around it; a 25-dB reduction was assigned to the emergency generator since a building enclosure is proposed. Noise would emanate from enclosure vents, so the vent locations on pumps and the emergency generator would be a factor in their effect on nearby sensitive receptors.

A 200-kilowatt, diesel-fueled emergency generator is proposed to serve the new WTP facilities, supplementing the existing emergency generator at this facility. The new generator would be adjacent to the proposed electrical substation. Like the existing generator, the proposed generator would be used infrequently (only during power outages and for periodic testing during the day).

As indicated in Table 3.10-8, estimated operational noise levels from pumping and substation facilities during the nighttime hours would not exceed the Orinda Noise Ordinance 45-dBA noise limit for mechanical equipment. Noise from the emergency generator during the nighttime hours would not exceed the Orinda Noise Ordinance nighttime noise limit for single-family residential zones. Implementation of Measure 3.10-4a would ensure that these facilities are designed to maintain operational noise impacts at a less-than-significant level.

Walnut Creek WTP – Alternative 1 or 2

This project would involve construction of the new Leland Pumping Plant No. 2 under both alternatives. Table 3.10-8 presents potential noise levels that could be generated at the nearest sensitive receptor by operation of this pumping plant. Since this facility would be completely enclosed, noise reductions are accounted for in estimated noise levels. As indicated in Table 3.10-8, estimated operational noise levels from the proposed pumping plant during the nighttime hours would be 39 dBA (Leq). The City of Walnut Creek Noise Element requires mitigation for projects resulting in noise increases of 3 dB or more. When the estimated noise level of 39 dBA (Leq) is converted to a 24-hour CNEL noise level, the resulting noise level would be 46 dBA (CNEL). The addition of 46 dB to the ambient noise level that was measured in the vicinity of this receptor (56 dBA, CNEL)[4] would increase the ambient noise level by less than 1 dB. Therefore, operational noise associated with this pumping plant would have a less-than-significant impact on the existing noise environment. Estimated noise levels would occur on the side of the building where the vent is located, while pump noise could be up to 20 dB lower on other sides of the building. Therefore, the building's vent would be located on the west or south side of the building, not on the sides facing residential receptors to the north or east. Implementation of Measure 3.10-4 would ensure that these facilities are designed to maintain operational noise impacts at a less-than-significant level.

Sobrante WTP – Alternative 1 or 2

No new major sources of noise are proposed at this site. Therefore, operation of proposed facilities would not result in any significant noise increases.

Upper San Leandro WTP – Alternative 1 or 2

No new major sources of noise are proposed at this site. Therefore, operation of proposed facilities would not result in any significant noise increases.

Donald Pumping Plant

Table 3.10-8 presents potential noise levels that could be generated at the nearest sensitive receptor by operation of the proposed pumping plant and transformer. Since these facilities would be either partially or completely enclosed, noise reductions are accounted for in estimated noise levels. A 10-dB reduction was assigned to the transformer since soundwalls would be constructed around it. The reference noise level for the pump already includes a building enclosure. Noise would emanate from the building's vent, so the vent location would be a factor in its effect on nearby sensitive receptors.

[4] This noise measurement was taken in 1998 (prior to current construction activities) at the fenceline of the closest residential receptor to the proposed pump station.

As indicated in Table 3.10-8, estimated noise levels from operation of the proposed pump and transformer during the nighttime hours would approach but not exceed the Orinda Noise Ordinance 45-dBA nighttime noise limit for mechanical equipment. Since the estimated noise level would occur on the side of the building where the vent is located, pump noise could be up to 20 dB lower on other sides of the building. Therefore, the building's vent would be located on the south or east side of the building, not on the sides facing residential receptors to the north or west. With vents facing away from residential receptors, operational noise is not expected to increase ambient noise levels in the project vicinity. Implementation of Measure 3.10-4 would ensure that these facilities are designed to maintain operational noise impacts at a less-than-significant level.

Fay Hill Pumping Plant

Table 3.10-8 presents potential noise levels that could be generated at the nearest sensitive receptor by operation of the proposed pumping plant. This facility would be located completely underground. As indicated in the table, estimated noise levels from operation of the proposed pump during the nighttime hours are not expected to cause sleep disturbance at the closest residential receptors. The Moraga Municipal Code does not include a numerical noise limit, but limits noise from fans or equipment to a level that does not disturb the "peace, quiet and comfort of neighboring residents." Implementation of Measure 3.10-4 would ensure that these facilities are designed to maintain operational noise impacts at a less-than-significant level.

Happy Valley Pumping Plant

Table 3.10-8 presents potential noise levels that could be generated at the nearest sensitive receptor by operation of the proposed pumping plant and transformer. Since these facilities would be either partially or completely enclosed, noise reductions are accounted for in estimated noise levels. The reference noise level for the pump already includes a building enclosure. A 10-dB reduction was assigned to the transformer since soundwalls would be constructed around it. As indicated in Table 3.10-8, noise levels just outside the plant's vent could exceed Orinda's 45-dBA noise limit by 8 dB, so the vent location would be a factor in its effect on nearby sensitive receptors. Implementation of Measure 3.10-4 would ensure that the building's vent is located away from nearby sensitive receptors. Since noise levels on the solid sides of the pumping plant enclosure (no vent openings) would be approximately 20 dB less, pumping plant noise would be reduced to below the Orinda noise limit if the vent opening is located on the south side of the building away from the closest residential receptors to the east and west. In addition, since the pumping plant would be located between the closest residential receptor and the transformer, transformer noise could be reduced to below the level listed in Table 3.10-8, depending on the design of the pumping plant enclosure. Estimated noise levels are not expected to increase ambient noise levels in the project vicinity. Implementation of Measure 3.10-4 would ensure that these facilities are designed to maintain operational noise impacts at a less-than-significant level.

Sunnyside Pumping Plant

Table 3.10-8 presents potential noise levels that could be generated at the nearest sensitive receptor by operation of the proposed pumping plant and transformer. Since these facilities would be either partially or completely enclosed, noise reductions are accounted for in estimated noise levels. The reference noise level for the pump already includes a building enclosure. Noise would emanate from the building's vent, so the vent location would be a factor in its effect on nearby sensitive receptors. A 10-dB reduction was assigned to the transformer since soundwalls would be constructed around it.

As indicated in Table 3.10-8, estimated noise levels from operation of the proposed pump and transformer during the nighttime hours would not exceed the Orinda Noise Ordinance 45-dBA noise limit for mechanical equipment or the Lafayette Noise Ordinance nighttime noise limit for single-family residential zones. In addition, estimated noise levels are not expected to increase ambient noise levels in the project vicinity. Implementation of Measure 3.10-4 would ensure that these facilities are designed to maintain operational noise impacts at a less-than-significant level.

Tice Pumping Plant

Table 3.10-8 presents potential noise levels that could be generated at the nearest sensitive receptor by operation of the proposed pumping plant and transformer. Since these facilities would be either partially or completely enclosed, noise reductions are accounted for in estimated noise levels. The reference noise level for the pump already includes a building enclosure. Noise would emanate from the building's vent, so the vent location would be a factor in its effect on nearby sensitive receptors. A 10-dB reduction was assigned to the transformer since soundwalls would be constructed around it.

As indicated in Table 3.10-8, estimated noise levels from operation of the proposed pump and transformer during the nighttime hours could approach ambient nighttime noise levels if the vent to the pump enclosure were located facing the closest residential receptor to the west, which could cause a small increase in ambient noise levels at this receptor. Contra Costa County does not specify operational noise limits for mechanical equipment, but estimated noise levels from this facility are not expected to cause sleep disturbance at the closest residential receptor. To minimize the potential for sleep disturbance, project facilities would be designed to minimize the potential for noise increases at residential receptors. Locating the pump enclosure vent so that it faces away from residential receptors to the west and north could reduce operational noise at these receptors by as much as 20 dB, to well below ambient noise levels. Locating the transformer so that it is on the east side of the pumping plant also would help to shield the closest residential receptor from noise increases or the "hum" noise that can be generated by transformers. Implementation of Measure 3.10-4 would ensure that these facilities are designed to maintain operational noise impacts at a less-than-significant level.

Withers Pumping Plant

Table 3.10-8 presents potential noise levels that could be generated at the nearest sensitive receptor by operation of the proposed pumping plant and transformer. Since these facilities would be either partially or completely enclosed, noise reductions are accounted for in estimated noise levels. The reference noise level for the pump already includes a building enclosure. Noise would emanate from the building's vent, so the vent location would be a factor in its effect on nearby sensitive receptors. A 10-dB reduction was assigned to the transformer since soundwalls would be constructed around it.

As indicated in Table 3.10-8, estimated noise levels from operation of the proposed pump and transformer during the nighttime hours could approach ambient nighttime noise levels if the vent to the pump enclosure were located facing the closest residential receptor to the south, which could cause a small increase in ambient noise levels at this receptor. Contra Costa County does not specify operational noise limits for mechanical equipment, but estimated noise levels from this facility are not expected to cause sleep disturbance at the closest residential receptor. Locating the pump enclosure vent so that it faces away from residential receptors to the southeast, east, north, and west could reduce operational noise at these receptors by as much as 20 dB, to well below ambient noise levels. Locating the transformer so that it is on the west or north side of the pumping plant would also help to shield the closest residential receptor to the southeast from noise increases or the "hum" noise that can be generated by transformers. Implementation of Measure 3.10-4 would ensure that these facilities are designed to maintain operational noise impacts at a less-than-significant level.

Mitigation Measure

Measure 3.10-4: Equipment used in WTTIP facilities will not cause ambient noise levels to exceed the nighttime noise limits specified in Table 3.10-8). Measures that could be incorporated into the design of proposed facilities to ensure that noise levels meet this criterion (as demonstrated in Table 3.10-8) include the following:

- Pumping and emergency generator facilities will be fully enclosed, and vents will be located on the building facades facing away from adjacent residential receptors, particularly at the Happy Valley Pumping Plant site where pumping plant noise must be reduced by 8 dB to meet Orinda's 45-dBA noise limit for mechanical equipment.

- Building enclosures will provide at least 40 dB of attenuation on solid walls (i.e., a 40-dB difference between interior vs. exterior noise) and a 20-dB reduction on the louvered side of the enclosure, when measured at 6 feet from the wall, directly in front of the louvers.

- Masonry sound barriers will be constructed around transformers, and substations will be of sufficient height to provide at least 10 dB or more of noise attenuation.

Tables 3.10-9 and 3.10-10 provide a summary of the applicable mitigation measures discussed above.

TABLE 3.10-9
SUMMARY OF APPLICABLE MITIGATION MEASURES – IMPACT 3.10-1

Facility	Measure 3.10-1a Noise Controls	Measure 3.10-1b Noise Ordinance Time and Noise Limits	Measure 3.10-1c Oakland Noise Limits	Measure 3.10-1d Tunnel-Related Noise Controls	Measure 3.10-1e Temporary Sound Barriers
Lafayette WTP					
Alternative 1	✓	✓	–	–	–
Alternative 2	✓	✓	–	–	–
Orinda WTP					
Alternative 1	✓	✓	–	–	–
Alternative 2	✓	✓	–	✓	✓[b]
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	✓	✓[a]	–	–	✓[a]
Glen Pipeline Improvements	✓	✓	–		–
Happy Valley Pumping Plant and Pipeline	✓	✓	–	–	✓
Highland Reservoir and Pipelines	✓	✓	–	–	✓[c]
Lafayette Reclaimed Water Pipeline	✓	–	–	–	✓[c]
Leland Isolation Pipeline and Bypass Valves	✓	–	–	–	–
Moraga Reservoir	✓	✓	–	✓	✓
Moraga Road Pipeline	✓	–	–	–	–
Sunnyside Pumping Plant	✓	✓	–	–	–
Tice Pumping Plant and Pipeline	✓	–	–	–	–
Withers Pumping Plant	✓	–	–	–	–

[a] Required for this project only if future residences are constructed in the vicinity of this reservoir.
[b] Possible requirement for micro-tunnel construction
[c] Use of a temporary sound barrier is required only for pipeline segments that would be constructed at night.

✓ = Applicable Impact
– = No Impact

TABLE 3.10-10
SUMMARY OF APPLICABLE MITIGATION MEASURES – IMPACTS 3.10-3a, 3.10-3b, and 3.10-4

Facility	Measure 3.10-3a Vibration Limits	Measure 3.10-3b Controlled Detonations	Measure 3.10-4 Operational Noise Controls
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	–	–	–
Leland Isolation Pipeline and Bypass Valves	–	–	–
Moraga Reservoir	✓	–	–
Moraga Road Pipeline	✓	–	–
New Leland Pressure Zone Reservoir and Pipeline	✓	–	–
Sunnyside Pumping Plant	–	–	✓
Tice Pumping Plant and Pipeline	✓	–	✓
Withers Pumping Plant	–	–	✓

✓ = Applicable Impact
– = No Impact

Program-Level Elements

Lafayette WTP

The closest sensitive receptors are residential uses approximately 500 feet to the south. At 500 feet, construction noise would not exceed the 70-dBA speech interference criterion, and therefore construction noise increases would be less than significant. There are no specific truck volumes estimated for this project, but increases of up to 100 trucks per hour along truck haul routes would result in noticeable noise increases along arterial and residential streets. However, noise levels would not exceed the 70-dBA speech interference criterion, and short-term maximum noise increases could be maintained at a less-than-significant level with appropriate staging and planning of these program-level projects. Implementation of mitigation measures (such as Measures 3.10-1a and 3.10-1b) that limit truck operations (haul trucks and concrete delivery trucks) to the daytime hours, as specified under each affected jurisdiction's hourly time limits, would minimize the potential for noise impacts.

The proposed realignment of the Walter Costa Trail is not expected to generate significant noise increases during or following its construction, although the final alignment could put trail users nearer to existing roadway-generated noise.

There is a potential for perceptible vibration levels to be generated during excavation activities (primarily during sheetpile driving for shoring, if required), which could temporarily annoy the closest residential receptors. Implementation of a performance standard (such as the 0.5 in/sec PPV standard required in Measure 3.10-3a) would likely preclude cosmetic or structural damage to nearby structures.

The proposed program-level WTP facilities would not introduce any new major sources of operational noise. In general, treatment facilities such as basins, filters, and drains would not be major sources of noise. Noise generated by water flowing through pipes or drains would be limited to areas in the vicinity of openings or vents; since these noise levels are generally less than ambient noise levels, they would not increase ambient noise levels beyond facility boundaries.

Orinda WTP

Sensitive receptors in the vicinity of program-level WTP projects include residential uses within approximately 200 feet to the west and 300 feet to the east of proposed facilities under both alternatives. The southern boundary of Wagner Ranch Elementary School is also approximately 15 feet north of the northernmost clearwell under both alternatives. Construction noise levels could exceed the speech interference criterion, but implementation of noise controls (similar to Measure 3.10-1a) would reduce construction noise levels to below the 70-dBA speech interference criterion, except at the northernmost clearwell, which would require substantial excavation over an extended period of time. At distances of 200 to 300 feet, implementation of measures similar to Measures 3.10-1a and 3.10-1b would likely be adequate to reduce potential noise impacts to a less-than-significant level. If the school uses the playfields between the WTP boundary and classrooms, a temporary sound barrier could also be required (similar to Measure 3.10-1e).

Under both alternatives, a micro-tunnel is proposed to extend from the north end of the facility (in the ballfields area) to the south end of the facility, connecting with the proposed clearwell, the San Pablo Pumping Plant, and the high-rate sedimentation unit. The micro-tunnel would require shafts at various locations along the micro-tunnel alignment. If the micro-tunnel requires a ventilation system or a dewatering pump system, residential receptors located 300 feet to the east and 400 feet to the west could be subject to nighttime noise associated with operation of this equipment. Implementation of noise controls similar to those specified in Measures 3.10-1a, 3.10-1d, and possibly Measure 3.10-1e, if necessary, would minimize the disturbing effects of such construction noise.

There are no specific truck volumes estimated for this project, but increases of up to 100 trucks per hour along truck haul routes would result in noticeable noise increases along arterial and residential streets. However, noise levels would not exceed the 70-dBA speech interference criterion, and short-term maximum noise increases could be maintained at a less-than-significant level with appropriate staging and planning of these program-level projects. Implementation of mitigation measures (such as Measures 3.10-1a and 3.10-1b) that limit truck operations (haul trucks and concrete delivery trucks) to the daytime hours, as specified under each affected jurisdiction’s hourly time limits, would minimize the potential for noise impacts.

There is a potential for perceptible vibration levels to be generated during excavation activities (primarily during sheetpile driving for shoring and micro-tunnel shaft construction), which could temporarily annoy the closest residential and school receptors. Implementation of a performance standard (such as the 0.5 in/sec PPV standard required in Measure 3.10-3a) would likely preclude cosmetic or structural damage to nearby structures.

The primary source of noise from program projects would be the two pump stations (San Pablo Pumping Plant and the low-lift pumping plant). These two facilities would be located in the center of the WTP site, east of the proposed clearwell. Since these two facilities are smaller than the proposed Los Altos facility, noise increases associated with them would not be greater than those listed in Table 3.10-8 for the Los Altos Pumping Plant. Like the Los Altos facility, estimated noise levels would likely be well below the sleep interference criterion and Orinda nighttime noise limit. Under both alternatives, combined noise from all three pump stations would likely still be below these two criteria and would not likely increase ambient noise levels.

Walnut Creek WTP

Program-level improvements would include the addition of high-rate sedimentation units and post-filtration UV disinfection in 2022. The high-rate sedimentation units and UV facilities would be located more than 300 feet from nearby residential receptors, and construction noise levels at these residences would be relatively low. Therefore, implementation of noise controls, similar to those required for the project-level elements, would maintain construction noise at a less-than-significant level.

There are no specific truck volumes estimated for this project, but increases of up to 100 trucks per hour along truck haul routes would result in noticeable noise increases along arterial and residential streets. However, noise levels would not exceed the 70-dBA speech interference criterion, and short-term maximum noise increases could be maintained at a less-than-significant level with appropriate staging and planning of these program-level projects. Implementation of mitigation measures (such as Measures 3.10-1a and 3.10-1b) that limit truck operations (haul trucks and concrete delivery trucks) to the daytime hours, as specified under each affected jurisdiction's hourly time limits, would minimize the potential for noise impacts.

There is a potential for perceptible vibration levels to be generated during excavation activities (primarily during sheetpile driving for shoring), which could temporarily annoy the closest residential and school receptors. Implementation of a performance standard (such as the 0.5 in/sec PPV standard required in Measure 3.10-3a) would likely preclude cosmetic or structural damage to nearby structures.

The primary source of operational noise from these facilities would likely be the ozonation system. Assuming this facility would be fully enclosed and vent openings are louvered and facing away from nearby residences, this facility could generate noise levels of 55 dBA (Leq) at 50 feet. When converted to CNEL, it is estimated that operation of this facility would result in an increase of 1 dB or less in the ambient noise level at the closest residential receptors. The City of Walnut Creek's Noise Element specifies a 3-dB threshold for requiring mitigation. Therefore, noise increases associated with this program-level project would be less than significant.

Leland Reservoir Replacement

Sensitive receptors include residential uses as close as 120 feet to the west and 400 feet to the east (across Leland Drive). The White Pony-Meher Elementary School is located immediately to the south, with the classroom building approximately 150 feet from the reservoir. At 120 feet, construction noise would exceed the 70-dBA speech interference criterion. Implementation of noise controls (similar to Measure 3.10-1a) would reduce construction noise levels to below the 70-dBA speech interference criterion, except for impact equipment. However, since impact-equipment-related noise would exceed the speech interference criterion by only 5 dB, it is expected that the Leq noise level could be reduced by 5 dB through such measures as limiting the duration of equipment operation during any given hour (see Measure 3.10-1a) or erecting a temporary sound barrier (see Measure 3.10-1e), thereby reducing any potential construction noise impacts to a less-than-significant level.

There are no specific truck volumes estimated for this project, but increases of up to 100 trucks per hour along truck haul routes would result in noticeable noise increases along arterial and residential streets. However, noise levels would not exceed the 70-dBA speech interference criterion, and short-term maximum noise increases could be maintained at a less-than-significant level with appropriate staging and planning of these program-level projects. Implementation of mitigation measures (such as Measures 3.10-1a and 3.10-1b) that limit truck operations (haul trucks and concrete delivery trucks) to the daytime hours, as specified under each affected jurisdiction's hourly time limits, would minimize the potential for noise impacts.

There is a potential for perceptible vibration levels to be generated during excavation activities (primarily during sheetpile driving for shoring), which could temporarily annoy the closest residential and school receptors. Implementation of a performance standard (such as the 0.5 in/sec PPV standard required in Measure 3.10-3a) would likely preclude cosmetic or structural damage to nearby structures.

There would not be any sources of noise associated with operating this reservoir.

New Leland Pressure Zone Reservoir and Pipeline

Sensitive receptors include residential uses as close as 200 feet to the north and 60 feet to the east of proposed grading limits for the reservoir. Residential uses are also located near the pipeline alignments west of Danville Boulevard. At 60 feet, construction noise would exceed the 70-dBA speech interference criterion both with and without implementation of noise controls (such as Measure 3.10-1a). With noise controls, construction noise levels would still exceed the speech interference criterion. Provision of a temporary noise barrier between the reservoir construction site and the closest residences would likely be adequate to reduce construction noise levels to a less-than-significant level. Depending on proximity of sensitive receptors to the pipeline alignment, construction noise could also exceed the 70-dBA speech interference criterion both without and with implementation of noise controls. Despite the potential exceedance of this criterion, pipeline construction would not affect any one receptor for more than about two weeks (plus a couple of additional days for paving the trench), reducing the potential for significant noise impacts. Therefore, implementation of noise controls and conformance with applicable ordinance time limits would likely maintain the potential effects of this temporary noise impact at a less-than-significant level.

There are no specific truck volumes estimated for this project, but increases of up to 100 trucks per hour along truck haul routes would result in noticeable noise increases along arterial and residential streets. However, noise levels would not exceed the 70-dBA speech interference criterion, and short-term maximum noise increases could be maintained at a less-than-significant level with appropriate staging and planning of these program-level projects. Implementation of mitigation measures (such as Measures 3.10-1a and 3.10-1b) that limit truck operations (haul trucks and concrete delivery trucks) to the daytime hours, as specified under each affected jurisdiction’s hourly time limits, would minimize the potential for noise impacts.

There is a potential for perceptible vibration levels to be generated during excavation activities (primarily during sheetpile driving for shoring), which could temporarily annoy the closest residential and school receptors. Implementation of a performance standard (such as the 0.5 in/sec PPV standard required in Measure 3.10-3a) would likely preclude cosmetic or structural damage to nearby structures.

There would be no sources of noise associated with operating this reservoir or pipeline.

St. Mary's Road/Rohrer Drive Pipeline

There are residential uses immediately adjacent to the road along some sections of the proposed pipeline alignment. St. Mary's College is adjacent to the alignment, although the campus is set back from the road. At 25 feet, construction noise would exceed the 70-dBA speech interference criterion without and with implementation of noise controls (such as Measure 3.10-1a). However, pipeline construction would not affect any one receptor for more than about two weeks, reducing the potential for significant noise impacts. Also, since residential setbacks vary from 25 to over 100 feet, noise levels at residences set back 100 feet or more would be reduced to a less-than-significant level.

There are no specific truck volumes estimated for this project, but increases of up to 100 trucks per hour along truck haul routes would result in noticeable noise increases along arterial and residential streets. However, noise levels would not exceed the 70-dBA speech interference criterion, and short-term maximum noise increases could be maintained at a less-than-significant level with appropriate staging and planning of these program-level projects. Implementation of mitigation measures (such as Measures 3.10-1a and 3.10-1b) that limit truck operations (haul trucks and concrete delivery trucks) to the daytime hours, as specified under each affected jurisdiction's hourly time limits, would minimize the potential for noise impacts.

There is a potential for perceptible vibration levels to be generated during excavation activities (primarily during sheetpile driving for shoring), which could temporarily annoy the closest residential and school receptors. Implementation of a performance standard (similar to the 0.5 in/sec PPV standard required in Measure 3.10-3a) would likely preclude cosmetic or structural damage to nearby structures.

There would be no sources of noise associated with operating this pipeline.

San Pablo Pipeline

Most of the proposed pipeline alignment would traverse undeveloped lands adjacent to San Pablo Reservoir. However, the south end would be located adjacent to or near residential uses. Wagner Ranch Elementary School in Orinda is located east of the pipeline alignment. At 25 feet, construction noise would exceed the 70-dBA speech interference criterion without and with implementation of noise controls (such as Measure 3.10-1a). However, pipeline construction would not affect any one receptor for more than about two weeks, reducing the potential for significant noise impacts.

There are no specific truck volumes estimated for this project, but increases of up to 100 trucks per hour along truck haul routes would result in noticeable noise increases along arterial and residential streets. However, noise levels would not exceed the 70-dBA speech interference criterion, and short-term maximum noise increases could be maintained at a less-than-significant level with appropriate staging and planning of these program-level projects. Implementation of mitigation measures (such as Measures 3.10-1a and 3.10-1b) that limit truck operations (haul trucks and concrete delivery trucks) to the daytime hours, as specified under each affected jurisdiction's hourly time limits, would minimize the potential for noise impacts.

There is a potential for perceptible vibration levels to be generated during excavation activities (primarily during sheetpile driving for shoring), which could temporarily annoy the closest residential and school receptors. Implementation of a performance standard (such as the 0.5 in/sec PPV standard required in Measure 3.10-3a) would likely preclude cosmetic or structural damage to nearby structures.

There would be no sources of noise associated with operating this pipeline.

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3.11 Hazards and Hazardous Materials

3.11.1 Approach to Analysis

The assessment focuses on the following issues:

- The potential for encountering hazardous substances in soil and groundwater during construction at any of the WTTIP sites based on regulatory database searches to identify permitted hazardous materials uses and environmental cases in the vicinity of ground-disturbing activities
- Hazardous building materials that could be encountered during demolition or renovation required for improvements at any of the WTTIP sites
- Safety risks associated with potentially gassy conditions in the proposed tunnel
- Potential public safety hazards associated with project construction
- Changes in the use of chemicals at the WTPs

3.11.2 Setting

Hazardous materials and wastes can result in public health hazards if released to the soil, groundwater, or air in vapors, fumes, or dust. Hazardous materials, defined in Section 25501(h) of the California Health and Safety Code, are materials that, because of their quantity, concentration, or physical or chemical characteristics, pose a substantial present or potential hazard to human health and safety or to the environment if released. Hazardous materials have been and are commonly used in commercial, agricultural, and industrial applications as well as in residential areas to a limited extent. A waste is any material that is relinquished, recycled, or inherently waste-like. Title 22 of the California Code of Regulations, Division 4.5, Chapter 11 contains regulations for the classification of hazardous wastes. A waste is considered a hazardous waste if it is toxic (causes human health effects), ignitable (has the ability to burn), corrosive (causes severe burns or damage to materials), or reactive (causes explosions or generates toxic gases) in accordance with the criteria established in Article 3. Article 4 lists specific hazardous wastes, and Article 5 identifies specific waste categories, including Resource Conservation and Recovery Act (RCRA) hazardous wastes, non-RCRA hazardous wastes, extremely hazardous wastes, and special wastes.

Hazardous Materials Regulation

Hazardous materials and hazardous wastes are extensively regulated by federal, state, and local regulations. In general, these regulations provide definitions of hazardous materials; establish reporting requirements; set guidelines for handling, storage, transport, remediation, and disposal of hazardous wastes; and require health and safety provisions for both workers and the public. Regulatory agencies also maintain lists, or databases, of sites that are permitted to handle hazardous wastes or store hazardous materials in underground storage tanks, as well as sites where soil or groundwater quality may have been affected by hazardous materials.

The major federal, state, and regional agencies enforcing hazardous material regulations include: the U.S. Environmental Protection Agency (federal); the Department of Toxic Substances Control (DTSC) and the Regional Water Quality Control Board (RWQCB) of the California Environmental Protection Agency (state); and the Bay Area Air Quality Management District (BAAQMD) (regional). In addition, a number of local agencies at the county and city level are responsible for regulating hazardous materials in the program area. Appendix H provides a more detailed description of the hazardous materials regulatory framework and the regulatory agencies responsible for implementing hazardous materials regulations.

Use and Storage of Hazardous Materials and Fuels

Hazardous Materials Business Plans

Businesses that handle specified quantities of chemicals are required to submit a Hazardous Materials Business Plan (HMBP) in accordance with community right-to-know laws. This plan allows local agencies to plan appropriately for a chemical release, fire, or other incident. The HMBP must include the following:

- An inventory of hazardous materials with specific quantity data, storage or containment descriptions, ingredients of mixtures, and physical and health hazard information
- Site and facility layouts that must be coded for chemical storage areas and other facility safety information
- Emergency response procedures for a release or threatened release of hazardous materials
- Procedures for immediate notification of releases to the administering agency
- Evacuation plans and procedures for the facility
- Descriptions of employee training in evacuation and safety procedures in the event of a release or threatened release of hazardous materials consistent with employee responsibilities, and proof of implementing such training on an annual basis
- Identification of local emergency medical assistance appropriate for potential hazardous materials incidents

Under the Certified Unified Program Agency (CUPA) regulations, the Contra Costa County Health Services Department is responsible for implementing the HMBP requirements in Contra Costa County, and the Oakland Fire Department is responsible for implementing these regulations in the city of Oakland.

California Accidental Release Program

The California Accidental Release Program (CalARP) includes regulatory requirements for facilities that handle regulated substances.[1] Ammonia is a regulated substance under state and federal risk management regulations. In accordance with CalARP regulations, preparation of a

[1] CalARP incorporates the requirements of the Federal Risk Management Program, but is more stringent with respect to the threshold quantities of chemicals requiring risk management plans.

risk management plan (RMP) is required for the storage of regulated substances above threshold quantities. The RMP includes a hazard assessment to evaluate the potential effects of an accidental release, a program for preventing an accidental release, and a program for responding to an accidental release. The RMP is filed with and administered by CUPA, which ensures review by and distribution to other potentially affected agencies.

Ammonia is used at the Orinda, Walnut Creek, Lafayette, Sobrante, and Upper San Leandro WTPs. At the federal level, only solutions with an ammonia concentration greater than 20 percent are regulated. However, CalARP regulations apply to all ammonia solutions. The federal and state threshold quantities for ammonia are 20,000 and 500 pounds, respectively. The quantity of ammonia stored at each WTP is above the state threshold quantity, and EBMUD is in the process of preparing RMPs for each WTP.

Although acetylene (used at the Orinda and Walnut Creek WTPs) and propane (used at the Walnut Creek WTP) are federally regulated flammable substances, the quantities stored are well below the federal threshold planning quantity of 10,000 pounds. Therefore, RMPs are not required for these substances.

Construction

Hazardous materials storage (e.g., fuel for construction equipment) associated with the proposed project would be temporary (during construction only). The RWQCB requires registration of an above-ground fuel storage tank at a construction site if the tank is 20,000 gallons or larger, or if the aggregate volume of above-ground petroleum storage is greater than 100,000 gallons. The temporary storage volumes for diesel during construction would be below these thresholds.

Tunnel Classification and Safety

Classification of tunnels and requirements for tunnel safety are addressed in the California Tunnel Safety Orders (California Administrative Code, Title 8, Subchapter 20, Article 8). In accordance with these regulations, the Division of Industrial Safety must assign a classification to a tunnel, whenever possible, to identify appropriate safety requirements before a public works project can be put out to bid. A tunnel can be classified as nongassy, potentially gassy, gassy, or extrahazardous depending on the likelihood that gas could be encountered during construction.

In accordance with the Tunnel Safety Orders, a tunnel is defined as an underground passageway, 30 inches in diameter or greater, that is excavated by employees working below the ground surface. Therefore, the orders would apply to the Orinda-Lafayette Aqueduct. Although the jack-and-bore and microtunnel excavations that would be constructed are 30 inches or more in diameter, employees would not work underground and the Tunnel Safety Orders would not apply to these.

For all tunnel operations, the Tunnel Safety Orders require an emergency plan that includes maps, ventilation controls, firefighting equipment, rescue procedures, evacuation plans, and communications. For potentially gassy tunnels, the Tunnel Safety orders specify monitoring and communications requirements during construction. If threshold levels of gases are exceeded and the Division of Industrial Safety determines that more gases may be encountered, the Division may halt operations until the tunnel can be reclassified. For gassy tunnels, the Tunnel Safety Orders specify: monitoring requirements for explosive gases and actions to be taken in the event that explosive vapors are identified; additional requirements for ventilation; restrictions on the use of equipment with internal combustion engines and spark-producing work activities such as welding or cutting; restrictions on smoking and possession of personal sources of ignition such as lighters or matches; requirements for a “kill” button to cut off electrical equipment in the event that sufficient vapors accumulate; and provision of a refuge chamber or escape route for employee safety.

Because gas was identified during construction of the nearby Lafayette Tunnel Nos. 1 and 2, Claremont Tunnel, Briones Dam Outlet Tunnel, and Berkeley Hills Tunnel, there is the potential that gas could be encountered in the Orinda-Lafayette Tunnel (Jacobs Associates, 2005). Therefore, this tunnel could be classified as potentially gassy or gassy, based on the detailed geotechnical investigation that would be completed for final design of the tunnel. If, based on the geotechnical investigation, the tunnel was found to be gassy, the Tunnel Safety Order requirements as described above would be applied.

Wildland Fire

The California Public Resources Code includes fire safety regulations that: restrict the use of equipment that may produce a spark, flame, or fire; require the use of spark arrestors[2] on construction equipment that has an internal combustion engine; specify requirements for the safe use of gasoline-powered tools in fire hazard areas; and specify fire suppression equipment that must be provided onsite for various types of work in fireprone areas. The Public Resources Code requirements would apply to construction activities at the Withers Pumping Plant because the site is in an area designated by the California Department of Forestry and Fire Protection as a “Wildland Area That May Contain Substantial Forest Fire Risks and Hazards” (California Department of Forestry and Fire Protection, 2000). The Public Resources Code requirements would also apply to construction activities at the Orinda WTP, Happy Valley Pumping Plant and Pipeline, and Sunnyside Pumping Plant because these sites are located in areas designated as a “Very High Fire Hazard Severity Zone.”

Any additional requirements of the Contra Costa County Fire Protection District and Moraga-Orinda Fire District would also apply to any WTTIP project located within a “Very High Fire Hazard Severity Zone.” The fire protection agencies may also designate new areas within their jurisdictions as “Very High Fire Severity Zones,” which could result in more WTTIP projects being located in such zones and subject to requirements for construction within these zones.

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[2] A spark arrestor is a device that prohibits exhaust gases from an internal combustion engine from passing through the impeller blades where they could cause a spark. A carbon trap is commonly used to retain carbon particles from the exhaust.

Control of Asbestos during Construction

The California Air Resources Board (CARB) has adopted an asbestos Airborne Toxic Control Measure (ATCM) for construction, grading, quarrying, and surface mining operations (CARB, 2002). The ATCM requires the use of best available dust mitigation measures to prevent offsite migration of asbestos-containing dust from road construction and maintenance activities, construction and grading operations, and quarrying and surface mining operations in areas of ultramafic rock,[3] serpentine,[4] or asbestos.[5] The BAAQMD implements the regulation, which became effective on July 22, 2002.

For construction projects that disturb one acre or less of asbestos-containing materials, the ATCM requires the site operator to implement standard dust mitigation measures before construction begins, and to maintain each measure throughout the duration of the construction project. Construction activities disturbing more than one acre of asbestos-containing materials are required to prepare an asbestos dust mitigation plan specifying measures that would be taken to ensure that no visible dust crosses the property boundary. The asbestos dust mitigation plan must be submitted to and approved by the BAAQMD prior to the beginning of construction, and the site operator must ensure the implementation of all measures throughout the construction project. In addition, the BAAQMD may require air monitoring for offsite migration of asbestos dust during construction activities and may change the plan on the basis of the air monitoring results.

Based on a review of site-specific geology information (see Section 3.4, Geology, Soils, and Seismicity) and regional geologic information (California Department of Conservation, 1982, 1991), there is a low potential to encounter naturally occurring asbestos at any of the WTTIP facilities, including the Orinda-Lafayette Aqueduct; therefore, the asbestos ATCM would not apply to any of the projects. If naturally occurring asbestos is identified during construction, the requirements of the ATCM would apply.

Hazardous Waste Classification

In accordance with California Code of Regulations, Title 22, Division 4.5, Chapter 11, Article 3, excavated soil and hazardous building materials would be classified as a hazardous waste if they exhibit the characteristics of ignitability, corrosivity, reactivity, or toxicity. In accordance with Section 66261.24 of these regulations, a waste is considered toxic if it contains:

- Total concentrations of certain substances at concentrations greater than the state total threshold limit concentration (TTLC);
- Soluble concentrations greater than the state soluble threshold limit concentration (STLC);
- Soluble concentrations of certain substances greater than federal toxicity regulatory levels using a test method called the toxicity characteristic leaching procedure (TCLP); or

[3] Ultramafic rocks are formed in high-temperature environments well below the surface of the earth.

[4] Serpentine is a naturally occurring group of minerals that can be formed when ultramafic rocks are metamorphosed during uplift to the earth's surface. Serpentinite is a rock consisting of one or more serpentine minerals. This rock type is commonly associated with ultramatic rock along earthquake faults. Small amounts of chrysotile asbestos, a fibrous form of serpentine minerals, are common in serpentinite.

[5] Asbestos is a term used for several types of naturally occurring fibrous materials found in many parts of California.

- Specified carcinogenic substances at a single or combined concentration of 0.001 percent.

A waste would be considered hazardous by state regulations if the soluble concentration of a substance exceeds the STLC determined by a waste extraction test, which involves a 10-to-1 dilution of the sample. Therefore, the total concentration of a substance would need to exceed 10 times the STLC for the soluble concentration to possibly exceed the STLC in the extract. Because the TCLP involves a 20-to-1 dilution of the sample, the total concentration of a substance in the soil would need to exceed 20 times the regulatory level for the soluble concentration to possibly be greater than the regulatory level in the extract. A waste may also be classified as toxic if testing indicates toxicity greater than specified criteria.

District Policies and Procedures

The District's policies and procedures related to the management of hazardous materials are described below.

EBMUD Emergency Operations Plan

The District has prepared an *Emergency Operations Plan* (EBMUD, 1999) outlining procedures to be followed in the event of natural disasters, severe storms, major system failures, or terrorist attacks. The District prepares a site-specific emergency response plan for individual facilities, using the Districtwide program as a guide; the plan identifies staff people to perform emergency duties and lists the resources needed to accomplish emergency tasks.

EBMUD Emergency Response Procedures

The HMBPs for the WTPs specify emergency response procedures to be implemented in the event of a chemical emergency, including the following:

- A fire, spill, release, or threatened release of hazardous materials or hazardous waste is immediately reported to the facility supervisor during normal working hours or to the District telephone radio operator during off hours. The telephone radio operator records known information and notifies others, depending on the nature of the emergency. If emergency assistance is required, the initial observer or supervisor calls 911.

- The supervisor, telephone radio operator, and/or onsite personnel assess the situation to determine what further actions are necessary. Depending on the situation, these actions may include notifying onsite personnel, support personnel, management, and regulatory agencies, or initiating the District *Emergency Operations Plan* or site-specific response plans or procedures, as appropriate. As detailed in the *Emergency Operations Plan*, the Standardized Management System is used to mobilize response teams and to initiate the Incident Command System to begin containment and cleanup procedures, evacuate the site, and/or provide assistance to emergency response personnel.

- If safe to do so, employees act as soon as possible to contain the fire or spill using emergency response equipment available at the site. This step occurs concurrent with or immediately subsequent to reporting the incident.

- Should evacuation be necessary, the facility supervisor or incident commander directs personnel to evacuate the facility. Upon notification, all employees immediately secure their areas and proceed to the assembly area prescribed by the evacuation plan map.
- In the event that 911 is called and fire, police, or medical emergency personnel respond, an EBMUD employee is designated to be available to emergency personnel to provide specific information and technical advice regarding conditions, locations, and characteristics of the site and materials at the site.
- In the event of an earthquake or other major emergency, employees follow the procedures identified in the District *Emergency Operations Plan* as appropriate.
- In the event that an employee experiences a serious chemical exposure, illness, or injury, 911 is called and the victim transported to the nearest hospital or treated as determined by the paramedics responding to the call. For lesser exposures, any affected employee is transported to a local medical facility in accordance with District procedure.

Plant personnel maintain a comprehensive inventory of emergency response equipment at each WTP, and a specially equipped emergency response vehicle is parked at the Orinda WTP and deployed in the event of an emergency. Emergency response equipment is regularly inspected and maintained. A copy of each HMBP is on file with the Contra Costa County Fire Protection District and Oakland Fire Department to assist these agencies in planning for potential chemical emergencies at the WTPs.

District Construction Specifications

Section 01125 of the EBMUD construction specifications, Site Safety and Regulatory Requirements, requires the contractor to provide plans, procedures, and controls when encountering hazardous conditions and hazardous substances during the performance of work. The District reviews submittals for general conformance with the requirements of the contract documents and specified laws and regulations. Specific planning documents related to hazards and hazardous materials that are required include a health and safety plan, materials management and disposal plan, water control and disposal plan, and spill prevention and response plan.

Community Warning Procedures

Contra Costa County

Contra Costa County's community warning system is designed to immediately alert residents within one mile of an incident, notify appropriate emergency response agencies, and provide ongoing updates about the incident and additional protective measures that may be required (Contra Costa County CAER, 2005). The system consists of outdoor sirens located in the industrial corridor of the county, National Weather Service radio alerts, radio and TV alerts, and email advisories for issuing shelter-in-place instructions. These alert features are linked by a radio frequency network and are designed to function when the telephone systems fail. In the future, to facilitate notification of sensitive receptors in the event of an emergency, emergency receivers will be placed in all schools, hospitals, daycare centers, convalescent homes, and other sensitive receptors in the industrial corridor. The County also has an emergency telephone calling system that dials residents and businesses in the affected area and plays a recorded message with emergency instructions.

City of Oakland

The City of Oakland's community warning system includes 27 outdoor sirens that can be activated to warn residents of an incident (City of Oakland, 2005). The nearest siren to the Upper San Leandro WTP is located at Fontaine Street and Keller Avenue. Depending on the nature of an incident, one or more sirens can be used to warn residents of a chemical release. The system also relies on radio and television stations to carry safety information and emergency instructions, and an emergency telephone calling system to warn residents. If required, emergency personnel are available to go door-to-door with emergency instructions. The type of notification used would depend on the urgency and severity of the incident.

Current Chemical Use at WTTIP Facilities

The water treatment plants are the only WTTIP facilities where EBMUD uses or stores hazardous materials. As required by law, the District maintains an HMBP for each WTP, which includes a hazardous materials inventory that lists chemicals stored and used at the site (EBMUD, 2005a through 2005e). Each WTP uses chemicals for water treatment as well as for emergency power and maintenance-related activities. All of the WTPs generate hazardous wastes.

Water Treatment Chemicals

Water treatment chemicals at each WTP, listed in Table 3.11-1, are stored inside of chemical storage buildings and distributed to plant facilities via chemical feed lines. At the Walnut Creek, Orinda, and Lafayette WTPs, polyaluminum hydroxychloride is used as the primary coagulant to remove suspended solids from the source water. Aluminum sulfate is the primary coagulant used at the Sobrante and Upper San Leandro WTPs. At all of the WTPs, a polymer is used as a coagulant and filter aid. Sodium hypochlorite and ammonia are used in the disinfection process, in which chlorine and ammonia combine to form chloramine, a disinfectant that effectively controls pathogens while minimizing levels of adverse disinfection byproducts. Sodium hydroxide is added for pH and corrosion control, and hydrofluorosilic acid (fluoride) is used for fluoridation. Sodium bisulfite is also used at the Orinda WTP to dechlorinate discharges to San Pablo Creek.

At the Upper San Leandro WTP, hydrogen peroxide is used in the ozonation process for taste and odor control and disinfection. Potassium permanganate is used at both WTPs for algae control.

Other Hazardous Materials and Hazardous Waste Generation

In addition to water treatment chemicals, each of the WTPs has an above-ground or underground diesel storage tank to supply an emergency generator. The Orinda and Walnut Creek WTPs each use acetylene, a compressed gas; the Orinda WTP uses a variety of compressed gases for welding as well as pesticides for pest control. The Walnut Creek WTP also uses propane for an onsite

TABLE 3.11-1
FORM AND HAZARD CLASS OF WATER TREATMENT CHEMICALS USED AT THE WTPs

Chemical Name	Use	Form	Hazard Class
Sodium Hypochlorite (15%)	Primary disinfection (chlorination) Secondary disinfection (chloramination)	Nonflammable liquid	Corrosive Oxidizer Fire Acute health
Liquid Ammonia (19%)	Secondary disinfection (chloramination)	Nonflammable liquid	Corrosive Acute health
Aluminum Sulfate (48%)	Primary coagulant	Nonflammable liquid	Corrosive Acute health
Polyaluminium Hydroxychloride (35%)	Primary coagulant	Nonflammable liquid	Corrosive Acute health
Cationic Polymer (20%)	Coagulant aid	Nonflammable liquid	Acute health
Nonionic Polymer (<40%)	Filter aid Flocculation aid	Nonflammable liquid	Corrosive Acute health
Sodium Hydroxide (Caustic Soda) (<50%)	pH & corrosion control	Nonflammable liquid	Corrosive Reactive Irritant Acute health
Hydrofluorosilicic Acid (Flouride) (25%)	Flouridation (tooth decay prevention)	Nonflammable liquid	Toxic Corrosive Reactive Acute health Chronic health
Potassium Permanganate (>97%)	Algae control	Nonflammable solid	Oxidizer Acute health
Hydrogen Peroxide (35%)	Taste & odor control	Nonflammable liquid	Oxidizer Unstable Corrosive Reactive Acute health Chronic health
Sodium Bisulfate	Dechlorination	Nonflammable Liquid	Acute Health

SOURCE: EBMUD, 2005a through 2005e.

barbeque. Each of the WTPs generates hazardous wastes for offsite disposal or recycling. These wastes are stored in onsite storage lockers from the time of generation through legal offsite disposal.

Handling and Storage Procedures

Hazardous materials and wastes are handled, stored, and disposed in accordance with guidance contained in the material safety data sheets that are kept at the WTPs. The operators receive deliveries of the process chemicals at designated chemical loading/unloading stations located outside and adjacent to chemical storage areas. These stations are designed so that leaks, spills, or releases are contained within a sump. The Orinda and Walnut Creek WTP loading/unloading areas are covered, and the Lafayette WTP area is not covered. Signs are posted to avoid the mixing of incompatible chemicals.

The process chemicals are stored in indoor above-ground storage tanks (ASTs) with secondary containment. Sodium hypochlorite, which is incompatible with ammonia, is stored in an isolated room with a sump. The chemicals are transported to the point of application through pipes; the pipes are contained within a trench that serves as secondary containment. The operators monitor and control the water treatment processes, including process chemical tank levels and feed rates, using the computer terminals located in the operations building and by conducting periodic visual checks of the equipment. The operators also inventory the process chemical tanks on a daily basis and conduct visual inspections at the same time.

Diesel for the emergency backup generators is stored in tanks with secondary containment. The tanks are operated, maintained, and tested in accordance with applicable regulations.

Supplemental storage, handling, and disposal guidance is provided in the *EBMUD Environmental Compliance Manual*. In addition, regulatory compliance staff conduct a wall-to-wall audit every year to ensure hazards are eliminated and to ensure compliance with applicable local, state, and federal environmental health and safety regulations and requirements. Upon completion of the audit, a report is prepared to identify needed corrective measures and estimated completion dates. The audits include the policies, procedures, and practices associated with emergency response, hazardous materials, hazardous waste, underground storage tanks (USTs), ASTs, solid waste, air emissions, and water and wastewater discharges.

Employee Training

As detailed in the *EBMUD Workplace Health and Safety Manual*, the potential for employee exposure to hazardous materials or wastes is minimized through implementation of an injury and illness prevention plan, which includes provisions for compliance with safety regulations, local work practices and rules, and required safety practices; safety communication (e.g., local safety committees); hazard reporting; and training.

Potential Presence of Hazardous Materials in Soil and Groundwater

To evaluate the potential presence of hazardous materials in the vicinity of WTTIP construction activities, environmental database reviews (EDR, 2005a through 2005q) were conducted to identify permitted uses of hazardous materials,[6] environmental cases,[7] and spill sites[8] where soil and/or groundwater contamination may be present. Search distances for specific facilities, such as the WTPs or pumping plants, varied depending on the type of regulatory database reviewed, and are consistent with the search distance specified in ASTM International Standard E 1527, Phase I

[6] Permitted uses of hazardous materials include those facilities that use hazardous materials or handle hazardous wastes in accordance with current hazardous materials and hazardous waste regulations.

[7] Environmental cases are those sites that are suspected of releasing hazardous materials or have had cause for hazardous materials investigations and are identified on regulatory agency lists.

[8] Spills sites are locations where a spill of hazardous materials has been reported to state or federal regulatory agencies; in some cases, spills of nonhazardous materials are reported.

Environmental Site Assessment Standard. For pipeline and tunnel projects, these sites were identified within a one-quarter-mile buffer zone on either side of the alignment. A description of each database reviewed is provided in Appendix H, and those databases with identified sites are listed in Table 3.11-2. Many sites are identified in more than one database. The sites are compiled by address in Appendix H.

As a screening-level approach, those sites with the potential to affect soil and groundwater quality at a WTTIP site, based on the environmental database review, are discussed below. These include environmental cases with documented groundwater contamination identified within the specified search distances and sites with documented soil contamination at or adjacent to the proposed WTTIP site. However, the database review does not provide detailed site-specific information regarding site conditions; in most cases, it would be necessary to conduct regulatory agency file reviews to evaluate the actual potential for one of these sites to affect soil or groundwater quality at a proposed WTTIP site.

Lafayette WTP

This WTP has permitted hazardous materials uses, but is not identified as an environmental case, and no spills of hazardous materials were indicated. There are no environmental cases identified within ASTM search distances from the WTP.

Orinda WTP

The Orinda WTP is identified in the CORTESE database; although no reason was provided, this database typically includes leaking UST sites, among other factors. This WTP has permitted hazardous materials uses, but no spills of hazardous materials were indicated. There are no environmental cases identified within ASTM search distances from the WTP.

Walnut Creek WTP

The Walnut Creek WTP has permitted hazardous materials uses, but is not identified as an environmental case, and no spills of hazardous materials were indicated. There are no environmental cases identified within ASTM search distances.

Sobrante WTP

The Sobrante WTP has permitted hazardous materials uses, but is not identified as an environmental case, and no spills of hazardous materials were indicated. There are no environmental cases identified within ASTM search distances.

Upper San Leandro WTP

The Upper San Leandro WTP has permitted hazardous materials uses. There was a release of diesel from the UST at this site in 1994 (LUST, CORTESE, and CS), and groundwater quality was affected. Soil was remediated by excavation and treatment, and groundwater was remediated by pumping and treatment. The case has been closed by the regulatory agencies. No spills of hazardous materials were indicated.

TABLE 3.11-2
DESCRIPTION OF ENVIRONMENTAL DATABASES

Acronym	Name and Description of Database
Permitted Uses	
AST	Above-Ground Petroleum Storage Tank Facilities. Facilities with registered above-ground storage tanks (ASTs).[a]
CA FID UST	California Environmental Protection Agency (Cal-EPA) Facility Inventory Database – Underground Storage Tanks (USTs). Facilities in a historical listing of active and inactive USTs.[b]
CONTRA COSTA SL	Contra Costa County Site List. Sites in Contra Costa County with USTs as well as hazardous waste generators and facilities that have submitted a hazardous materials business plan.[b]
DRY CLEANERS	The Dry Cleaner Facilities Database. Dry-cleaner-related facilities that have U.S. Environmental Protection Agency (U.S. EPA) identification numbers.[b]
EMI	Emissions Inventory Database. Sites for which the California Air Resources Board and local air pollution control agencies have collected toxic and criteria pollutant emission data.[a]
FINDS	Facility Index System. A database that includes information on facilities in other, more detailed databases.[a]
HAZNET	Hazardous Waste Information System. Facilities that have filed hazardous waste manifests with the Department of Toxic Substances Control (DTSC).[a]
HIST UST	Hazardous Substances Storage Container Database. Facilities on a historic list of UST sites.[b]
RCRA LQG	Resource Conservation and Recovery Act Large Quantity Generators. Permitted facilities that report generation of over 1,000 kilograms per month of nonacutely hazardous waste or 1 kilogram per month of acutely hazardous waste.[b]
RCRA SQG	Resource Conservation and Recovery Act Small Quantity Generators. Permitted facilities that generate more than 100 kilograms per month but less than 1,000 kilograms per month of nonacutely hazardous waste.[b]
SWEEPS	Statewide Environmental Evaluation and Planning System. A listing of UST sites that was prepared for the State Water Resources Control Board in the early 1980s, but is no longer maintained or updated.[b]
UST	Underground Storage Tanks. Facilities permitted to maintain USTs.[b]
WDS	Waste Discharge System. Facilities that have been issued waste discharge requirements.[a]
Environmental Cases	
ALAMEDA COUNTY CS	Alameda County Contaminated Sites. Leaking UST sites and sites with known soil or groundwater contamination.[c]
AWP	Annual Work Plan, formerly known as the Bond Expenditure Plan, identifies hazardous substance sites targeted by the DTSC for cleanup.[d]
CA SLIC	Spills, Leaks, Investigation, and Cleanup Cost Recovery Listing. Sites under the jurisdiction of the San Francisco Bay Regional Water Quality Control Board.[c]
CALSITES	Previously referred to as the Abandoned Sites Program Information System (ASPIS), this list identifies potential hazardous waste sites, which are then screened by the DTSC for further action.[d]
CERCLIS NFRAP	Comprehensive Environmental Response, Compensation, and Liability Information System sites where, following an initial investigation, no contamination was found, contamination was removed quickly, or the contamination was not serious enough to require federal Superfund action or National Priority List consideration.[b]
CORTESE	Cortese Hazardous Waste and Substances Site List. A compilation of sites listed in the Leaking Underground Storage Tank (LUST), Solid Waste Information System (SWF/LF), and CALSITES databases.[c]
LUST	Leaking Underground Storage Tanks. A compilation of LUST sites.[c]

TABLE 3.11-2 (Continued)
DESCRIPTION OF ENVIRONMENTAL DATABASES

Acronym	Name and Description of Database
Environmental Cases (cont.)	
NOTIFY 65	Proposition 65 Records. Facility notifications about any release that could threaten drinking water and thereby expose the public to a potential health risk.[d]
REF	Unconfirmed Properties Referred to Another Agency. Properties where contamination has been confirmed and which were determined not to require direct DTSC Site Mitigation Program action or oversight.[b]
VCP	Voluntary Cleanup Program Properties. Low-threat properties with either confirmed or unconfirmed releases, where the project proponents have requested that the DTSC oversee investigation and/or cleanup activities.[c]
Spill Sites	
CHMIRS	California Hazardous Materials Incident Reporting System. Hazardous materials spills and releases reported to the California Office of Emergency Services.[a]
ERNS	Emergency Response Notification System. These cases are usually spills or releases of chemicals reported to federal authorities.[a]
HMIRS	The Hazardous Materials Information Reporting System. Hazardous material spill incidents that were reported to the U.S. Department of Transportation.[a]

[a] Search area: project property and adjacent area.
[b] Search area: within one-quarter mile of property.
[c] Search area: within one-half mile of property.
[d] Search area: within one mile of property.

SOURCE: EDR, 2005a through 2005q; table compiled by Orion Environmental Associates.

There are three environmental cases identified within ASTM search distances from this WTP. In 1990, there was a release of waste oil from a UST at Exxon, located at 8008 Mountain Boulevard (Site No. 13), approximately three-eighths mile to the east (LUST, CORTESE, and CS). In 1992, there was a release of diesel from a UST at 7100 Mountain Boulevard (Site No. B15), approximately three-eighths mile to the north (LUST and CORTESE). Groundwater quality was affected at both sites, which have been remediated and closed by the regulatory agencies. Although there are permitted hazardous materials uses at these sites, they are not discussed here because the sites are located more than one-quarter mile from the WTP.

The Oakland Naval Hospital at 8758 Mountain Boulevard (Site No. C16) is one-half mile to the southeast of the WTP. The military base is closed but is listed as an active site in the DTSC Annual Work Plan (AWP and CALSITES). There was a preliminary assessment of the site in 1991, but the site has been archived by the U.S. EPA (CERC NFRAP). There was also a release of gasoline from a UST at this site (LUST, CORTESE, and CS) in 1991. No remedial action was taken, but the case was closed by the Alameda County Department of Environmental Health in 1994.

Orinda-Lafayette Aqueduct

With the exception of the Orinda WTP, which is identified in the CORTESE database (Site No. 20), there are no environmental cases with documented soil contamination adjacent to or within the aqueduct alignment, and no environmental cases with documented groundwater contamination or reported spill sites within one-quarter mile of the alignment.

Ardith Reservoir and Donald Pumping Plant

The Donald Pumping Plant and Ardith Reservoir site is not listed as a permitted hazardous materials use site, an environmental case, or a spill site. There are no environmental cases identified within ASTM search distances.

Fay Hill Pumping Plant and Pipeline Improvements

This analysis does not discuss permitted hazardous materials uses, environmental cases, or spill sites in the vicinity of the Fay Hill Pumping Plant because no excavation or other soil-disturbing activities would take place at this site.

There are environmental cases within one-quarter mile of the Fay Hill Pipeline Improvements, primarily on Moraga Road, Center Street, and Rheem Boulevard to the west of Moraga Road. Five of these sites (Site Nos. A2, A9, B12, E24, and F30) have experienced leaks from a UST (LUST and CORTESE); however, these environmental cases have a low potential to cause soil or groundwater contamination in the vicinity of the pipeline alignment, because these sites are all topographically lower than the proposed alignment.

Fay Hill Reservoir

The Fay Hill Reservoir site is not identified as a permitted hazardous materials use, an environmental case, or a spill site. The five LUST sites located within one-quarter mile of the Fay Hill Pipeline are also within approximately one-half mile of the reservoir site; however, these sites also have a low potential to cause soil or groundwater contamination at the reservoir site because they are all topographically lower.

Glen Pipeline Improvements

There are no environmental cases, permitted hazardous materials uses, or spill sites within one quarter mile of the Glen Pipeline Improvements.

Happy Valley Pumping Plant and Pipeline

The proposed Happy Valley Pumping Plant site is not identified as a permitted hazardous materials use site, an environmental case, or a spill site, and there were no environmental cases identified within ASTM search distances.

The only environmental case within one-quarter mile of the pipeline alignment is a LUST site (LUST and CORTESE) at 12 El Sueno Road, approximately one-quarter mile southeast of the southern terminus of the pipeline alignment. There was a release of heater fuel from a UST in 1997; groundwater quality was affected, but the case has been closed. MTBE was detected in the groundwater at this site. There were no reported spills of hazardous materials within one-quarter mile of the pipeline alignment.

Highland Reservoir and Pipelines

There are no permitted hazardous materials uses, environmental cases, or spill sites at the proposed Highland Reservoir site or within ASTM search distances. There are no environmental cases or spill sites identified within one-quarter mile of the proposed Highland Pipeline alignments.

Lafayette Reclaimed Water Pipeline

The proposed Lafayette Reclaimed Water Pipeline follows much of the same alignment as the proposed Highland Pipelines, and there are no environmental cases or spill sites identified within one-quarter mile of the alignments.

Leland Isolation Pipeline and Bypass Valves

Environmental cases identified within one-quarter mile of the pipeline alignment include 10 LUST sites (LUST and CORTESE), as summarized in Table 3.11-3. One of these sites reported a release that could affect a drinking water source (NOTIFY 65). The materials released at LUST sites include gasoline and diesel, and groundwater quality was affected at five of these sites. Six of the sites have been closed by the regulatory agencies, one is undergoing investigation, one is undergoing remediation, and two are undergoing post-remedial action monitoring. MTBE was identified at each of the six sites tested for this compound.

There are three spill sites within one-quarter mile of the proposed Leland Isolation Pipeline, all identified in the CHMIRS database. In 1988, there was a release of an unidentified material at 1646 North California Street (Site No. G31); in 2000, there was a release of gasoline to the storm drain at 1666 North Main Street (Site No. O55); and, in 1988, there was a spill of an unspecified material at the corner of North Broadway and Ygnacio Valley Drive (Site No. T80).

The Leland Bypass Valves would be located at the Danville Pumping Plant. This site has permitted hazardous materials uses, but no environmental cases or spill sites were identified at the site or within ASTM search distances.

Moraga Reservoir

The Moraga Reservoir site was not identified as an environmental cases or spill site, and no environmental cases were identified within ASTM search distances.

Moraga Road Pipeline

Environmental cases identified within one-quarter mile of the pipeline alignment include six LUST sites (LUST and CORTESE), as summarized in Table 3.11-3. These are:

- One case at 310 Moraga Road (Site No. 10), near the intersection with Campolindo Drive. This site is undergoing investigation of a gasoline release from a UST. Groundwater quality was affected, and MTBE was detected in the groundwater.

TABLE 3.11-3
LEAKING UNDERGROUND STORAGE TANK SITES IDENTIFIED WITHIN ONE-QUARTER MILE OF PIPELINE ALIGNMENTS

EDR Site No.	Site Name	Address	Substance Released	Media Affected	Case Status	MTBE Detected
Leland Isolation Pipeline						
B5	Pacific Bell	1755 Locust Street	Diesel	Groundwater	Closed	Not tested
C11	Braner–Sloane Motors, Inc.	1840 N. Main Street	Gasoline	Soil	Closed	Not tested
E17	Unocal	1322 N. Main Street	Gasoline	Groundwater	Monitoring	Yes
I35	Parker Robb Chevrolet, Inc.	1707 N. Main Street	Gasoline	Groundwater	Closed	Yes
L44	SRS Development	1756 Broadway Street	Gasoline	Soil	Closed	Not tested
M50	Xtra Oil Company	1980 Main Street	Gasoline	Soil	Closed	Yes
P62	Shell	265 Ygnacio Valley Road	Gasoline	Soil	Monitoring	Yes
U87	Exxon Ras	605 Ygnacio Valley Road	Gasoline	Groundwater	Remedial Action Underway	Yes
88	L'il Bear Car Wash #1	604 Ygnacio Valley Road	Gasoline	Groundwater	Site Characterization	Yes
89	Anderson Oldsmobile GMC	635 Ygnacio Valley Road	Gasoline	Not Specified	Closed	Not tested
Moraga Road Pipeline						
10	Acalanes High School	310 Moraga Road	Gasoline	Groundwater	Open	Yes
14	Rheem Theater	350 Park Street	Gasoline	Groundwater	Closed	Not tested
14	Shell Oil Co.	383 Rheem Boulevard	Gasoline	Groundwater	Closed	Yes
15	Unocal Service Station	398 Rheem Boulevard	Waste Oil	Groundwater	Monitoring	Yes
18	Exxon Service Station	425 Moraga Road	Gasoline	Groundwater	Closed	Yes
20	Exxon Service Station	530 Moraga Road	Waste Oil	Groundwater	Closed	Yes
Tice Pipeline						
B11	Golden Gate Service Station	1601 Tice Valley Boulevard	Gasoline	Groundwater	Closed	Yes
B5	Shell	1600 Tice Valley Boulevard	Waste Oil	Groundwater	Closed	Yes
B6	Mobil Service Station	2400 Olympic Boulevard	No data provided – Identified in CORTESE database only			
E26	Walkers Hydraulics	1360 Boulevard Way	Gasoline	Soil	Closed	Not tested
F31	Cal Metcalf	1299 Boulevard Way	Gasoline	Not Specified	Closed	Not tested

SOURCE: EDR, 2005j; EDR, 2005m; EDR, 2005o; EDR, 2005p; table compiled by Orion Environmental Associates.

- Four sites near the intersection of Rheem Boulevard and Moraga Road (Site Nos. 14, 15, and 18; Site No. 14 includes two addresses). The materials released include gasoline and waste oil. Groundwater quality was affected at each of these sites. Three of the cases have been closed, and one is undergoing post-remedial action monitoring. MTBE was identified at the three sites tested for this compound.
- One site at 530 Moraga Road (Site No. 20), near the intersection with Lucas Drive. There was a release of waste oil from a UST at this site. Groundwater quality was affected, but the case has been closed. MTBE was detected in the groundwater.

Seven spill sites have been identified within one-quarter mile of the proposed Moraga Road Pipeline alignment, five of which involved hazardous materials or unspecified materials. Sites listed in the CHMIRS database include a spill of transformer oil onto a van at 730 Moraga Road in 2000 (Site No. 6); a release of an unspecified material at 300 Moraga Road in 1991 (Site No. 9); a release of an unspecified material in front of 324 Park Street in 1990 (Site No. 16); and a release of an unspecified material at 715 Moraga Road in 1991 (Site No. 23). In 1996, a transformer failed at 100 Calle de Mesa (Site No. 7, ERNS).

Sunnyside Pumping Plant

There are no permitted hazardous materials uses, environmental cases, or spill sites identified at the proposed Sunnyside Pumping Plant location or within ASTM search distances.

Tice Pumping Plant and Pipeline

The Tice Pumping Plant site is not identified as a permitted hazardous materials use site, an environmental case, or a spill site.

Environmental cases identified within one-quarter mile of the pipeline alignment include four LUST sites (Site Nos. B11, B5, E26, and F31; LUST and CORTESE) and one site identified only in the CORTESE database only (Site No. B6), as summarized in Table 3.11-3. The materials released at the LUST sites include gasoline and waste oil, and groundwater quality was affected at two of these sites. All four of the sites have been closed by the regulatory agencies. MTBE was identified at each of the two sites tested for this compound. All of these sites are also within one-half mile of the proposed pumping plant site. There are no reported spills of hazardous materials within one-quarter mile of the pipeline alignment.

Withers Pumping Plant

The proposed Withers Pumping Plant site is not identified as a permitted hazardous materials use site, an environmental case, or a spill site. A spill of diesel from a contractor's generator occurred at the Grayson Reservoir in 1999 while the reservoir was under construction (CHMIRS). The only environmental case identified within ASTM search distances is a facility at 2099 Reliez Valley Road (Site No. 1), located approximately three-eighths mile to the southeast. This site is identified in the CORTESE database, although no reason was provided.

Hazardous Building Materials

Hazardous building materials are included in this discussion because the WTTIP projects would require demolition or renovation of existing buildings and water treatment facilities that may contain such materials. Hazardous building materials could present a public health risk if disturbed. Hazardous building materials include asbestos, electrical equipment such as transformers and fluorescent light ballasts that contain PCBs or di (2 ethylhexyl) phthalate (DEHP), fluorescent lights containing mercury vapors, and lead-based paints. Reservoir liner materials may also contain metals or PCBs. If removed during demolition or renovation, these materials would require special disposal procedures.

Asbestos is a common name for a group of naturally occurring fibrous silicate minerals that are made up of thin but strong, durable fibers. Until the 1970s, asbestos was commonly used as a building material, including use as insulation, shingles and siding, roofing felt, floor tiles, acoustical ceiling material, and automotive brakes and clutches. Asbestos is a known carcinogen and presents a public health hazard if it is present in the friable (easily crumbled) form. Long-term, chronic inhalation of high levels of asbestos can cause lung diseases such as asbestosis, mesolethioma, and lung cancer.

PCBs are mixtures of synthetic organic chemicals with physical properties ranging from oily liquids to waxy solids. Due to their nonflammability, chemical stability, high boiling point, and electrical insulating properties, PCBs were used in hundreds of industrial and commercial applications, including use in electrical, heat transfer, and hydraulic equipment; as plasticizers in paints, plastic, and rubber compounds; in pigments, dyes, and carbonless copy paper; and many others. More than 1.5 billion pounds of PCBs were manufactured in the United States before production ceased in 1977 (U.S. EPA, 2005). PCBs are a known human carcinogen; they are highly toxic substances that remain persistent in the environment, accumulate in biological systems, interfere with the reproductive system, and act as an immunosuppressant. Under Section 6(e) of the Toxic Substances Control Act, Congress began regulating the use and manufacturing of PCBs in 1976, legislating “cradle to grave” (i.e., from manufacture to disposal) management of PCBs in the United States.

Most fluorescent light ballasts manufactured before 1978 contain approximately 0.5 ounces of PCBs in a small capacitor, although the quantity can be up to 2 ounces. In 1978, the U.S. EPA estimated that approximately 850 million of these capacitors were in use in the United States. Ballasts manufactured after January 1, 1978 do not contain PCBs and should be labeled as such on the ballast. Between 1979 and the early 1990s, DEHP was used in place of PCBs as a dielectric fluid in some fluorescent light ballasts and other electrical equipment (Green Lights Recycling, 2005). DEHP is classified as a probable human carcinogen by the U.S. Department of Health and Human Services and as a hazardous substance by the U.S. EPA. Because of this classification, ballasts containing DEHP must be legally disposed of; ballast incineration or a combination of ballast recycling and incineration are recommended for complete destruction of DEHP.

Spent fluorescent light tubes commonly contain mercury vapors. In February 2004, regulations took effect in California that classified all fluorescent lamps and tubes as a hazardous waste. When these lamps or tubes are broken, mercury is released to the environment; mercury can also be absorbed through the lungs into the bloodstream and can be washed by rain water into waterways. The mercury in urban stormwater sediment results in part from improperly discarded fluorescent lamps and tubes (CIWMB, 2005). In 2000, approximately 370 pounds of mercury were released in California due to the breakage of electric lamps and tubes during storage and transportation. It is estimated that nearly 75 million waste fluorescent lamps and tubes are generated annually in California, and these lamps and tubes contain more than half a ton of mercury.

Prior to 1960, lead-based paint was commonly used and is likely present in buildings constructed before that time. Lead is toxic to humans, particularly young children, and can cause a range of human health effects depending on the level of exposure. When adhered to the surface of a material, lead-based paint poses little health risk. Where the paint is delaminated or chipping, it can cause a potential threat to the health of young children or other building occupants who may ingest the paint. Lead dust also presents public health risks during the demolition of structures that contain lead-based paint. Lead-based paint that has separated from a structure may also contaminate nearby soil.

3.11.3 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:

- Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials;
- Create a significant hazard to the public or the environment through foreseeable upset and accident conditions involving the release of hazardous materials into the environment;
- Result in hazardous emissions or the handling of hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school;
- Be located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would create a significant hazard to the public or the environment;
- Be located within an area covered by an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, and would result in a safety hazard for people residing or working in the project area;
- Be located within the vicinity of a private airstrip and would result in a safety hazard for people residing or working in the project area;

- Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan; or
- Expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands.

Title 40 of the Code of Federal Regulations (40 CFR) and Title 22 of the California Code of Regulations define and identify hazardous materials and wastes and provide threshold levels for these substances. In accordance with these regulations, a hazardous waste is a substance (or combination of substances) that, because of its quantity, concentration, or physical, chemical, or infectious characteristics, may pose a substantial threat or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed. Regulatory agencies determine what constitutes a “substantial” hazard or an “insignificant” level of hazardous materials on a case-by-case basis, depending on the proposed uses, potential exposure, and degree and type of hazard.

The following impacts were considered in this section, but were found to be absent from or not applicable to the WTTIP; therefore, no further discussion of these impacts is provided.

- None of the WTTIP projects are located within an area covered by an airport land use plan or within two miles of an airport or airstrip. The closest airport to a WTTIP project site is Buchanan Field, located near the intersection of Highway 4 and Interstate 680, which is more than two miles from the proposed Withers Pumping Plant. The proposed plant is located just outside of the Airport Influence Area.
- Although construction activities could impede access for emergency response vehicles and therefore interfere with an emergency response plan or emergency evacuation plan, measures to avoid interference with emergency access are addressed in Section 3.8, Traffic and Circulation.
- Although increased throughput of water treatment chemicals at the WTPs could require more chemical deliveries and indirectly result in an incremental increase in the potential for accidents during transport, the transport of hazardous materials and wastes is regulated by the California Department of Transportation and the California Highway Patrol. These agencies regulate container types and packaging requirements as well as licensing and training for truck operators, chemical handlers, and hazardous waste haulers. Because EBMUD and all service providers will be required to comply with existing and future hazardous materials laws and regulations for the transport of hazardous materials, the risk of accidental releases of hazardous materials during normal transport operations is the same as under existing conditions which does not constitute a significant hazard.
- While the Orinda WTP is located within one-quarter mile of Wagner Ranch Elementary School, the use of hazardous materials would be managed safely to protect public health, in accordance with existing and future regulatory-approved HMBPs. There would be no change in the quantity of hazardous materials stored as a result of the WTTIP. The risk of a release of hazardous materials from the WTP is the same as under existing conditions, and there is no need for specific mitigation associated with implementation of the WTTIP.

Table 3.11-4 summarizes the significance determinations of identified hazards and hazardous materials impacts as they apply to each project facility.

Construction Impacts

Impact 3.11-1: Exposure of workers and the public to hazardous materials that could be present in excavated soil, tunnel muck, or groundwater.

If hazardous materials are present in excavated soil, groundwater, or tunnel muck, a release to the environment could occur or construction workers and the public could be exposed to the hazardous materials in the soil and groundwater or to chemical vapors during construction.

Depending on the nature and extent of any contamination encountered, adverse health effects and nuisance vapors could result if proper precautions are not taken. Contaminated soil or groundwater could also require disposal as a restricted or hazardous waste.

However, in accordance with Section 01125 of the EBMUD construction specifications (described in the Setting), the contractor would be required to prepare and implement the following plans for all projects requiring excavation or dewatering:

- A site health and safety plan, prepared in accordance with applicable regulations, detailing measures to be taken to alleviate the identified risks, specifying appropriate health and safety requirements, and designating a site safety and health supervisor.

- A materials disposal plan specifying how the contractor will remove, handle, transport, and dispose of all material for a specific project in a safe, appropriate, and lawful manner. The plan must identify the disposal method for soil and the approved disposal site, and include written documentation that the disposal site will accept the waste. Materials and wastes may only be recycled, reused, reclaimed, or disposed of at locations approved by the District. Prior to disposition of wastes, the contractor must submit copies of waste profile forms and correspondence between the contractor and the disposal facility to the District. Prior to disposal of hazardous wastes, the contractor must submit copies of the waste manifests to the District and provide documentation that the waste hauler is regulated by the state to transport hazardous wastes.

- A water control and disposal plan describing measures for containment, handling, and disposal of groundwater (if encountered), runoff 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. The discharge must comply with regulations of the RWQCB, California Department of Fish and Game, county flood control districts, and any other regulatory agency having jurisdiction, whichever is most stringent.

With compliance with EBMUD construction specifications, including preparation of a health and safety plan, material disposal plan, and water control and disposal plan, hazardous materials impacts related to exposure to hazardous materials in the soil and groundwater during construction would be less than significant for projects located on property owned by EBMUD.

TABLE 3.11-4
SUMMARY OF POTENTIAL PROJECT-LEVEL HAZARDS AND HAZARDOUS MATERIALS IMPACTS

Facility	Impact 3.11-1 Hazardous Materials in Soil and Groundwater	Impact 3.11-2 Hazardous Building Materials	Impact 3.11-3 Gassy Conditions in Tunnels	Impact 3.11-4 High-Pressure Gas Line Rupture	Impact 3.11-5 Wildland Fires	Impact 3.11-6 Release from Construction Equipment	Impact 3.11-7 Accidental Release during Operation (WTPs)
Lafayette WTP							
Alternative 1	SM	SM	–	–	–	LTS	LTS
Alternative 2	–	SM	–	–	–	LTS	LTS
Orinda WTP							
Alternative 1	SM	–	–	–	LTS	LTS	–
Alternative 2	SM	SM	–	–	LTS	LTS	–
Walnut Creek WTP							
Alternative 1	SM	–	–	–	–	LTS	–
Alternative 2	SM	–	–	–	–	LTS	–
Sobrante WTP							
Alternative 1	SM	SM	–	–	–	LTS	LTS
Alternative 2	SM	SM	–	–	–	LTS	LTS
Upper San Leandro WTP							
Alternative 1	SM	SM	–	–	–	LTS	LTS
Alternative 2	SM	SM	–	–	–	LTS	LTS
Orinda-Lafayette Aqueduct							
Alternative 2	SM	–	LTS	SM	LTS	LTS	–
Ardith Reservoir	SM	–	–	–	–	LTS	–
Donald Pumping Plant	SM	SM	–	–	–	LTS	–
Fay Hill Pumping Plant and Pipeline Improvements	SM	SM	–	–	–	LTS	–
Fay Hill Reservoir	SM	SM	–	–	–	LTS	–
Glen Pipeline Improvements	SM	–	–	–	–	LTS	–
Happy Valley Pumping Plant and Pipeline	SM	–	–	SM	LTS	LTS	–
Highland Reservoir and Pipelines	SM	–	–	SM	–	LTS	–
Lafayette WTP Reclaimed Water Pipeline	SM	–	–	SM	–	LTS	LTS
Leland Isolation Pipeline and Bypass Valves	SM	–	–	SM	–	LTS	–
Moraga Reservoir	SM	SM	–	–	–	LTS	–
Moraga Road Pipeline	SM	–	–	SM	–	LTS	–
Sunnyside Pumping Plant	SM	–	–	SM	LTS	LTS	–
Tice Pumping Plant and Pipeline	SM	–	–	SM	–	LTS	–
Withers Pumping Plant	SM	–	–	–	LTS	LTS	–

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

However, historic or current land uses at or in the vicinity of WTTIP sites could have resulted in a release of hazardous materials that could affect soil or groundwater quality within the project boundaries. For these sites, it would be beneficial to conduct a site history and/or database review prior to construction to evaluate the potential to encounter hazardous materials in the soil and groundwater; therefore, Measure 3.11-1 would be implemented for all WTTIP projects. In accordance with this measure, the District or contractor would conduct a Phase I environmental site assessment in accordance with ASTM-established protocols for the construction of facilities requiring excavation of over 50 cubic yards of soil and would also conduct necessary followup investigations to evaluate soil and groundwater quality at the site and implement all appropriate measures.

For all pipeline projects, the District or contractor would conduct an environmental database review to identify environmental cases, permitted hazardous materials uses, and spill sites within one-quarter mile of the pipeline and conduct regulatory agency file reviews for sites that could potentially affect soil or groundwater quality within the pipeline alignment.

Because hazardous materials conditions at a site could change over time, and because implementation of project-level WTTIP components would span 10 years, this mitigation measure would be required at all WTTIP sites, regardless of the potential to encounter hazardous materials in the soil or groundwater based on the database review discussed in this analysis.

Lafayette WTP

Alternative 1

Construction of all proposed (project-level) facilities at the Lafayette WTP would require excavation of approximately 167,200 cubic yards of soil, about 100,000 cubic yards of which would be removed for offsite disposal. Dewatering could be required for some of the project facilities. The Lafayette WTP is not identified as an environmental case, and there are no known environmental cases within ASTM search distances. Therefore, the potential for encountering hazardous materials in the soil or groundwater is low.

Alternative 2

There would be limited soil excavation required at the Lafayette WTP under Alternative 2.

Orinda WTP

Alternative 1

Construction of the new backwash water recycle system would require excavation of approximately 15,700 cubic yards of soil, 12,600 cubic yards of which would be removed for offsite disposal. Dewatering could be required for construction of this system. Although the Orinda WTP is identified in the CORTESE database, the reason is not provided. There were no environmental cases with documented groundwater contamination within ASTM search distances. Therefore, the potential for encountering hazardous materials in the soil or groundwater is low.

Alternative 2

This alternative would include substantially more excavation than Alternative 1 because one new clearwell and the Los Altos Pumping Plant would be constructed in addition to the backwash water recycle system. Excavation of approximately 296,000 cubic yards of soil would be required, 152,000 cubic yards of which would be removed for offsite disposal. As with Alternative 1, the potential for encountering hazardous materials in the soil or groundwater is low.

Walnut Creek WTP – Alternative 1 or 2

Construction of the new filter plant and new Leland Pumping Plant No. 2 under both alternatives would require excavation of approximately 5,500 cubic yards of soil, 4,100 cubic yards of which would be removed for offsite disposal. Dewatering would likely be required for construction of these facilities. The Walnut Creek WTP is not an identified environmental case, and there are no environmental cases within ASTM search distances. Therefore, the potential for encountering hazardous materials in the soil or groundwater is low.

Sobrante WTP – Alternative 1 or 2

Under Alternative 1, construction of the filter-to-waste equalization basin, high-rate sedimentation units, and chlorine contact basin would require excavation of approximately 37,100 cubic yards of soil, 21,600 cubic yards of which would be removed for offsite disposal. Under Alternative 2, construction would require excavation of approximately 38,100 cubic yards of soil, 28,500 cubic yards of which would be removed for offsite disposal. Dewatering would likely be required for construction of these facilities. The Sobrante WTP is not identified as an environmental case, and there are no environmental cases with documented groundwater contamination within ASTM search distances. Therefore, the potential for encountering hazardous materials in the soil or groundwater is low.

Upper San Leandro WTP – Alternative 1 or 2

Under both alternatives, construction of the filter-to-waste equalization basin would require excavation of approximately 1,800 cubic yards of soil, 1,500 cubic yards of which would be removed for offsite disposal. Because groundwater quality was affected by a release of diesel from a UST at this site, the potential to encounter hazardous materials in the soil and or groundwater is high.

Orinda-Lafayette Aqueduct – Alternative 2

Tunneling would produce tunnel muck and would require dewatering at a rate of 100 to 350 gallons per minute. The potential for encountering groundwater contamination is low, because there are no environmental cases with documented groundwater contamination within one-quarter mile of the tunnel alignment. However, the tunnel muck and discharged water would likely contain traces of hydraulic oil from the tunneling operations. Construction of the pipeline would require excavation of approximately 26,200 cubic yards of soil, and dewatering would likely be required. There are no known environmental cases within one-quarter mile of the pipeline alignment. Therefore, it is unlikely that hazardous materials would be encountered in the soil or groundwater during construction.

Ardith Reservoir and Donald Pumping Plant

Construction of the new Ardith Reservoir and new Donald Pumping Plant would require excavation of approximately 9,700 cubic yards of soil. Because there are no environmental cases within ASTM search distances, the potential to encounter hazardous materials in the soil during construction is low. Dewatering would not likely be required.

Fay Hill Pumping Plant and Pipeline Improvements

Improvements at the Fay Hill Pumping Plant would be installed within the existing pumping plant and would not require soil excavation. Construction of the Fay Hill Pipeline Improvements would require excavation of approximately 230 cubic yards of soil. This pipeline would be constructed within Rheem Boulevard, which is topographically higher than any known environmental cases identified within one-quarter mile; therefore, the potential to encounter hazardous materials in the soil is low. Dewatering would not likely be required.

Fay Hill Reservoir

Construction of the Fay Hill Reservoir within the footprint of the existing reservoir would require excavation of approximately 8,400 cubic yards of soil. Because the environmental cases within ASTM search distances are located at a lower elevation, there is a low potential to encounter hazardous materials in the soil from offsite sources. However, as discussed in impact 3.11-2, hazardous materials have been known to be used in construction of some of the reservoirs, and surficial soil could contain hazardous materials from historic sandblasting and other repair and maintenance activities. Dewatering would not likely be required.

Glen Pipeline Improvements

Construction of the Glen Pipeline Improvements would require excavation of approximately 2,150 cubic yards of soil, and dewatering would likely be required. Because there are no known environmental cases within one-quarter mile of the pipeline alignment to the north of Highway 24, there is a low potential to encounter hazardous materials in the soil or groundwater in this area.

Happy Valley Pumping Plant and Pipeline

Construction of the Happy Valley Pumping Plant and Pipeline would require excavation of approximately 2,700 cubic yards of soil for the pipeline and limited amounts of excavation for the pumping plant. As discussed in the Setting, there is one LUST site with historic groundwater contamination within one-quarter mile of the pipeline alignment (at the southern end of the alignment); therefore, hazardous materials could be encountered in the soil or groundwater in this area. The primary contaminants of concern include petroleum products and MTBE.

Highland Reservoir and Pipelines

Construction of the new Highland Reservoir and Pipelines would require excavation of approximately 20,400 cubic yards and 2,900 cubic yards of soil, respectively. It is likely that dewatering would be required for construction of the pipeline. Because there are no environmental cases within ASTM search distances from the planned reservoir location or within one-quarter mile of the pipeline alignment, it is unlikely that hazardous materials would be encountered in the soil or groundwater.

Lafayette Reclaimed Water Pipeline

The proposed Lafayette Reclaimed Water Pipeline would share much of the same alignment as the proposed Highland Reservoir Pipeline, but would require excavation of 340 cubic yards of soil in areas where it would not share the same alignment. It is likely that dewatering would be required for construction of the pipeline. Because there are no known environmental cases within one-quarter mile of the pipeline alignment, it is unlikely that hazardous materials would be encountered in the soil or groundwater.

Leland Isolation Pipeline and Bypass Valves

Construction of the Leland Isolation Pipeline would require excavation of approximately 560 cubic yards of soil. It is likely that dewatering would be required for construction of the pipeline. There are 10 environmental cases within one-quarter mile of the pipeline alignment, and groundwater quality was affected at 5 of these sites. Therefore, the potential to encounter hazardous materials in the soil or groundwater during construction is high. The potential contaminants include petroleum products and MTBE.

Construction of the Leland Bypass Valves at the Danville Pumping Station would require excavation of limited quantities of soil. Because there are no environmental cases within ASTM search distances, the potential to encounter hazardous materials in the soil or groundwater is low.

Moraga Reservoir

Replacement of the Moraga Reservoir would require excavation of approximately 12,700 cubic yards of soil. However, based on the lack of environmental cases within ASTM search distances, there is a low potential to encounter hazardous materials in the soil from offsite sources. However, as discussed in impact 3.11-2, hazardous materials have been known to be used in construction of some of the reservoirs, and surficial soil could potentially contain hazardous materials from historic sandblasting and other repair and maintenance activities. It is unlikely that dewatering would be required.

Moraga Road Pipeline

Construction of the Moraga Road Pipeline would require excavation of approximately 47,000 cubic yards of soil, and dewatering would likely be required. As discussed in the Setting, there are six known environmental cases within one-quarter mile of the pipeline alignment, including one site near Campolindo Drive, four sites near Rheem Boulevard, and one site near

Lucas Drive. Groundwater quality was affected at each of these sites, and therefore soil and groundwater contamination could be encountered during project construction. The primary contaminants of concern include petroleum products and MTBE.

Sunnyside Pumping Plant

Construction of the Sunnyside Pumping Plant would require excavation of limited quantities of soil. Because there are no environmental cases within ASTM search distances, the potential to encounter hazardous materials in the soil is low. It is unlikely that dewatering would be required.

Tice Pumping Plant and Pipeline

Construction of the Tice Pumping Plant and Pipeline would require excavation of approximately 1,300 cubic yards and 740 cubic yards of soil, respectively. It is likely that dewatering would be required. There are four known LUST sites within one-half mile of the pumping plant site and within one-quarter mile of the pipeline alignment, and groundwater quality was affected at two of these sites. Therefore, hazardous materials could be encountered in the soil and groundwater. The primary contaminants of concern include petroleum products and MTBE.

Withers Pumping Plant

Construction of the Withers Pumping Plant would require excavation of approximately 780 cubic yards of soil. Because there are no environmental cases within ASTM search distances, there is a low potential to encounter hazardous materials in the soil or groundwater.

Mitigation Measure

Measure 3.11-1: For construction of all facilities requiring excavation of more than 50 cubic yards of soil, the District or contractor will use a qualified professional to conduct a Phase I environmental site assessment in conformance with standards adopted by ASTM International. If the Phase I environmental site assessment indicates that a release of hazardous materials could have affected soil or groundwater quality at the site, the District will retain a qualified environmental professional to conduct a Phase II environmental site assessment to evaluate the presence and extent of contamination at the site, in conformance with state and local guidelines and regulations. If the results of the subsurface investigation(s) indicate the presence of hazardous materials, alteration of facility design or site remediation may be required by the applicable state or local regulatory agencies, and the contractors will be required to comply with all regulatory requirements for facility design or site remediation. The Phase I environmental site assessment will be completed within twelve months prior to construction to accurately estimate the conditions that could be expected during construction.

For pipeline projects, the District or contractor will conduct an environmental database review to identify environmental cases, permitted hazardous materials uses, and spill sites within one-quarter mile of the pipeline alignment. Regulatory agency files will be reviewed for those sites that could potentially affect soil and groundwater quality within the pipeline alignment. The environmental database review will be completed within six months prior to construction to accurately estimate the conditions that could be expected during construction.

Impact 3.11-2: Exposure of workers and the public to hazardous building materials during demolition or renovation of existing structures.

In the absence of proper abatement procedures, demolition or renovation of a structure that contains hazardous building materials can expose workers and the public to hazardous materials. The types of hazardous building materials that could be encountered during building demolition include asbestos, lead-based paint, electrical equipment containing PCBs, fluorescent tubes containing mercury vapors, and fluorescent light ballasts containing DEHP. Existing storage tanks may be painted with lead-based paint, and materials used in the construction of existing reservoirs may contain asbestos, PCBs, metals, or other materials. If friable or nonfriable asbestos is present, disturbance of the asbestos-containing materials could result in the exposure of the public or construction workers to airborne asbestos fibers, unless proper asbestos abatement precautions are taken. Similarly, if lead-based paint is present and has delaminated or chipped from the surface of building materials, storage tanks, or reservoirs, there is a potential for the release of airborne lead particles, unless proper lead abatement procedures are followed. If PCBs are present in the buildings to be demolished, leakage could expose workers to unacceptable levels of PCBs. Removal of fluorescent tubes could result in exposure to mercury vapors if the lights are broken or to DEHP in the light ballasts.

Hazardous building material surveys have not been conducted for the structures that would be demolished under the WTTIP. However, as specified in Measure 3.11-2, the District will conduct a survey for hazardous building materials prior to any demolition or renovation activities and, if warranted, will implement appropriate abatement procedures in compliance with applicable regulations. With implementation of this measure, and preparation of a health and safety plan, materials disposal plan, and water control and disposal plan in accordance with Section 01125 of the EBMUD construction specifications (described under Impact 3.11-1), this impact would be less than significant for all WTTIP projects.

The following text identifies WTTIP projects where building demolition or renovation would occur.

Lafayette WTP

Alternative 1

Under Alternative 1, demolition of the existing backwash water equalization basin, clarifier, clearwell, Bryant-Colorados Pumping Plant No. 1, pump building, and solids storage tank would be required for construction of the chlorine contact basin and backwash water recycle system. Five of the existing filters would also be rehabilitated, and there would be changes to the chemical storage and feed systems. The electrical connections and pumps would be removed from the pumping plant, and the electrical/control systems would be removed from the control room of the filter building.

Alternative 2

Under Alternative 2, renovations would be made to the existing chemical building to increase the sodium hypochlorite storage capacity, and the backwash water equalization basin and clarifier would be demolished. Chemical feed pumps and electrical equipment would also be removed.

Orinda WTP – Alternative 2

Under Alternative 2, the existing basin would be demolished for construction of a clearwell, the new Los Altos Pumping Plant, and the electrical substation.

Sobrante WTP – Alternative 1 or 2

Under either alternative, there would be renovations to the existing chemical building for construction of the new ozone generators, to the existing ozone building for construction of ozone diffusers and an ozone destruct system, and to the existing flocculation/sedimentation backwash water settling basins. Under Alternative 2 there would also be renovations to the existing chemical building for construction of new chemical storage tanks.

Upper San Leandro WTP – Alternative 1 or 2

Under either alternative, there would be renovations to the existing chemical building for construction of the new ozone generator and to the existing ozone building for construction of ozone diffusers and an ozone destruct system. Under Alternative 2 there would also be renovations to the existing chemical building for the construction of new chemical storage tanks.

Donald Pumping Plant

The existing Donald Pumping Plant would be demolished.

Fay Hill Pumping Plant and Pipeline Improvements

There would be renovations to the Fay Hill Pumping Plant to accommodate higher capacity pumps.

Fay Hill Reservoir

The existing open-cut reservoir would be demolished to accommodate construction of two new reservoirs in the same footprint. The sealant in the liner of the existing reservoir contains 5,000 milligrams per kilogram of zinc, which is equal to the TTLC of 5,000 milligrams per kilogram; therefore, the sealant could require disposal as a hazardous waste.

Moraga Reservoir

The existing open-cut reservoir would be demolished to accommodate construction of a new reservoir in the same footprint. The reservoir roof contains asbestos.

Mitigation Measure

Measure 3.11-2: The District will perform or incorporate into contract specifications for all WTTIP project components involving demolition or renovation of existing facilities the requirement that the contractor(s) have a hazardous building materials survey completed for each of the structures by a registered environmental assessor or a registered engineer prior to demolition or renovation activities. If any friable asbestos-containing materials, lead-containing materials, or hazardous components of reservoir liner materials are identified, adequate abatement practices, such as containment and/or removal, will be implemented prior to demolition or renovation.

Impact 3.11-3: Potentially gassy or gassy conditions in the proposed Orinda-Lafayette Tunnel (Alternative 2).

Accumulated natural gases in the tunnel portion of the aqueduct could cause an explosion during construction. Although a classification has not yet been assigned to the tunnel that would be constructed under the proposed Orinda-Lafayette Aqueduct project, EBMUD would be required to file an application for gas classification with the Division of Industrial Safety prior to the project being put out to bid. The application would be based on the detailed geotechnical characterization that would be performed for final design of the project. If the tunnel is classified as potentially gassy or gassy, project construction would be performed in compliance with the Tunnel Safety Order requirements (discussed in the Setting section) for the monitoring of explosive vapors, ventilation, and the restriction of potential ignition sources in tunnels. The Division of Industrial Safety could require additional measures if conditions warrant and could shut down the tunneling operation if unsafe conditions were identified. Resumption of tunneling operations would not be allowed until the Division of Industrial Safety inspected the tunnel conditions and cleared the tunnel for reentry. With compliance with the Tunnel Safety Orders, impacts related to the potential for an explosion due to gassy conditions in the tunnel are less-than-significant.

Impact 3.11-4: Rupture of a high-pressure gas line.

Rupture of a high-pressure gas pipeline during excavation required for WTTIP project construction could result in a leak and, if the released liquids or gases came into contact with an open flame or spark, could cause an explosion. Because of the greater risk involved in excavating around high-pressure gas lines and the potential for catastrophic results, this impact would be considered a significant hazard to the public unless adequate mitigation measures are implemented. However, as discussed in Section 3.12, Public Services and Utilities, the construction contractor would be required to conform to applicable California Occupational Health and Safety Administration Construction Safety Orders prior to and during excavation in the vicinity of the high-pressure gas line, including notifying the utility company to locate the line prior to excavation as well as verifying the exact location of the utility by safe and acceptable means, including the use of hand tools.

To reduce this impact to a less-than-significant level, the District would implement Measure 3.12-1c, as described in Section 3.12, Public Services and Utilities. With implementation of this measure, the potential for pipeline rupture and subsequent explosion would be low, and impacts related to damage to the high-pressure gas line would be less than significant.

This impact applies to WTTIP projects involving underground construction and that are proximate to existing gas or other petroleum pipelines larger than 6 inches in diameter or greater than 60 pounds per square inch in pressure. The Orinda-Lafayette Aqueduct (Alternative 2), Happy Valley Pipeline, Highland Reservoir Inlet/Outlet Pipeline, Lafayette Reclaimed Water Pipeline, Leland Isolation Pipeline, Moraga Road Pipeline, Sunnyside Pumping Plant, and Tice Pipeline projects would be potentially affected (see Table 3.11-4).

Impact 3.11-5: Increased risk of wildland fires during construction in high fire hazard areas.

The use of construction equipment and temporary onsite storage of diesel fuel could pose a wildland fire risk in areas classified by the California Department of Forestry and Fire Protection as a “Wildland Area That May Contain Substantial Forest Fire Risks and Hazards” or a “Very High Fire Hazard Severity Zone.” The proposed WTTIP projects that are currently located in such areas include the Withers Pumping Plant, the Orinda WTP, the entry shaft of the Orinda-Lafayette Aqueduct, the Happy Valley Pumping Plant and Pipeline, and the Sunnyside Pumping Plant. However, addition of “Very High Hazard Safety Zones” by the Contra Costa County Fire Protection District or the Moraga-Orinda Fire District could result in other WTTIP facilities being located in designated fire risk area.

The time of the greatest fire danger is during the clearing phase, when people and machines are working among vegetative fuels that can be highly flammable; if piled onsite, the cleared vegetative materials could also become a fire fuel. Potential sources of ignition include equipment with internal combustion engines, gasoline-powered tools, and equipment or tools that produce a spark, fire, or flame. Such sources include sparks from blades or other metal parts scraping against rock, overheated brakes on wheeled equipment, friction from worn or unaligned belts and drive chains, and burned-out bearings or bushings. Sparking as a result of scraping against rock is difficult to prevent. The other hazards result primarily from poor maintenance of the equipment. Smoking by onsite construction personnel is also a source of ignition during construction.

Regulations governing the use of construction equipment in fireprone areas are designed to minimize the risk of wildland fires during construction activity. In accordance with the Public Resources Code, the construction contractor would be required to comply with the following legal requirements during construction activities for the Withers Pumping Plant, the Orinda WTP, the west end of the Orinda-Lafayette Aqueduct, the Happy Valley Pumping Plant and Pipeline, and the Sunnyside Pumping Plant and any additional projects that are located in a “Very High Fire Hazard Severity Zone” based on mapping at the time of construction:

- Earthmoving and portable equipment with internal combustion engines would be equipped with a spark arrestor to reduce the potential for igniting a wildland fire (PRC Section 4442).
- Appropriate fire suppression equipment would be maintained during the highest fire danger period – from April 1 to December 1 (PRC Section 4428).
- On days when a burning permit is required, flammable materials would be removed to a distance of 10 feet from any equipment that could produce a spark, fire, or flame, and the construction contractor would maintain the appropriate fire suppression equipment (PRC Section 4427).
- On days when a burning permit is required, portable tools powered by gasoline-fueled internal combustion engines would not be used within 25 feet of any flammable materials (PRC Section 4431).

With compliance with the requirements of the Public Resources Code, and any additional requirements imposed by the Contra Costa County Fire Protection District or the Moraga-Orinda Fire District, potential impacts related to wildland fires due to construction activities would be less than significant.

Impact 3.11-6: Potential for accidental release of hazardous materials from construction activities.

All of the WTTIP projects are located near a creek or a storm system that discharges to a surface water body. If accidentally released, hazardous materials such as oil, grease, or fuel could degrade surface water quality. However, as described in Section 3.5, Hydrology and Water Quality, compliance with Section 01125 of the EBMUD construction specifications (compliance with NPDES stormwater permitting requirements) would reduce the potential for release of construction-related fuels and other hazardous materials to stormwater and receiving water. Furthermore, the contractor would prepare a spill prevention and response plan in accordance with Section 01125. The plan would list the hazardous materials (including petroleum products) proposed for use or generated at the job site and also describe measures for preventing spills, monitoring hazardous materials, and providing immediate response to spills. Spill response measures would address notification of EBMUD; safety issues regarding construction personnel and public health; and methods for spill response and cleanup. To provide further protection of water quality, as specified in Measure 3.5-1a, the District will incorporate into the contract specifications the requirement that the contractor design staging areas to contain surface runoff and place drip pans under heavy equipment stored overnight. With compliance with EBMUD contract specifications and implementation of Measure 3.5-1a, hazardous materials impacts associated with potential chemical spills or releases of petroleum products during construction would be less than significant at all WTTIP sites.

Operational Impacts

Impact 3.11-7: Potential for accidental release of chemicals stored at WTPs.

The proposed improvements would result in a change in the quantities of chemicals stored at the Lafayette WTP and change the specific hazardous materials used at the Sobrante and Upper San Leandro WTPs under both alternatives. Alternative 2 would result in an increase in the quantities of water treatment chemicals stored at the Sobrante and Upper San Leandro WTPs. If accidentally released, these chemicals could cause human health effects to plant personnel and surrounding populations and could cause adverse environmental effects if released to the environment. The proposed changes in chemical storage are summarized in Table 3.11-5. However, the chemical storage and handling systems would be designed and constructed in accordance with legal requirements for the safe storage of hazardous materials, described below.

Incorporation of these legally required design features would reduce the potential for spills resulting from the storage and handling of hazardous materials that would be used at the WTPs. In addition, the District would be required by the Contra Costa County Health Services Department and the Oakland Fire Department to update the HMBPs for each WTP to reflect the changes in chemical storage and to update the RMPs for the Lafayette WTP, Sobrante WTP, and Upper San Leandro WTP to reflect the changes in storage of ammonia. With compliance with these legal requirements, potential impacts related to a release of chemicals from one of the WTPs would be less than significant.

Design of Chemical Storage Facilities

The Uniform Fire Code, Article 80, includes specific requirements for the safe storage and handling of hazardous materials. These requirements reduce the potential for a release of hazardous materials and for mixing of incompatible materials such as sodium hypochlorite and ammonia that could pose a public health or water quality risk. The following specific design features would reduce the potential for a release of hazardous materials that could affect public health or the environment:

- Separation of incompatible materials with a noncombustible partition.
- Spill control in all storage, handling, and dispensing areas.
- Separate secondary containment for each chemical storage system. The secondary containment would hold the entire contents of the tank, plus the volume of water needed to supply the fire suppression system for a period of 20 minutes in the event of a catastrophic spill.

TABLE 3.11-5
EXISTING AND PROPOSED CHEMICAL STORAGE CAPACITIES AT WTPs WHERE THERE WOULD BE A CHANGE IN STORAGE

	Lafayette WTP			Sobrante WTP			Upper San Leandro WTP		
	Existing Storage	Proposed Storage		Existing Storage	Proposed Storage		Existing Storage	Proposed Storage	
Chemical Name		**Alternative 1**	**Alternative 2**		**Alternative 1**	**Alternative 2**		**Alternative 1**	**Alternative 2**
Sodium Hypochlorite	Two 3,950-gallon tanks	Four 12,000-gallon tanks	Two 4,000-gallon tanks Four 6,000-gallon tanks	Two 6,700-gallon tanks	Same	Four 6,700-gallon tanks	Two 10,000-gallon tanks	Two 10,000-gallon tanks	Four 10,000-gallon tanks
Liquid Ammonia	One 2,000-gallon tank	Two 2,000-gallon tanks	None	Two 2,000-gallon tanks	Same	Two 6,000-gallon tanks	Two 2,000-gallon tanks	Same	Three 2,000-gallon tanks
Aluminum Sulfate	None	None	None	Two 10,000-gallon tanks	Same	Same	Two 10,000-gallon tanks	Same	Same
Polyaluminium Hydroxychloride	Two 6,000-gallon tanks	Same	None	None	None	None	None	None	None
Anionic Polymer	Three 55-gallon drums	Four 55-gallon drums	None	None	None	None	None	None	None
Cationic Polymer	Two 3,000-gallon tanks	Two 3,000-gallon tanks	None	Two 3,200-gallon tanks	Same	Same	Two 3,200-gallon tanks	Same	Same
Nonionic Polymer	Two 400-gallon totes	Three 400-gallon totes	None	Two 450-gallon totes	Same	Same	Two 450-gallon totes	Same	Same
Polyacrylamide Polymer	None	None	None	Four 55-gallon tanks	Same	Same	None	None	None
Sodium Hydroxide (Caustic Soda)	Two 6,000-gallon tanks	Same	None	Two 6,600-gallon tanks	Same	Four 6,600-gallon tanks	Two 6,000-gallon tanks	Same	Four 6,600-gallon tanks
Hydrofluorosilicic Acid (Flouride)	Two 5,000-gallon tanks One 150-gallon tank	Same	None	Two 6,600-gallon tanks	Same	Same	Two 7,000-gallon tanks	Same	Same
Liquid Oxygen	None	None	None	None	Two 10,000-gallon tanks	Two 14,000-gallon tanks	None	Two 10,000-gallon tanks	Two 20,000-gallon tanks
Dessicant	None	None	None	Four 332-pound containers	None	None	Four 332-pound containers	None	None

TABLE 3.11-5 (Continued)
EXISTING AND PROPOSED CHEMICAL STORAGE CAPACITIES AT WTPs WHERE THERE WOULD BE A CHANGE IN STORAGE

	Lafayette WTP			Sobrante WTP			Upper San Leandro WTP		
	Existing Storage	Proposed Storage		Existing Storage	Proposed Storage		Existing Storage	Proposed Storage	
Chemical Name		Alternative 1	Alternative 2		Alternative 1	Alternative 2		Alternative 1	Alternative 2
Catalyst	None	None	None	One 1,850-pound container	None	None	None	None	None
Potassium Permanganate	None	None	None	Twenty 5-pound buckets	Same	Thirty 55-pound	Twenty 5-pound buckets	Twenty 55-pound drums	Thirty 55-pound drums
Hydrogen Peroxide	None	None	None	One 1,900-gallon tank	Same	Same	One 1,850-gallon tank	One 1,900-gallon tank	One 1,900-gallon tank
Ozone	None	None	None	None	None	None	None	None	None

Source for existing storage: EBMUD, 2005a through 2005e.
Source for proposed storage: EBMUD, 2005f

Design of Chemical Storage Facilities

Liquid oxygen is an oxidizing cryogenic liquid[9] that is not toxic or flammable. However, if released, ignition of combustible materials can occur more easily in the oxygen-enriched atmosphere. National Fire Protection Association (NFPA) 50, Standard for Bulk Oxygen at Consumer Sites, specifies standards to ensure the safe storage of liquid oxygen and provide adequate separation between the storage facilities and combustibles. In accordance with this standard, the liquid oxygen at the Sobrante and Upper San Leandro WTPs would be stored in above-ground tanks, out of doors. The tanks would be underlain by noncombustible surfaces, and the systems would not be located beneath electrical power lines or within 50 feet of a combustible or flammable hazardous material.

NFPA 50 further requires that liquid oxygen tanks are located at least 50 feet from buildings of wood-frame construction; 1 foot away from buildings of other construction; and 10 feet from openings in walls of adjacent structures. NFPA 50 also specifies minimum distances from nonambulatory patients; places of public assembly; public sidewalks or parked cars; and property lines for the protection of public safety. Additional standards for liquid oxygen systems are provided in Article 75 of the California Fire Code and Standard 80-2 of the Uniform Fire Code.

Lafayette WTP

Alternative 1

With implementation of Alternative 1, sodium hypochlorite storage would be increased from two 3,950-gallon tanks to four 12,000-gallon tanks, ammonia storage would be increased from one 2,000-gallon tank to two 2,000-gallon tanks and anionic polymer storage would be increased from three55-gallon drums to four 55-gallon drums. The new tanks would be constructed within the new chemical storage building, and the sodium hypochlorite and ammonia, incompatible chemicals, would be stored in separate rooms.

Alternative 2

With implementation of Alternative 2, sodium hypochlorite storage would be increased from two 3,950-gallon tanks to two 4,000-gallon tanks and four 6,000-gallon tanks. The new tanks would be constructed within the existing chemical storage building. No other hazardous materials would be stored or used at the WTP, and the existing hazardous materials storage and distribution systems would be decommissioned. Although there would be an increase in the quantities of sodium hypochlorite stored at this WTP, the use of other water treatment chemicals would be discontinued. This would be a beneficial impact of the project.

Lafayette Reclaimed Water Pipeline

Under this project, reclaimed water from the filter backwash water recycle system would likely be dechlorinated using sodium bisulfite, which would be stored at the Lafayette WTP. This impact would be less than significant.

[9] An oxidizing cryogenic liquid is one that has a normal boiling point below -150 degrees Fahrenheit and readily reacts to promote or initiate combustion of combustible materials.

Sobrante WTP

Alternative 1

With implementation of Alternative 1, the only change in chemical storage would be the addition of two new 10,000 gallon liquid oxygen tanks. The new tanks would be constructed in accordance with NFPA 50. Diesel is the only combustible or flammable hazardous material used at the WTP, and in accordance with NFPA 50, the liquid oxygen tanks would not be located within 50 feet of the diesel tank or where they could be exposed to a release from diesel pipelines.

Alternative 2

With implementation of Alternative 2, the volume of liquid oxygen storage would be greater; two new 14,000 gallon liquid oxygen tanks would be added. As for Alternative 1, the storage would comply with NFPA 50.

Sodium hypochlorite would be increased from two 6,700-gallon tanks to four 6,700- gallon tanks, sodium hydroxide would be increased from two 6,600 gallon tanks to four 6,600 gallon tanks, and liquid ammonia would be increased from two 2,000 gallon tanks to two 6,000 gallon tanks. The new tanks would be constructed in the chemical storage building and the sodium hypochlorite and ammonia, incompatible chemicals, would be stored in separate rooms.

Upper San Leandro WTP

Alternative 1

With implementation of Alternative 1, the only change in chemical storage would be the addition of two new 10,000 gallon liquid oxygen tanks. The new tanks would be constructed in accordance with NFPA 50. Diesel is the only combustible or flammable hazardous material used at the WTP, and in accordance with NFPA 50, the liquid oxygen tanks would not be located within 50 feet of the diesel tank or where they could be exposed to a release from diesel pipelines.

Alternative 2

With implementation of Alternative 2, the volume of liquid oxygen storage would be greater; two new 20,000 gallon liquid oxygen tanks would be added. As for Alternative 1, the storage would comply with NFPA 50.

Sodium hypochlorite would be increased from two 10,000-gallon tanks to four 10,000- gallon tanks, sodium hydroxide would be increased from two 6,000 gallon tanks to four 6,600 gallon tanks, and ammonia would be increased from two 2,000 gallon tanks to three 2,000 gallon tanks. The new tanks would be constructed in the chemical storage building and the sodium hypochlorite and ammonia, incompatible chemicals, would be stored in separate rooms.

Program-Level Elements

The program-level projects are expected to have impacts that are similar to those identified for the project-level projects; the applicability of each hazards and hazardous materials impact to the program-level projects is summarized in Table 3.11-6. With compliance with EBMUD construction specifications and applicable laws at the time of construction, and with implementation of measures similar to those specified for the project-level projects, hazardous materials and hazards impacts related to implementation of the program-level projects are expected to be less than significant. The text below evaluates the potential impacts of each program-level project.

TABLE 3.11-6
SUMMARY OF POTENTIAL HAZARDS AND HAZARDOUS MATERIALS IMPACTS – PROGRAM-LEVEL PROJECTS

Facility	Impact 3.11-1 Hazardous Materials in Soil and Groundwater	Impact 3.11-2 Hazardous Building Materials	Impact 3.11-3 Gassy Conditions in Tunnels	Impact 3.11-4 High-Pressure Gas Line Rupture	Impact 3.11-5 Wildland Fires	Impact 3.11-6 Release from Construction Equipment	Impact 3.11-7 Accidental Release during Operation
Lafayette WTP							
Alternative 1	✓	✓	–	–	–	✓	–
Orinda WTP							
Alternative 1	✓	✓	✓	–	✓	✓	–
Alternative 2	✓	✓	✓	–	✓	✓	–
Walnut Creek WTP							
Alternative 1	✓	–	–	–	–	✓	–
Alternative 2	✓	–	–	–	–	✓	–
Leland Reservoir Replacement	✓	✓	–	–	–	✓	–
New Leland Pressure Zone Reservoir and Pipeline	✓	–	✓	✓	–	✓	–
St. Mary's Road/ Rohrer Drive Pipeline	✓	–	–	✓	–	✓	–
San Pablo Pipeline	✓	–	–	✓	✓	✓	--

✓ = Applicable Impact
– = No Impact

Lafayette WTP

Under Alternative 1, excavation and possibly dewatering would be required for construction of the high-rate sedimentation facility and UV disinfection building. However, with implementation of a measure similar to Measure 3.11-1 and compliance with EBMUD construction specifications, impacts related to potential hazardous materials that could be encountered in the soil and groundwater would be less than significant.

Demolition of existing structures could be required for construction of the UV disinfection building, if these structures are not demolished at the time the project-level components are constructed at this WTP. However, with implementation of a measure similar to Measure 3.11-2 and compliance with EBMUD contract specifications, this impact would be less than significant.

A release of hazardous materials or petroleum products from construction activities could occur. However, with compliance with EBMUD contract specifications and implementation of a measure similar to Measure 3.5-1a (see Section 3.5, Hydrology and Water Quality), hazardous materials impacts associated with a potential release during construction would be less than significant.

Realignment of the Walter Costa Trail would not require any significant excavation or dewatering and therefore would not be expected to result in significant hazardous materials impacts.

No program-level improvements would be made at the Lafayette WTP under Alternative 2.

Orinda WTP

Under Alternative 1, excavation and dewatering would be required for construction of two clearwells, the low-lift pumping plant, the electrical substation, the San Pablo Pumping Plant, the chlorine contact basin, the UV disinfection building, and the high-rate sedimentation unit. Under Alternative 2, fewer program-level facilities would be built and excavation quantities at the Orinda WTP would be less than under Alternative 1. However, excavation would still be required for construction of a clearwell, the low-lift pumping plant, the electrical substation, the San Pablo Pumping Plant, the chlorine contact basin, the UV disinfection building, and the high-rate sedimentation unit. However, with implementation of a measure similar to Measure 3.11-1 and compliance with EBMUD construction specifications, impacts related to potential hazardous materials that could be encountered in the soil and groundwater would be less than significant.

Under Alternative 1, the existing settling basins would be demolished for construction of a new clearwell, the low-lift pumping plant, the San Pablo Pumping Plant, and the electrical substation. Under both alternatives, a building would be demolished for construction of the high rate sedimentation unit. However, with implementation of a measure similar to Measure 3.11-2 and compliance with EBMUD contract specifications, this impact would be less than significant.

The Orinda WTP is located in an area designated as a "Wildland Area That May Contain Substantial Forest Fire Risks and Hazards," and program-level construction activities could increase the risk of a wildland fire. However, with compliance with applicable regulations, this impact would be less than significant.

A release of hazardous materials or petroleum products from construction activities could occur; however, with compliance with EBMUD contract specifications and implementation of a measure similar to Measure 3.5-1a (control of leakage), hazardous materials impacts associated with a potential release during construction would be less than significant.

Walnut Creek WTP

At the Walnut Creek WTP under both alternatives, excavation and possibly dewatering would be required for construction of the UV disinfection building and high-rate sedimentation unit. However, with implementation of a measure similar to Measure 3.11-1 and compliance with EBMUD construction specifications, impacts related to potential hazardous materials that could be encountered in the soil and groundwater would be less than significant.

A release of hazardous materials or petroleum products from construction activities could occur; however, with compliance with EBMUD contract specifications and implementation of a measure similar to Measure 3.5-1a (control of leakage), hazardous materials impacts associated with a potential release during construction would be less than significant.

Leland Reservoir Replacement

The Leland Reservoir Replacement would require excavation and possibly dewatering for construction of the new reservoir at the existing site. However, with implementation of a measure similar to Measure 3.11-1 and compliance with EBMUD construction specifications, impacts related to exposure to hazardous materials that could be encountered in the soil and groundwater would be less than significant.

The existing Leland Reservoir would be demolished. However, with implementation of a measure similar to Measure 3.11-2 and compliance with contract specifications, impacts related to exposure to hazardous materials in soil and groundwater would be less than significant.

An accidental release of hazardous materials or petroleum products from construction activities could occur; however, with compliance with EBMUD contract specifications and implementation of a measure similar to Measure 3.5-1a (control of leakage), hazardous materials impacts associated with a potential release during construction would be less than significant.

New Leland Pressure Zone Reservoir and Pipeline

Construction would require excavation and possibly dewatering from the new reservoir and pipeline, both of which are located on land not currently owned by EBMUD. However, with implementation of a measure similar to Measure 3.11-1 and compliance with EBMUD construction specifications, impacts related to exposure to hazardous materials that could be encountered in the soil and groundwater would be less than significant.

Depending on future siting, construction of the pipeline could also require excavation near a currently unknown but potentially present high priority utility, potentially resulting in accidental rupture of the line unless proper procedures are followed. However, through avoidance during subsequent project siting and compliance with construction safety orders as described in Section 3.12, Public Services and Utilities, and measures similar to Measure 3.12-1c (documentation of proper procedures and increased oversight), this impact would be considered less than significant.

An accidental release of hazardous materials or petroleum products from construction activities could occur; however, with compliance with EBMUD contract specifications and implementation of a measure similar to Measure 3.5-1a (control of leakage), hazardous materials impacts associated with a potential release during construction would be less than significant.

St. Mary's Road/Rohrer Drive Pipeline

Construction of the pipeline would require excavation, and possibly dewatering, along the entire pipeline alignment. However, with implementation of a measure similar to Measure 3.11-1 and compliance with EBMUD construction specifications, impacts related to exposure to hazardous materials that could be encountered in the soil and groundwater would be less than significant.

As described above for the other pipeline projects, construction of this pipeline could potentially result in the accidental rupture of a potentially present priority utility line unless proper procedures are followed. Avoidance during subsequent project siting and compliance with construction safety orders as described in Section 3.12, Public Services and Utilities, and measures similar to Measure 3.12-1c (documentation of proper procedures and increased oversight), would help ensure that this impact would be less than significant.

An accidental release of hazardous materials or petroleum products from construction activities is possible but would be less than significant assuming incorporation of mitigation as described above.

San Pablo Pipeline

Excavation would be required to install the pipeline, construct the San Pablo Pumping Plant at the Orinda WTP, convert the existing standby 2.5-mile San Pablo Tunnel to convey treated water, and to connect the pipeline to the West of Hills water distribution system at Colusa Avenue near the San Pablo WTP in El Cerrito. Dewatering could possibly be required based on the proximity of the pipeline alignment to San Pablo Creek and San Pablo Reservoir. However, with implementation of a measure similar to Measure 3.11-1 and compliance with EBMUD construction specifications, impacts related to exposure to hazardous materials that could be encountered in the soil and groundwater would be less than significant. A measure similar to Measure 3.11-1b could also be required for creek crossings.

Potential pipeline construction impacts related to high priority utilities, if present, and as a result of accidental hazardous materials release would be considered less than significant given incorporation of mitigation measures as described above for the other pipeline projects.

The pipeline would traverse areas designated as a "Wildland Area That May Contain Substantial Forest Fire Risks and Hazards" and a "Very High Fire Hazard Severity Zone," and program-level construction activities could increase the risk of a wildland fire. However, with compliance with applicable regulations, this impact would be less than significant.

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3.12 Public Services and Utilities

3.12.1 Approach to Analysis

This section addresses potential impacts to public services and utilities from implementation of the WTTIP projects. This analysis is based on a review of available planning documents for the study area, discussions with District personnel, and site reconnaissance of the various WTTIP project sites. Public utilities in the project area include water, wastewater, electrical, and natural gas conveyance facilities. Public services include solid waste disposal, schools, hospitals, police, and fire protection. In general, implementation of the WTTIP projects would not have direct[1] long-term effects on the demand for public services and utilities, with the exception of water service (the WTTIP would improve water service) and energy. Long-term energy use would increase as needed to power new pumping plants and water treatment plant operations. However, short-term disruption to utilities as well as interference with fire and emergency services could occur during construction of the project components. See Section 3.2, Land Use, Planning, and Recreation regarding potential impacts to parks and other recreation facilities; Section 3.8, Traffic and Circulation, for information regarding potential disruption of access for public services such as emergency service providers and schools; and Section 3.11, Hazards and Hazardous Materials, for a discussion of potential public health and safety issues related to utility conflicts.

3.12.2 Setting

WTTIP projects are located in Orinda, Lafayette, Walnut Creek, Moraga, and Oakland, as well as portions of unincorporated Contra Costa County. Table 3.12-1 shows public utility service providers in the WTTIP project area.

Water Supply

As discussed in Chapter 2, Project Description, the District provides water service to much of the East Bay. Since water supply service is the subject of the WTTIP and this EIR, detailed information regarding overall water service can be found in Chapter 2.

Wastewater

Central Contra Costa Sanitary District (CCCSD) and EBMUD provide wastewater collection service to the Lamorinda/Walnut Creek area and Oakland. CCCSD collects and cleans an average of 45 million gallons per day (mgd) of wastewater for approximately 440,000 residents and businesses in central Contra Costa County (CCCSD, 2005). The CCCSD's service area encompasses approximately 126 square miles, from Martinez to parts of San Ramon, from Moraga to Clayton, and includes the WTTIP study area. The CCCSD's Collection System Operations Division is based in Walnut Creek. EBMUD treats domestic, commercial, and industrial wastewater for approximately 640,000 people in an 83-square-mile area, including the

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[1] Chapter 4 of this EIR evaluates the potential for implementation of the WTTIP to induce growth and contribute to *indirect*, secondary impacts, including an increased demand for public services and utilities (other than water).

TABLE 3.12-1
UTILITY AND SERVICE PROVIDERS IN WTTIP PROJECT AREAS

City/County	Sewers	Electricity/Gas	Telephone	Police	Fire	Ambulance
City of Lafayette	CCCSD	PG&E	AT&T	City, County, CHP	CCCFPD	Various
City of Orinda	CCCSD	PG&E	AT&T	City	MOFD	Various
City of Walnut Creek	CCCSD	PG&E	AT&T	City, CHP	CCCFPD	Various
Town of Moraga	CCCSD	PG&E	AT&T	City	MOFD	Various
City of Oakland	City, EBMUD	PG&E	Various	City, CHP	City	Various
Contra Costa County	CCCSD	PG&E	Various	County, CHP	CCCFPD	Various

CCCSD = Central Contra Costa Sanitary District
PG&E = Pacific Gas and Electric Company
MOFD = Moraga-Orinda Fire District
CCCFPD = Contra Costa County Fire Protection District
CHP = California Highway Patrol

SOURCE: City of Lafayette, 2005; City of Orinda, 2005; City of Walnut Creek, 2005; Town of Moraga, 2005; City of Oakland, 2005; Contra Costa County, 2005; CCCSD, 2005

City of Oakland. The communities served by the wastewater system operate sewer collection systems that discharge into one of five EBMUD intercepting sewers. Wastewater collected by the interceptors' flows to EBMUD's wastewater treatment plant in Oakland. The average annual flow into the plant is approximately 80 mgd (EBMUD, 2005).

Police

The Contra Costa County Sheriff's Department provides nontraffic-related law enforcement and police protection services for all unincorporated areas in the county, and contracts its services to some incorporated cities in the county. The sheriff's department also maintains mutual-aid agreements with police departments in the Lafayette, Orinda, Walnut Creek, and Moraga. As a part of these agreements the cities contract with the Contra Costa County Sheriff's Department for the provision of law enforcement services (Contra Costa County, 2005). The City of Oakland provides law enforcement services within its city boundaries. East Bay Regional Parks District police patrol recreation areas and work with the local city and county police and sheriff's departments as necessary for police protection. The California Highway Patrol is responsible for the enforcement of traffic-related offenses in the county's unincorporated areas and along Highway 24 and Interstate 680.

Fire Protection

Fire protection in the WTTIP area is provided by the Contra Costa County Fire Protection District. The Moraga-Orinda Fire District serves Moraga and Orinda. There are also reserve firefighters assigned to individual stations throughout the Fire Protection District (Contra Costa County, 2005). Oakland is served by the Oakland Fire Department, which provides comprehensive emergency services within its boundaries. Stations employ emergency medical technicians, and paramedics are employed by local ambulance services.

Solid Waste Management

The Central Contra Costa Solid Waste Authority is a joint powers authority that franchises solid waste and recycling collection services in Lafayette, Moraga, Orinda, Walnut Creek, and surrounding unincorporated communities. Operating landfills in Contra Costa County include the Acme Landfill in Pacheco, which is restricted to receiving construction and demolition wastes and yard debris; Keller Canyon Landfill near Pittsburg; and West Contra Costa Sanitary Landfill in Richmond. Table 3.12-2 indicates the daily permitted capacity, the remaining capacity, and the estimated site life at the three operating landfills in Contra Costa County.

Schools and Preschools

Public elementary and middle school districts in the vicinity of the project sites include Lafayette Elementary, Orinda Union, Mt. Diablo, Moraga Elementary, Walnut Creek, and Oakland Unified. Public high schools in the vicinity of the project sites are part of the Acalanes Union School District. There are also numerous private, post-secondary, and preschool facilities in the vicinity of the project sites. The locations of these facilities are listed in Table 3.12-3.

Regulatory Setting

Appendix D identifies County and City general plan policies related to the provision of utilities and services. State policies related to energy and solid waste are described below.

2005 California Energy Action Plan II

The *California Energy Action Plan II* is the state's principal energy planning and policy document (California Energy Commission, 2005). The plan continues the goals of the original Energy Action Plan, describes a coordinated implementation plan for state energy policies, and identifies specific action areas to ensure that California's energy is adequate, affordable, technologically advanced, and environmentally sound. In accordance with this plan, the first priority actions to address California's increasing energy demands are energy efficiency and demand response (i.e., reduction of customer energy usage during peak periods in order to address system reliability and support the best use of energy infrastructure). Additional priorities include the use of renewable sources of power and distributed generation (i.e., the use of relatively small power plants near or at centers of high demand). To the extent that these actions are unable to satisfy the increasing energy and capacity needs, clean and efficient fossil-fired generation is supported.

The Energy Action Plan II includes the following energy efficiency action specific to water supply systems:

> Identify opportunities and support programs to reduce electricity demand related to the water supply system during peak hours and opportunities to reduce the energy needed to operate water conveyance and treatment systems.

TABLE 3.12-2
ESTIMATED REMAINING CAPACITY AND SITE LIFE FOR CONTRA COSTA COUNTY LANDFILLS

	Remaining Capacity					Site Life in Years			
Landfill	Cubic Yards	Tons	Average TPD[a]	Tons Disposed 2004	Maximum Permitted TPD	@ Average Daily	@ Maximum Daily	@ County Average[b]	Days of Operation per Year
Keller Canyon Landfill[c]	62,453,590	36,223,082	2,468	804,848	3,500	47.0	33.2	36.1	312
Acme Landfill[d]	546,781	328,069	61	19,120	1,500	17.2	0.7	0.3	312
WCCSL[e]	1,156,800	636,240	833	302,949	2,500	2.1	0.7	0.6	360
TOTAL	64,157,171	37,187,391	3,363	1,126,917	7,500				

a For each landfill, this figure represents the average of daily receipts for the years 2002, 2003 and 2004.
b Projected annual average of 1,002,247 tons per year based on average reported annual disposed waste from all Contra Costa County jurisdictions for the period 2002 to 2004.
c Remaining capacity as of January 1, 2005 based on an aerial survey conducted February 11, 2005, and adjusted back using average daily disposal for 2004. Tonnage figures are based on in-place density of 1,160 pounds per cubic yard.
d Remaining capacity based on aerial survey conducted on January 31, 2004, and adjusted forward to January 1, 2005 using average daily disposal for 2004. Tonnage figures are based on in-place density of 1,200 pounds per cubic yard.
e Remaining capacity as of January 1, 2005. Tonnage figures are based on in-place density of 1,100 pounds per cubic yard.

TPD = tons per day
WCCSL = West Contra Costa Sanitary Landfill

SOURCE: Contra Costa County, 2006.

TABLE 3.12-3
SCHOOLS, HOSPITALS, AND FIRE STATIONS IN PROJECT VICINITY

	Street Address
City of Lafayette	
Schools in the Vicinity of WTTIP Project Sites	
Burton Valley Elementary School	561 Marriewood Drive
Lafayette Elementary School	950 Moraga Road
M.H. Stanley Intermediate School	3455 School Street
White Pony and Meher Elementary School	999 Leland Drive
Happy Valley Elementary School	3855 Happy Valley Road
Springhill Elementary School	3301 Springhill Road
Acalanes High School	1200 Pleasant Hill Road
Bentley School	1000 Upper Happy Valley Road
Preschools in the Vicinity of WTTIP Project Sites	
The Child Day Schools	1049 Stuart Street
French for Fun	3470 Mt. Diablo Boulevard, A115
Happy Days Learning Center	3205 Stanley Boulevard
Joyful Beginnings	955 Moraga Road
Merriewood Children's Center	561 Merriewood Drive
Michael Lane Preschool	682 Michael Lane
Seedlings Preschool	49 Knox Drive
Hospitals in the Vicinity of WTTIP Project Sites	
John Muir Medical Center Sierra Surgi-Center	970 Dewing Avenue
Fire Stations in the Vicinity of WTTIP Project Sites	
CCCFPD Station 15	3338 Mt. Diablo Boulevard
CCCFPD Station 16	4007 Los Arabis Drive
CCCFPD Station 17	620 St. Mary's Road
City of Orinda	
Schools in the Vicinity of WTTIP Project Sites	
Wagner Ranch Elementary	350 Camino Pablo
North Bay Orinda School	19 Altarinda Road
Springs Academy	89 Moraga Way
Glorietta Elementary School	15 Martha Road
Orinda Intermediate School	80 Ivy Drive
El Ray Elementary School	25 El Camino Moraga
Miramonte High School	750 Moraga Way
Sleepy Hollow Elementary School	20 Washington Lane
Preschools in the Vicinity of WTTIP Project Sites	
Fountainhead Montessori School	30 Santa Maria Way
Fire Stations in the Vicinity of WTTIP Project Sites	
Moraga Orinda Fire Department Station 43	20 Via Las Cruces
Moraga Orinda Fire Department Station 44	295 Orchard Road
Moraga Orinda Fire Department Station 45	33 Orinda Way
Town of Moraga	
Schools in the Vicinity of WTTIP Project Sites	
Camino Pablo Elementary School	1111 Camino Pablo
Joaquine Moraga Intermediate School	1010 Camino Pablo
Campolindo High School	300 Moraga Road
Donald L. Rheem Elementary School	90 Laird Drive
Los Perales Elementary School	22 Wakefield Drive
Frederick Taylor University	346 Rheem Boulevard
Preschools in the Vicinity of WTTIP Project Sites	
Creative Playhouse, Inc.	1350 Moraga Way
Fountainhead Montessori School	1450 Moraga Road
Moraga Bright Beginnings Christian Preschool	1689 School Street
Mulberry Tree Preschool	1455 St. Mary's Road
Saklan Valley School	1678 School Street
The Child Day Schools	372 Park Street

TABLE 3.12-3 (Continued)
SCHOOLS, HOSPITALS, AND FIRE STATIONS IN PROJECT VICINITY

	Street Address
Fire Stations in the Vicinity of WTTIP Project Sites	
Moraga Orinda Fire Department Station 41	1280 Moraga Way
Moraga Orinda Fire Department Station 42	555 Moraga Road
City of Walnut Creek	
Schools in the Vicinity of WTTIP Project Sites	
Dorris Eaton School	1847 Newell Avenue
Las Lomas High School	1460 South Main Street
St. Mary's School	1158 Bont Lane
Muir Wood Elementary School	2050 Vanerslice Avenue
Walnut Heights Elementary School	4064 Walnut Boulevard
Buena Vista Elementary School	2355 San Juan Avenue
Walnut Creek Christian Academy	2336 Buena Vista Avenue
Parkmead Elementary School	960 Ygnacio Valley Road
Walnut Creek Intermediate School	2425 Walnut Boulevard
Palmer School for Boys and Girls	2740 Jones Road
Contra Costa Christian High School	2721 Larkey Lane
Eagle Peak Montessori	800 Hutchinson Road
Del Oro High (Continuation)	1969 Tice Valley Boulevard
Foothill Middle School	2775 Cedro Lane
Bancroft Elementary School	2200 Parish Drive
Northgate High School	425 Castle Rock Road
Valle Verde Elementary School	3275 Peachwillow Lane
Preschools in the Vicinity of WTTIP Project Sites	
Bianchi School	2521 Walnut Boulevard
Bianchi School	2850 Cherry Lane
Brenda's Infant Toddler Care	2451 Mallard Drive
Children's World Learning Center	2875 Mitchell Drive
Contra Costa Christian Preschool	2721 Larkey Lane
Contra Costa Jewish Community Center	2071 Tice Valley Boulevard
Gan B'nai Shalom	74 Eckley Lane
Garden Gate Montessori School	63 Sandy Lane
Kid Time, Inc.	1547 Geary Road
Love and Care Learning Center	1985 Geary Road
North Creek Preschool	2303 Ygnacio Valley Road
Pied Piper Preschool	2263 Whyte Park Avenue
St. Mary Pre-Kindergarten Program	1158 Bont Lane
Preschool at Seven Hills School	975 North San Carlos Drive
Trinity Lutheran School	2317 Buena Vista Avenue
Walnut Creek Presbyterian Church Preschool	1801 Lacassie Avenue
Hospitals in the Vicinity of WTTIP Project Sites	
Kaiser Permanente Medical Center	1425 S. Main St.
Mt. Diablo Medical Center	1601 Ygnacio Valley Road
National Specialty Hospital	177 La Casa Via
Fire Stations in the Vicinity of WTTIP Project Sites	
CCCFPD Station 1	1330 Civic Drive
CCCFPD Station 3	1520 Rossmoor Parkway
CCCFPD Station 4	700 Hawthorne Drive
CCCFPD Station 7	1050 Walnut Avenue
City of Oakland	
Schools in the Vicinity of WTTIP Project Sites	
Burckhalter Elementary School	3994 Burckhalter Avenue
Parker Elementary School	7929 Ney Avenue
Reems (Ernestine C.) Academy of Technology and Art	8425 MacArthur Boulevard
Howard Elementary School	8755 Fontaine Street
City of El Sobrante	
Fire Stations in the Vicinity of WTTIP Project Sites	
CCCFPD Station 69	4640 Appian Way

SOURCE: California Department of Education, 2006; East Bay Preschool Directory, 2006; Contra Costa County, 2005.

In 2002, California established its Renewable Portfolio Standard program,[2] with the goal of increasing the percentage of renewable energy in the state's electricity mix to 20 percent by 2017. The California Energy Commission subsequently accelerated that goal to 2010, and further recommended increasing the target to 33 percent by 2020. Because much of electricity demand growth is expected to be met by increases in natural-gas-fired generation, reducing consumption of electricity and diversifying electricity generation resources are significant elements of plans to reduce natural gas demand.

California Integrated Waste Management Act of 1989

The California Integrated Waste Management Act of 1989 (Public Resources Code [PRC], Division 30), enacted through Assembly Bill (AB) 939 and modified by subsequent legislation, required all California cities and counties to implement programs to reduce, recycle, and compost at least 50 percent of wastes by the year 2000 (PRC Section 41780). The state determines compliance with this mandate to "divert" 50 percent of generated waste (which includes both disposed and diverted waste) through a complex formula. This formula requires cities and counties to conduct empirical studies to establish a "base year" waste generation rate against which future diversion is measured. The actual determination of the diversion rate in subsequent years is arrived at through deduction, not direct measurement: instead of counting the amount of material recycled and composted, the city or county tracks the amount of material disposed at landfills, then subtracts the disposed amount from the base year amount. The difference is assumed to be diverted (PRC Section 41780.2).

Local Setting

Streets and trails throughout the project area also function as underground utility corridors, the location of which must be taken into consideration when siting and installing water pipelines. District staff identified existing utilities within streets that would be affected by pipeline construction using maps provided by other agencies and EBMUD as-built drawings. Table 3.12-4 identifies existing underground utilities located within the alignments of proposed WTTIP pipelines (or at other WTTIP project sites) evaluated at a project-level of detail. The pipeline alignments were also inspected for any physical markers indicating the presence of utilities.

For purposes of analysis, this EIR uses the California Department of Transportation (Caltrans) uses policies in the *Caltrans Project Development Procedures Manual* (Caltrans, 1999) to identify "high priority" utilities that would pose a greater risk to workers and the public should an accident occur during construction, and which therefore warrant special consideration. Pursuant to the policy, high priority utilities include pipelines carrying petroleum products, oxygen, chlorine, toxic or flammable gases; natural gas in pipelines greater than 6 inches nominal pipe diameter or with normal operating pressures greater than 60 pounds per square inch gauge; and

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[2] The Renewable Portfolio Standard is a flexible, market-driven policy to ensure that the public benefits of wind, solar, biomass, and geothermal energy continue to be realized as electricity markets become more competitive. The policy ensures that a minimum amount of renewable energy is included in the portfolio of electricity resources serving a state or country. By increasing the required minimum amount over time, the Renewable Portfolio Standard puts the electricity industry on a path toward increasing sustainability.

TABLE 3.12-4
EXISTING UNDERGROUND UTILITIES LOCATED WITHIN PROJECT-LEVEL PIPELINE ALIGNMENTS[a]

Facility	Street	Roadway Segment	Utility	Diameter (inches)
Orinda-Lafayette Aqueduct (Alternative 2 only)	El Nido Ranch Road	St. Stephens Drive to Lizann Drive	Water Sewer Natural Gas Storm Drain	20, 8 12 6 18
	El Nido Ranch Road	Lizann Drive to Acalanes Road	Water Sewer Natural Gas Storm Drain	20 12 6 18
	El Nido Ranch Road	Acalanes Road to Upper Happy Valley Road	Water Sewer Natural Gas Storm Drain	12 30 6 18
	El Nido Ranch Road	Upper Happy Valley Road to just west of Sunnybrook Drive	Water Sewer Natural Gas Storm Drain	12, 8 30 6 18
	Mt. Diablo Boulevard	Oakland Athletic Club to Lafayette Reservoir Recreation Area entrance	Water Sewer Natural Gas Storm Drain	No 30 6 (over 60 psi) 18
Fay Hill Pumping Plant and Pipeline Improvements	Moraga Road	Fay Hill Pumping Plant inlet line to Moraga Road	Water Sewer Natural Gas Storm Drain	12, 24 Unknown 4 10
	Rheem Boulevard	East of Moraga Road to Chalda Way	Water Sewer Natural Gas Storm Drain	6 8 6 24
Glen Pipeline Improvements	Nordstrom Lane/Glen Road	Hilltop Drive to Monticello Road	Water Sewer Natural Gas[b] Storm Drain	6 6 2 Unknown
Happy Valley Pumping Plant and Pipeline	Miner Road	Oak Arbor to Lombardy Lane	Water Sewer Natural Gas[b] Storm Drain	6, 12 6, 18 6, 6 (over 60 psi) 12
	Lombardy Lane	Miner Road to Sleepy Hollow	Water Sewer Natural Gas Storm Drain	8, 12 12, 18 6 (over 60 psi), 4 Unknown
Happy Valley Pumping Plant and Pipeline (cont.)	Lombardy Lane	Sleepy Hollow to Van Ripper Lane	Water Sewer Natural Gas Storm Drain[b]	6, 8 6, 12 4, 6 (over 60 psi) 12
	Lombardy Lane	Van Ripper Lane to proposed Happy Valley Pumping Plant	Water Sewer Natural Gas[b] Storm Drain Crossing	12 10, 8 4, 6 (over 60 psi) 30
Leland Isolation Pipeline and Bypass Valves	Lacassie Drive	North California Street to North Main Street	Water Sewer Natural Gas[b] Electric Storm Drain	69, 24, 6 60, 10, 16 (over 60 psi), 6 Yes 48

TABLE 3.12-4 (Continued)
EXISTING UNDERGROUND UTILITIES LOCATED WITHIN PROJECT-LEVEL PIPELINE ALIGNMENTS[a]

Facility	Street	Roadway Segment	Utility	Diameter (inches)
Leland Isolation Pipeline and Bypass Valves (cont.)	Danville Boulevard	Near Rudgear Road	Water Sewer Natural Gas Storm Drain Petroleum[b]	69, 60, 48, 24, 10 60, 36 2,4 Unknown 10
Moraga Road Pipeline	Mt. Diablo Boulevard	Lafayette WTP to Lafayette Reservoir Recreation Area	Water Sewer Natural Gas[b] Storm Drain	48,24 30 4, 8 (over 60 psi) None
	Over Lafayette Reservoir property	Mt. Diablo Boulevard to Moraga Road	Water Sewer Natural Gas Storm Drain	12, 36 15 None None
	Moraga Road	Nemea Court to Sky-Hy Drive	Water Sewer Natural Gas Storm Drain	8, 12, 36 8 3 15
	Moraga Road	Sky-Hy Drive to Rheem Boulevard	Water Sewer Natural Gas Storm Drain	12, 12, 36 15 4 12, 18, 24
	Moraga Road	Rheem Boulevard	Water Sewer Natural Gas Storm Drain Communication Electric	12, 12, 36 Unknown 4 27 Yes Yes
	Moraga Road	Rheem Boulevard to Draeger Drive	Water Sewer Natural Gas Storm Drain Communication Electric	12, 12, 36 Unknown 4 12 to 58x36 Yes Yes
Highland Reservoir and Pipelines	Within Lafayette WTP	Connection point for Colorados Pressure Zone to Mt. Diablo Boulevard	Water Sewer Natural Gas Storm Drain	30 None 4 None
	Mt. Diablo Boulevard	Lafayette WTP to Lafayette Reservoir Recreation Area	Water Sewer Natural Gas[b] Storm Drain	24, 48 30 8 (over 60 psi) None
Highland Reservoir and Pipelines (cont.)	Access road	Across access road	Water Sewer Natural Gas Storm Drain	None 15 None None
	Over Lafayette Reservoir property	Access road to reservoir site	Water Sewer Natural Gas[b] Storm Drain Telephone	24, 8 None 6 (over 60 psi) None Yes
Lafayette Reclaimed Water Pipeline	Within Lafayette WTP	Gravity thickener tank to Mt. Diablo Boulevard	Water Sewer Natural Gas Storm Drain	None 15 None None

TABLE 3.12-4 (Continued)
EXISTING UNDERGROUND UTILITIES LOCATED WITHIN PROJECT-LEVEL PIPELINE ALIGNMENTS[a]

Facility	Street	Roadway Segment	Utility	Diameter (inches)
Lafayette Reclaimed Water Pipeline (cont.)	Mt. Diablo Boulevard	Lafayette WTP to Lafayette Reservoir Recreation Area	Water Sewer Natural Gas[b] Storm Drain	None 30 6 (over 60 psi) None
	Access road	Across access road	Water Sewer Natural Gas Storm Drain	None 15 None None
	Over Lafayette Reservoir property	Access road to Lafayette Reservoir	Water Sewer Natural Gas[b] Storm Drain Telephone	24, 8 None 6 (over 60 psi) None Yes
Sunnyside Pumping Plant	Happy Valley Road	Happy Valley Road near Sundown Terrace	Water Sewer Natural Gas[b] Storm Drain Electric	12, 12 8 6 (over 60 psi), 4 Unknown Yes
Tice Pumping Plant and Pipeline	Boulevard Way	Warren to Olympic Boulevard	Water Sewer Natural Gas Storm Drain	6, 12 12 2 Unknown
	Olympic Boulevard	Boulevard Way to Tice Pumping Plant	Water Sewer Natural Gas[b] Storm Drain	8, 12, 20 24, 45 4, 12, 16 (over 60 psi) Unknown

[a] Due to the nature of underground construction, the exact location of under ground utilities cannot be guaranteed based on construction documents; the precise location can only be determined by careful probing or hand digging, in compliance with Article 6 of the Cal/OSHA Construction Safety Orders.

[b] The utility is considered to be high priority based on *Caltrans Project Development Procedures Manual* definition of high-risk facilities that include: (1) petroleum products; (2) oxygen; (3) chlorine; (4) toxic or flammable gases; (5) natural gas in pipelines greater than 6 inches nominal pipe diameter, or pipelines with normal operating pressures greater than 60 pounds per square inch gauge; (6) underground electric supply lines, conductors, or cables that have a potential to ground of more than 300 volts, either directly buried or in a duct or conduit, that do not have concentric grounded or other effectively grounded metal shields or sheaths (Caltrans, 1997).

SOURCE: McGowan, 2006b.

underground electric supply lines, conductors, or cables that have a potential to ground of more than 300 volts that do not have effectively grounded sheaths (Caltrans, 1999). Table 3.12-4 indicates known high priority utilities near proposed WTTIP facility locations.

During design, the existing utilities will be located again and identified with greater precision (e.g., shown on the 100 percent design drawings). Due to the nature of underground construction, the exact location of underground utilities cannot be guaranteed based on construction documents; the precise location can only be determined by careful probing or hand digging, in compliance with Article 6 of the California Occupational Safety and Health Administration (Cal/OSHA) Construction Safety Orders. Utilities Service Alert, which provides utility location services, is not available until the time of construction.

3.12.3 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:

- Substantially interfere with or change the demand for utilities;
- Interfere with or substantially change the demand for government services such as schools, hospitals, or police and fire protection, or require alteration of these services;
- Exceed the disposal capacity of local landfills or cause wasteful, inefficient, or unnecessary consumption of energy; or
- Impair or prevent a city or county from complying with the waste diversion mandates of the California Integrated Waste Management Act of 1989.

Refer to Chapter 4 regarding the potential for the WTTIP to induce growth and contribute to indirect, secondary impacts, including increased demand for public services and utilities (other than water). Refer to Section 3.8, Traffic and Circulation, regarding potential disruption of access to land uses (including schools) adjacent to pipeline construction projects.

Impacts and Mitigation Measures

Table 3.12-5 indicates public services and utilities impacts by project facility. Table 3.12-6 identifies applicable mitigation measures for individual WTTIP projects.

Impact 3.12-1: Potential damage to or interference with existing public utilities.

Construction activities for the proposed WTTIP projects could result in damage to or interference with existing water, sewer, storm drain, natural gas, oil, electric, and/or communication lines and, in some cases, could require that existing lines be permanently relocated, potentially causing interruption in service. Numerous utility lines of varying sizes are located along and across proposed pipeline alignments (see Table 3.12-4); within the Lafayette, Orinda, Walnut Creek, Sobrante, and Upper San Leandro WTPs; and at the various pumping plants and reservoir sites. Streets and trails function as utility corridors within the project area, which creates a greater potential for interference with other existing utilities. The focus of this discussion is on pipeline construction projects proposed as part of the WTTIP. If the specific locations of underground utilities are not located prior to construction, the utility lines could be damaged and the associated services interrupted.

In most cases, service disruptions would be temporary and would not exceed one day. All utility lines and cables that would be disrupted during pipe installation could be identified during preliminary design. As a condition of approval for either a utility excavation permit or an encroachment permit, the District would prepare a detailed engineering and construction plan

TABLE 3.12-5
SUMMARY OF POTENTIAL PROJECT-LEVEL PUBLIC SERVICES AND UTILITIES IMPACTS

Facility	Impact 3.12-1 Disruption of Utility Lines	Impact 3.12-2 Increase in Electricity Demand	Impact 3.12-3 Increase in Public Services Demand	Impact 3.12-4 Adverse Effect on Landfill Capacity	Impact 3.12-5 Failure to Achieve State Diversion Mandates
Lafayette WTP					
Alternative 1	SM	LTS	LTS	SM	SM
Alternative 2	SM	LTS	LTS	–	SM
Orinda WTP					
Alternative 1	SM	LTS	LTS	SM	SM
Alternative 2	SM	LTS	LTS	SM	SM
Walnut Creek WTP					
Alternative 1 or 2	SM	LTS	LTS	SM	SM
Sobrante WTP					
Alternative 1 or 2	SM	LTS	LTS	SM	SM
Upper San Leandro WTP					
Alternative 1 or 2	SM	LTS	LTS	SM	SM
Orinda-Lafayette Aqueduct					
Alternative 2	SM	LTS	LTS	SM	SM
Ardith Reservoir and Donald Pumping Plant	SM	LTS	LTS	SM	SM
Fay Hill Pumping Plant and Pipeline Improvements	SM	LTS	LTS	SM	SM
Fay Hill Reservoir	SM	LTS	LTS	SM	SM
Glen Pipeline Improvements	SM	LTS	LTS	SM	SM
Happy Valley Pumping Plant and Pipeline	SM	LTS	LTS	SM	SM
Highland Reservoir and Pipelines	SM	LTS	LTS	SM	SM
Lafayette Reclaimed Water Pipeline	SM	LTS	LTS	SM	SM
Leland Isolation Pipeline and Bypass Valves	SM	LTS	LTS	LTS	SM
Moraga Reservoir	SM	LTS	LTS	SM	SM
Moraga Road Pipeline	SM	LTS	LTS	SM	SM
Sunnyside Pumping Plant	SM	LTS	LTS	–	–
Tice Pumping Plant and Pipeline	SM	LTS	LTS	SM	SM
Withers Pumping Plant	SM	LTS	LTS	SM	SM

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

TABLE 3.12-6
SUMMARY OF APPLICABLE MITIGATION MEASURES – IMPACT 3.12-1 AND 3.12-4

Facility	Measures 3.12-1a through 3.12-1g Identifying Utility Lines during Construction	Measures 3.12-4a and 3.12-4b Solid Waste Recycling and Reuse
Lafayette WTP		
Alternative 1	✓	✓
Alternative 2	✓	–
Orinda WTP		
Alternative 1	✓	✓
Alternative 2	✓	✓
Orinda-Lafayette Aqueduct		
Alternative 2	✓	✓
Walnut Creek WTP		
Alternative 1 or 2	✓	✓
Sobrante WTP		
Alternative 1 or 2	✓	✓
Upper San Leandro WTP		
Alternative 1 or 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	✓	✓

✓ = Applicable Impact
– = No Impact

that thoroughly describes construction techniques and protective measures for minimizing impacts to utilities.

Construction of facilities at any of the WTPs would not interrupt water supply service to the corresponding service areas because water service during any planned outages could be provided on a temporary basis from existing distribution storage. With the exception of planned outages to connect facilities to power, the WTPs would remain online during the construction of proposed improvements. The expected duration of the planned outages would be 12 hours during the summer and 24 hours during the winter. The level of service during a planned outage would remain unchanged.

With implementation of Measures 3.12-1a through 3.12-1h (requiring utility-locating safety practices prior to and during construction), impacts related to potential damage to or interference with public utilities would be less than significant.

Orinda-Lafayette Aqueduct

The Orinda-Lafayette Aqueduct would run along El Nido Ranch Road to Mt. Diablo Boulevard. Utility lines carrying water, sewage, natural gas, and storm drain runoff are located along the pipeline alignment. The natural gas line along Mt. Diablo Boulevard is considered to be high priority (see Table 3.12-4 for location, utility type, and diameter information).

Fay Hill Pumping Plant and Pipeline Improvements

The Fay Hill Pumping Plant and Pipeline Improvements include an inlet line to Moraga Road from the Fay Hill Pumping Plant. As part of the proposed pumping plant improvements, an onsite PG&E transformer would be relocated. Pipeline improvements are proposed along Rheem Boulevard beginning east of Moraga Road and ending at Chalda Way. Utility lines carrying water, sewage, natural gas, and storm drain runoff are located along the pipeline alignment (see Table 3.12-4 for location, utility type, and diameter information).

Glen Pipeline Improvements

The proposed Glen Pipeline Improvements would be installed along Nordstrom Lane/Glen Road from Hilltop Drive to Monticello Road. Utility lines carrying water, sewage, natural gas, and storm drain runoff electricity are located along the pipeline alignment (see Table 3.12-4 for location, utility type, and diameter information).

Happy Valley Pumping Plant and Pipeline

The proposed Happy Valley Pipeline improvements would be constructed along Miner Road and Lombardy Lane. The Happy Valley Pumping Plant would include a new transformer and PG&E underground cable connecting to an existing PG&E power pole. Utility lines carrying water, sewage, natural gas, storm drain runoff, communication, and electricity are located along the pipeline alignment. The natural gas lines along the entire proposed pipeline alignment are considered to be high priority (see Table 3.12-4 for location, utility type, and diameter information).

Highland Reservoir and Pipelines

The proposed Highland Pipeline would be located at the Lafayette WTP. It would cross Mt. Diablo Boulevard between the Lafayette WTP and Lafayette Reservoir Recreation Area, and continue along an access road over Lafayette Reservoir property to the reservoir site. Utility lines carrying water, sewage, natural gas, storm drain runoff, and telephone services are located along the pipeline alignment. The natural gas lines along sections of the proposed pipeline alignment are considered to be high priority. The proposed limit of construction for Highland Reservoir is adjacent to existing telephone vaults and buried gas lines (see Table 3.12-4 for location, utility type, and diameter information).

Lafayette Reclaimed Water Pipeline

For the most part, the proposed Lafayette Reclaimed Water Pipeline would be constructed in the same trench as the proposed Highland Pipelines and therefore would have similar potential utility impacts. Additionally, Lafayette Reclaimed Water Pipeline facilities would require electrical power to be extended to the treatment area for the UV reactor and pumps (see Table 3.12-4 for location, utility type, and diameter information).

Leland Isolation Pipeline and Bypass Valves

The proposed Leland Isolation Pipeline and Bypass Valves would be located in Lacassie Drive between North California Street and North Main Street, in Danville Boulevard near Rudgear Road, and near the Danville Pumping Plant along the Iron Horse Trail. Utility lines carrying water, sewage, natural gas, storm drain runoff, and petroleum are located along the pipeline alignments. The petroleum line is considered to be high priority (see Table 3.12-4 for location, utility type, and diameter information).

Moraga Road Pipeline

The proposed improvements would be constructed from the Lafayette WTP, then across Mt. Diablo Boulevard and through the Lafayette Reservoir Recreation Area where the pipeline would run overland toward the southeast to Nemea Court. The pipeline would then extend southward to Moraga Road and then along Moraga Road from the intersection of Draeger Drive and Moraga Road Utility lines carrying water, sewage, natural gas, and storm drain runoff are located along the pipeline alignment. The natural gas line along the Mt. Diablo Boulevard section of the proposed pipeline alignment is considered to be high priority (see Table 3.12-4 for location, utility type, and diameter information).

Sunnyside Pumping Plant and Pipeline

The proposed Sunnyside Pumping Plant and Pipeline facilities would be located along Happy Valley Road near Sundown Terrace. The project facilities include a new transformer and a PG&E underground utility line connecting to an existing electrical box and buried pipelines. Utility lines carrying water, sewage, natural gas, storm drain runoff, and electricity are located in the project vicinity. The nearby natural gas line is considered to be high priority (see Table 3.12-4 for location, utility type, and diameter information).

Tice Pumping Plant and Pipeline

The proposed Tice Pipeline alignment would travel along Olympic Boulevard from the proposed Tice Pumping Plant to Boulevard Way, continuing along Boulevard Way from Warren to Olympic Boulevard. Project facilities would require the relocation of a PG&E meter, a transformer, and an electrical pole on the proposed site. Utility lines carrying water, sewage, natural gas, and storm drain runoff are located in the project vicinity. The nearby natural gas line is considered to high priority (see Table 3.12-4 for location, utility type, and diameter information).

Withers Pumping Plant

The proposed Withers Pumping Plant project would involve the installation of a new transformer and a metering and switchgear cabinet onsite and would require the relocation of a PG&E electrical pole.

Mitigation Measures

Measure 3.12-1a: Prior to excavation, the District or its contractors will locate overhead and underground utility lines, such as natural gas, electricity, sewage, telephone, fuel, and water lines, that may reasonably be expected to be encountered during excavation work.

Measure 3.12-1b: The District or its contractors will find the exact location of underground utilities by safe and acceptable means, including the use of hand and modern techniques as well as customary types of equipment. Information regarding the size, color, and location of existing utilities must be confirmed before construction activities begin.

Measure 3.12-1c: The District or its contractors will confirm the specific location of all high priority utilities (i.e. pipelines carrying petroleum products, oxygen, chlorine, toxic or flammable gases; natural gas in pipelines greater than 6 inches in diameter, or with normal operating measures, greater than 60 pounds per square inch gauge; and underground electric supply lines, conductors, or cables that have a potential to ground more than 300 volts that do not have effectively grounded sheaths) and such locations will be highlighted on all constructions drawings. In the contract specifications, the District will require that the contractor provide weekly updates on planned excavation for the upcoming week and identify when construction will occur near a high priority utility. On days when this work will occur, District construction managers will attend tailgate meetings with contractor staff to review all measures—those identified in the Mitigation Monitoring and Reporting Program and in the construction specifications—regarding such excavations. The contractor's designated health and safety officer will specify a safe distance to work near high-pressure gas lines, and excavation closer to the pipeline will not be authorized until the designated health and safety officer confirms and documents in the construction records that: (1) the line was appropriately located in the field by the utility owner using as-built drawings and a pipeline-locating device, and (2) the location was verified by hand by the construction contractor. The designated health and safety officer will provide written confirmation to the District that the line has been adequately located, and excavation will not start until this confirmation has been received by the District.

Measure 3.12-1d: While any excavation is open, the District or its contractors will protect, support, or remove underground utilities as necessary to safeguard employees.

Measure 3.12-1e: The District or its contractors will notify local fire departments any time damage to a gas utility results in a leak or suspected leak, or whenever damage to any utility results in a threat to public safety.

Measure 3.12-1f: The District or its contractors will contact utility owner if any damage occurs as a result of the project and promptly reconnect disconnected cables and lines with approval of owner.

Measure 3.12-1g: The District will observe Department of Health Services (DHS) standards, which require: (1) a 10-foot horizontal separation between parallel sewage and water mains (gravity or force mains); (2) a 1-foot vertical separation between perpendicular water and sewage line crossings; and (3) encasement of sewage mains in protective sleeves where a new water line crosses under or over an existing wastewater main.

Measure 3.12-1h: The District or its contractors will coordinate final construction plans and specifications with affected utilities, such as PG&E.

Impact 3.12-2: Short-term and long-term increase in energy demand.

Construction of the WTTIP facilities would result in an irretrievable and irreversible commitment of natural resources though direct consumption of fossil fuels and use of materials. The proposed activities would require connections to existing power sources, which would increase the short-term use of electricity and refined petroleum products during the operation of construction equipment (primarily gas, diesel, and motor oil). Equipment manufacturers have made progress in addressing fuel efficiency during construction, including the development of fuel-efficient engines and equipment. This short-term increase in electricity demand would not be significant, and no mitigation is required.

Over the long term, increased consumption of electricity and nonrenewable resources would primarily occur at two types of facilities:

- *Pump Stations*. Much of the energy involved in municipal water systems is used for pumping. Approaches to conserving energy in the movement of water include using energy-efficient equipment and implementing concurrent repairs and maintenance of facilities to minimize power use. Scheduling pumps to operate as much as possible during off-peak energy demand periods, within system constraints, also reduces potential contributions to rolling blackouts.

- *Water Treatment Plants*. Water treatment facilities use energy to pump and process water. The amount of energy required for treatment depends on source-water quality, treatment methods used, and pumping requirements for the treated water. Energy requirements for treatment are typically small, and the bulk of the energy is used to pump treated water. Energy savings are being achieved by reducing the volume of treated water pumped (through water conservation), using energy-efficient treatment and pumping equipment, using effective instrumentation and controls, managing pumping operations, and implementing concurrent repairs and maintenance of facilities to minimize power use.

The proposed water treatment plant and pumping plant improvements would increase the demand for electricity in the long term. A preliminary study performed by PG&E in February 2006 indicates a need for additional electric distribution facilities under both Alternative 1 and Alternative 2 based on the 2005 Walnut Creek Load Growth Package (Chan, 2006).

The Lafayette WTP is on PG&E's Lakewood circuit and receives electricity from the Lakewood substations located at 838 Ygnacio Valley Road, Walnut Creek, approximately 7.5 miles from the Lafayette WTP. Under Alternative 1, electricity demand at the Lafayette WTP would increase by 2,349 kilowatts (Chan, 2006). PG&E has indicated that additional electric distribution facilities (new substation bank and circuit) could be required by 2014 at the Lakewood circuit due to increased electricity use at the Lafayette WTP.

The Orinda WTP is on PG&E's Sobrante 1103 circuit and receives electricity from the Sobrante substation located at 511 Bear Creek Road, Lafayette, approximately 1.4 miles from the Orinda WTP. Under Alternative 2, electricity demand at the Orinda WTP would increase by 6,339 kilowatts (Chan, 2006). PG&E has indicated that additional electric distribution facilities (new substation bank and circuit) could be required by 2012 at the Sobrante 1103 circuit due to increased demand at Orinda WTP.

Through its *Renewable Energy Facilitation Plan*, EBMUD has created a strategy to increase the use of renewable energy technologies within its service territory, with the aim of reducing the environmental impact of electricity use. The plan is based on three basic actions:

- Increased use of renewable-energy-based generating technologies at District facilities
- Purchase of offsite renewable energy generation through bilateral contracts, green tags (renewable energy certificates), or other contractual mechanisms
- Marketing and outreach to customers regarding the benefits of both EBMUD's use of renewable technologies and customer adoption of renewable energy technologies

EBMUD already operates two hydropower plants in the Sierra Nevada foothills and generates biogas-based electricity at its wastewater treatment facility. It has also implemented a 30-kilowatt solar photovoltaic project in Oakland. In addition to this existing stock of onsite renewable generation technologies, EBMUD is planning a 410-kilowatt solar photovoltaic system at the Sobrante WTP.

Although it is not currently doing so, EBMUD may be able to purchase renewable energy generation from offsite facilities. EBMUD may be able to purchase energy generated though green methodologies using bilateral generation contracts and/or green tags once a California regulatory framework is established (ICF Consulting, 2003).

EBMUD uses marketing and public outreach to help members of the community adopt and implement renewable energy strategies. Examples currently in use are bill inserts, the District's website, and other District publications that inform customers about water conservation, water efficiency, and other environmental accomplishments (ICF Consulting, 2003).

Consistent with the *California Energy Action Plan II* priorities for reducing energy usage and the *Renewable Energy Facilitation Plan*, the District would ensure that energy-efficient equipment is used for all WTTIP projects and would continue to time energy usage during nonpeak periods. Where possible, electricity for WTTIP projects would be supplied from a renewable energy resource, or an alternative renewable energy resource such as solar power. Therefore, the long-term increase in electricity demand would not be significant, and no mitigation is required.

Impact 3.12-3: Potential short-term increase in demand for police and fire services.

Construction of proposed facilities would generate truck and employee traffic along haul routes and at the proposed sites, temporarily increasing the accident potential in these areas. However, this increased potential for accidents would result in a limited, short-term demand for additional police or fire services, and only on an as-needed and emergency basis. This short-term increase in demand could be accommodated by existing resources within the project areas. In addition, construction of pipelines in or adjacent to roadways could result in partial or complete road closure and would impair local fire, police, or other emergency access during this period. Disruption of roadway access and increased accident potential could also occur in the event of a pipeline rupture or other emergency upset condition. Such an event could also temporarily increase demand for police and fire services as well as impair emergency access (see Section 3.8, Traffic and Circulation). The potential impact on the demand for police and fire services would be less than significant. To provide further protection, the District would implement Measures 3.12-1a through 3.12-1h (as well as traffic safety and access measures identified in Section 3.8). There would be no long-term increases in demand for police or fire services associated with the WTTIP projects. Improved security measures at the WTPs and pumping plants, such as security fencing, alarms, and controlled access, are proposed as part of the project. The potential for long-term increases in demand for police and fire services (associated with secondary impacts of growth due to implementation of the WTTIP projects) is discussed in Chapter 4 of this EIR. Table 3.12-5 indicates public service and utilities impacts by project facility.

Mitigation Measure

Measure 3.12-3: The District will implement Measures 3.12-1a through 3.12-1h.

Impact 3.12-4: Potential adverse effects on solid waste landfill capacity.

The California Integrated Waste Management Board found that the Lamorinda/Walnut Creek and Oakland jurisdictions achieved or nearly achieved the 50 percent solid waste diversion goal for the 2003/2004 year (California Integrated Waste Management Board, 2005). However, construction of WTTIP projects would result in the generation of a large volume of waste materials which, if the total amount were disposed of in local landfills, could exceed the daily tonnage limit of these landfills. These waste materials include construction and demolition materials and excavation spoils from the WTPs, pumping plants, and reservoirs, and trench and tunnel spoils from construction of transmission pipelines. The largest potential source of solid waste would be the excavated soil; some of this material would be stockpiled and reused as backfill. Table 3.12-7 indicates the estimated amount of excavated soils and demolition materials potentially requiring disposal for each of the WTTIP facilities. The total volume of excavated material would be up to approximately 230,000 cubic yards (cy) under Alternative 1 and approximately 376,000 cy under Alternative 2. This amount could have a significant impact on landfill capacity. To reduce this impact to a less-than-significant level, the District will implement Measures 12.3-4a and 12.3-4b.

TABLE 3.12-7
ESTIMATE OF SOLID WASTE GENERATED BY WTTIP CONSTRUCTION ACTIVITIES

Facility	Estimated Total Cubic Yards of Soil to be Disposed[a,b] Alternative 1	Alternative 2
Lafayette WTP		
Alternative 1	99,660	800
Orinda WTP		
Alternative 1	12,550	–
Alternative 2	–	151,760
Walnut Creek WTP		
Alternative 1 or 2	4,100	4,100
Sobrante WTP		
Alternative 1	21,580	–
Alternative 2	–	28,460
Upper San Leandro WTP	1,510	1,510
Alternative 1 or 2		
Orinda-Lafayette Aqueduct	–	98,732
Ardith Reservoir	8,500	8,500
Donald Pumping Plant	700	700
Fay Hill Pumping Plant and Pipeline Improvements	230	230
Fay Hill Reservoir	8,400	8,400
Glen Pipeline Improvements	700	700
Happy Valley Pumping Plant and Pipeline	2660	2660
Highland Reservoir and Pipelines	20,420	20,420
Leland Isolation Pipeline and Bypass Valves	560	560
Moraga Reservoir	15,280	15,280
Moraga Road Pipeline	27,720	27,720
Highland Inlet/Outlet and Reclaimed Water Pipelines	1,380	1,380
Sunnyside Pumping Plant	0	0
Tice Pumping Plant and Pipeline	3,080	3,080
Withers Pumping Plant	520	520
Total Estimated Cubic Yards	**229,550**	**375,512**

a Includes demolition material quantities.
b Numbers rounded.

SOURCE: McGowan, 2006a; ESA, 2006.

Mitigation Measures

Measure 3.12-4a: The District will encourage project facility design and construction methods that produce less waste, or that produce waste that could more readily be recycled or reused.

Measure 3.12-4b: The District will include in its construction specifications a requirement for the contractor to describe plans for recovering, reusing, and recycling wastes produced through construction, demolition, and excavation activities.

Impact 3.12-5: Potential failure to achieve state-mandated solid waste diversion rates.

The WTTIP projects have the potential to create an estimated 230,000 cy of solid waste under Alternative 1 and 376,000 cy of solid waste under Alternative 2. This material could substantially increase the disposal rates of jurisdictions in the WTTIP area and would thereby lower their diversion rates for the purpose of calculating AB 939 diversion. To reduce this impact to a less-than-significant level, the District will implement Measures 3.12-4a and 3.12-4b.

Mitigation Measure

Measure 3.12-5: The District will implement Measures 3.12-4a and 3.12-4b.

Program-Level Elements

All program-level elements would result in a short-term energy consumption impact during construction and a potential temporary increase in the demand for police and fire services.

Lafayette WTP

Proposed future changes to the Lafayette WTP include high-rate solids removal and post-filtration UV disinfection for the entire WTP flow. Potential impacts caused by the disruption of existing utilities would be similar to those described above for the proposed project-level facilities. Measures similar to Measures 3.12-1a through 3.12-1h would likely be required and would lessen the impact. Proposed program improvements to the Lafayette WTP would involve providing treated water storage and constructing a low-lift pumping plant. These new facilities would require energy consumption during construction as well as operation. The potential impact to solid waste landfill capacities under this project would be minor due to the types of facilities being proposed.

Orinda WTP

Potential impacts caused by the disruption of existing utilities would be similar to those described above for the proposed project-level facilities. Measures similar to Measures 3.12-1a through 3.12-1h would likely be required and would lessen the impact. Proposed program improvements to the Orinda WTP would involve providing treated water storage and constructing pumping plants, a high rate sedimentation unit, and UV disinfection building. These new facilities would require energy consumption during construction as well as operation. This project could result in an impact to solid waste landfill capacities. A significant amount of earthmoving would be required to construct the proposed low-lift pumping plant, San Pablo Pumping Plant, chlorine contact basin, and clearwells. Measures similar to Measures 3.12-4a and 3.12-4b would likely be required and would lessen the impact.

Walnut Creek WTP

Proposed program facility improvements to the Walnut Creek WTP would involve providing high-rate solids removal and post-filtration UV disinfection. Potential impacts caused by the disruption of existing utilities would be similar to those described above for the proposed project-level facilities. Measures similar to Measures 3.12a through 3.12h would likely be required and would lessen the impact. Proposed program improvements would involve a UV disinfection building and two high-rate sedimentation units. These new facilities would require energy consumption during construction as well as operation. The potential impact to solid waste landfill capacities under this project would be minor due to the types of facilities being proposed.

Leland Reservoir Replacement

The Leland Reservoir Replacement project would drain and demolish the existing Leland Reservoir and replace it with a new 9-million-gallon tank at the same site. Potential impacts to existing utilities would be minimal. The new reservoir would require energy consumption during construction. This project could result in a potential impact to solid waste landfill capacities. A significant amount of earthmoving would be required to demolish the reservoir and construct the new one. Measures similar to Measures 3.12-4a and 3.12-4b would likely be required and would lessen the impact.

New Leland Pressure Zone Reservoir and Pipeline

The proposed New Leland Pressure Zone Pipeline includes of a 1,700-foot-long inlet/outlet pipeline (20-inch diameter). The proposed pipeline alignment extends between the tank site and a transmission main under Interstate 680 and a transmission main in South Main Street. Utility lines carrying water, sewage, natural gas, and storm drain runoff could be located in the project vicinity. Construction of this pipeline could inadvertently disrupt existing utilities. Measures similar to Measures 3.12-1a through 3.12h would lessen the potential impact. These new facilities would require energy consumption during construction. A significant amount of earthmoving would be required to construct the proposed reservoir and pipeline. Measures similar to Measures 3.12-4a and 3.12-4b would likely be required and would lessen the impact.

St. Mary’s Road/Rohrer Drive Pipeline

Existing utility lines carrying water, sewer, natural gas, and storm drain runoff could be located in streets along the proposed St. Mary’s Road/Rohrer Drive Pipeline alignment. Construction of the proposed pipeline could inadvertently disrupt these lines. Measures similar to Measures 3.12-1a through 3.12-1h would lessen the potential impact. This new pipeline would require energy consumption during construction. Construction of this pipeline could temporarily increase the need for police and fire services in the event of vandalism or destruction.

San Pablo Pipeline

The proposed San Pablo Pipeline would be constructed in an EBMUD access road and would not likely result in the disruption to existing utility lines in the project vicinity. This new pipeline would require energy consumption during construction. Construction of this pipeline could temporarily increase the need for police and fire services in the event of vandalism or destruction.

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