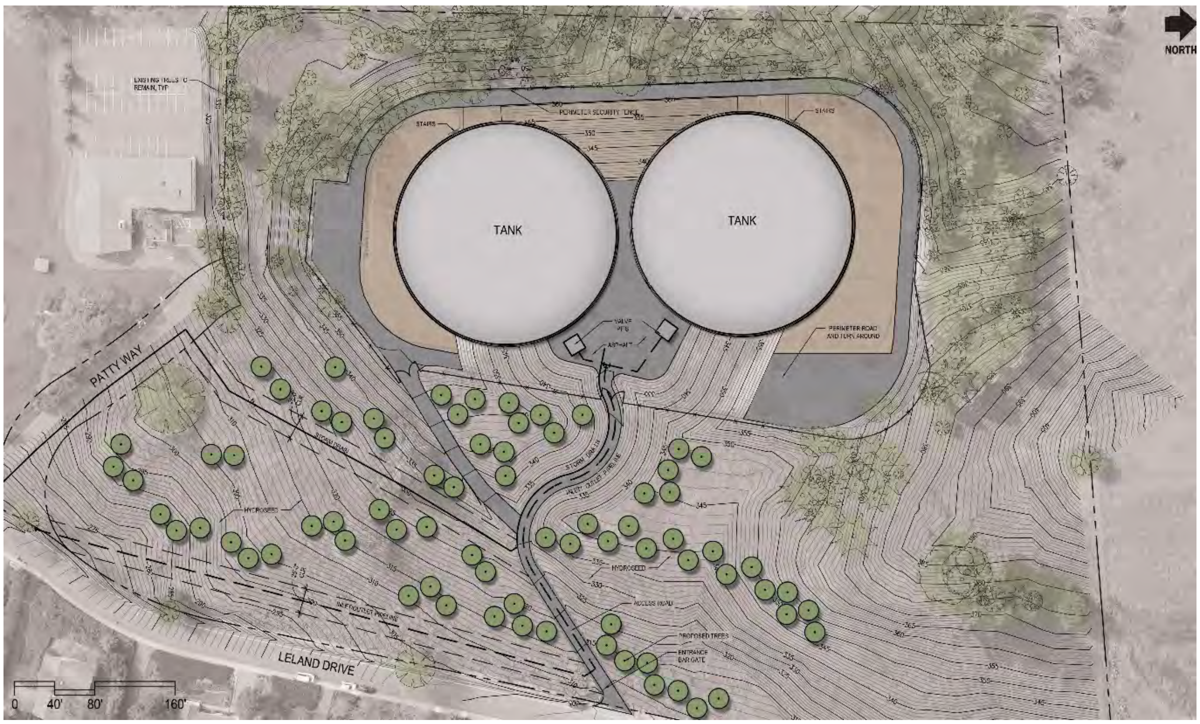
EAST BAY MUNICIPAL UTILITY DISTRICT

Leland Reservoir Replacement Project

Draft Environmental Impact Report

Volume II - Appendices

SCH #2016082082



Prepared By:

RMC water and environment

WOODARD & CURRAN

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January 2018

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East Bay Municipal Utility District

Leland Reservoir Replacement Project

Draft Environmental Impact Report
Volume II - Appendices

January 2018

Prepared for:
East Bay Municipal Utility District
Water Distribution Planning Division
375 11th Street
Oakland, CA 94607

Prepared by:
RMC, a Woodard & Curran Company
2175 North California Boulevard, Suite 315
Walnut Creek, CA 94596

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List of Appendices

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Appendix A: Notice of Preparation, Initial Study and Notice of Completion

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EBMUD

NOTICE OF PREPARATION OF ENVIRONMENTAL IMPACT REPORT LELAND RESERVOIR REPLACEMENT PROJECT EAST BAY MUNICIPAL UTILITY DISTRICT

August 31, 2016

TO: Responsible and Trustee Agencies, Organizations, and Interested Parties

FROM: East Bay Municipal Utility District
375 Eleventh Street, MS 701
Oakland, CA 94607-4240

SUBJECT: Notice of Preparation (NOP) of a Draft Environmental Impact Report for the Leland Reservoir Replacement Project

The East Bay Municipal Utility District (EBMUD), acting as lead agency under the California Environmental Quality Act (CEQA), is preparing an Environmental Impact Report (EIR) for the Leland Reservoir Replacement Project.

AGENCIES: EBMUD requests your input regarding the scope and content of the environmental information that is germane to your agency's statutory responsibilities in connection with the proposed project.

ORGANIZATIONS AND INTERESTED PARTIES: EBMUD requests comments and concerns from organizations and interested parties regarding the environmental issues associated with construction and operation of the proposed project.

PROJECT TITLE: Leland Reservoir Replacement Project

PROJECT LOCATION: Leland Reservoir is located on a 14.5-acre site opposite 1050 Leland Drive in the City of Lafayette. The site is south of State Route 24 and east of Pleasant Hill Road (see Figure 1).

PROJECT PURPOSE: The Leland Reservoir Replacement Project will replace the existing open-cut reservoir (60 years old), which is under the California Division of Safety of Dams' (DSOD) jurisdiction, with new on-site facilities to ensure long-term reliability and redundancy of the water distribution system, meet existing and future water needs, facilitate repair and replacement of aging infrastructure, and maintain water quality by downsizing the reservoir and replacing it with optimal storage based on projected future demands. The project will remove the dam embankments from DSOD's jurisdiction.

PROJECT DESCRIPTION: The project includes replacement of the existing 18-million-gallon (MG) open-cut Leland Reservoir with two new 8-MG prestressed concrete tanks within the existing reservoir basin. The project also includes replacing approximately 1,700 linear feet of existing 36-inch transmission pipeline that currently runs beneath the reservoir with approximately 2,700 linear feet of pipeline to be constructed in Windsor Drive, Condit Road and a short section of Leland Drive between Condit Road and Meek Place, and approximately 950 feet of pipeline within the Leland Reservoir site. The current access road from Leland Reservoir up to and around the reservoir perimeter will be retained and improved. Figure 2 shows the reservoir site and proposed pipelines. Construction would involve demolition of the existing reservoir structure, removing vegetation and breaching the embankment to provide access into the existing reservoir basin, constructing two new tanks within the basin, and restoring and landscaping the site following construction. Construction would require stockpiling of soil from the embankment on the eastern portion of the site adjacent to Leland Drive.

POTENTIAL ENVIRONMENTAL EFFECTS: Based on the Initial Study completed for the project, the following areas of potentially significant environmental impact will be analyzed in the Draft EIR: Aesthetics, Air Quality/Climate Change, Biological Resources, Cultural Resources, Geology/Soils, Greenhouse Gas Emissions, Hazards/Hazardous Materials, Hydrology/Water Quality, Land Use/Planning, Noise, Recreation, and Transportation/Traffic. Potential cumulative impacts and potential for growth inducement will be addressed; alternatives, including the No Project Alternative, will be evaluated.

PUBLIC REVIEW PERIOD: This NOP is available for public review and comment pursuant to California Code of Regulations, Title 14, Section 15082(b) for 30 days. The comment period for the NOP begins August 31, 2016 and ends on September 30, 2016. Due to the limits mandated by State Law, your response must be sent at the earliest possible date but not later than 30 days after receipt of this notice.

SCOPING MEETING: EBMUD will hold a scoping meeting on September 15, 2016, starting at 6:30 pm, at The Meher School, located at 999 Leland Drive in Lafayette. You are welcome to attend and present environmental information that you believe should be addressed in the EIR.

RESPONSES AND QUESTIONS: Responses to, or questions regarding, this NOP should be directed to:

Oscar Herrera, P.E.
East Bay Municipal Utility District
375 Eleventh Street, MS 701
Oakland, CA 94607-4240
Phone: 510-287-1005
Email: lelandreservoir@ebmud.com

CEQA PROCESS: The Draft EIR is planned for publication in spring 2017, with action by EBMUD's Board of Directors expected in fall 2017. Notice will be given of public meetings, including a meeting that will be held during the Draft EIR comment period. At the end of the review and comment process, EBMUD's Board of Directors will determine whether to certify the EIR and approve the Leland Reservoir Replacement Project. The NOP and all CEQA-related documents for this project will be available for review on the EBMUD website at:

https://www.ebmud.com/about-us/construction-my-neighborhood/leland-reservoir-and-pipeline-replacement/

Xavier Irias 8-31-16

Xavier J. Irias
Director of Engineering and Construction
East Bay Municipal Utility District

Date

sb16_159

Figure 1: Project Location

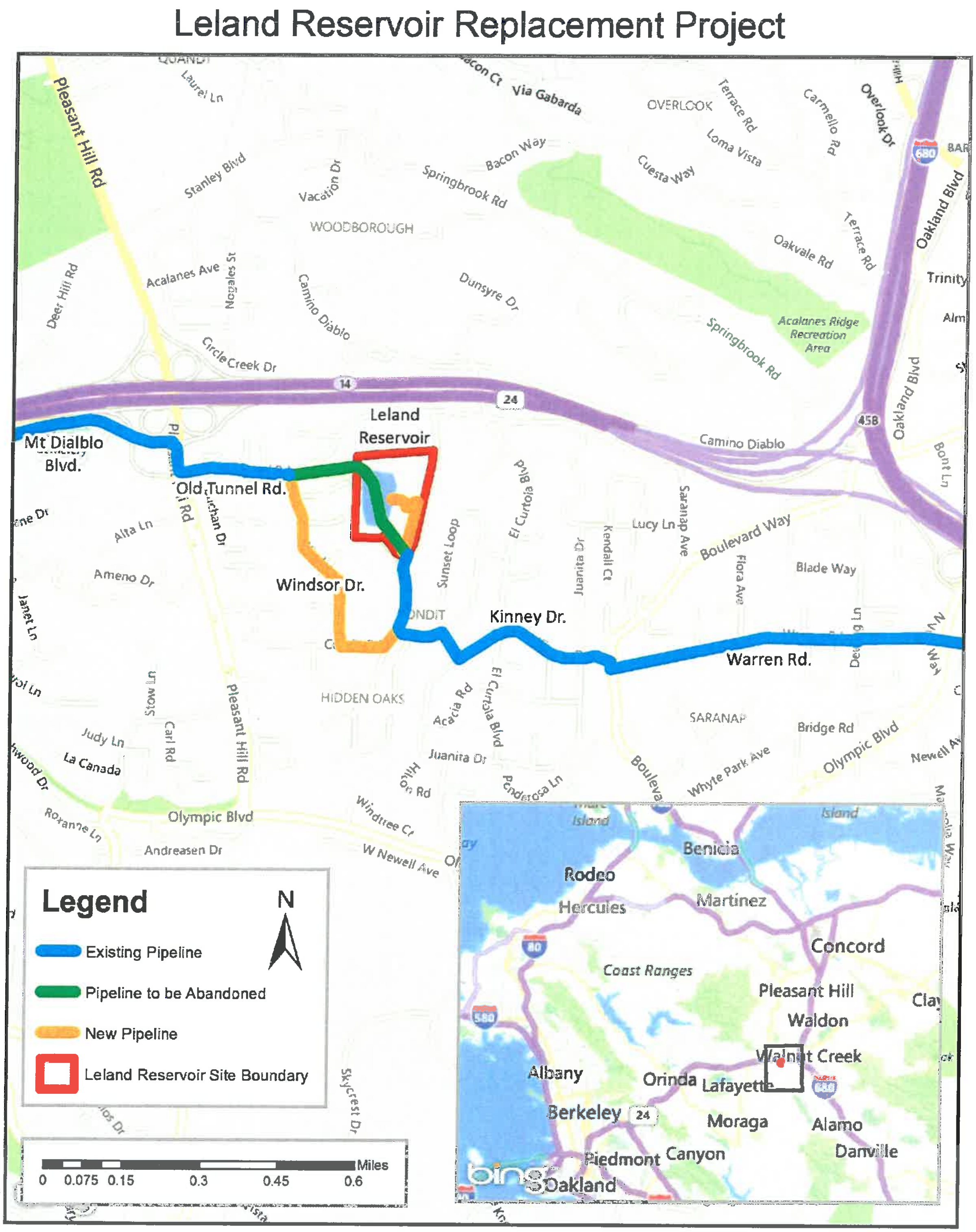
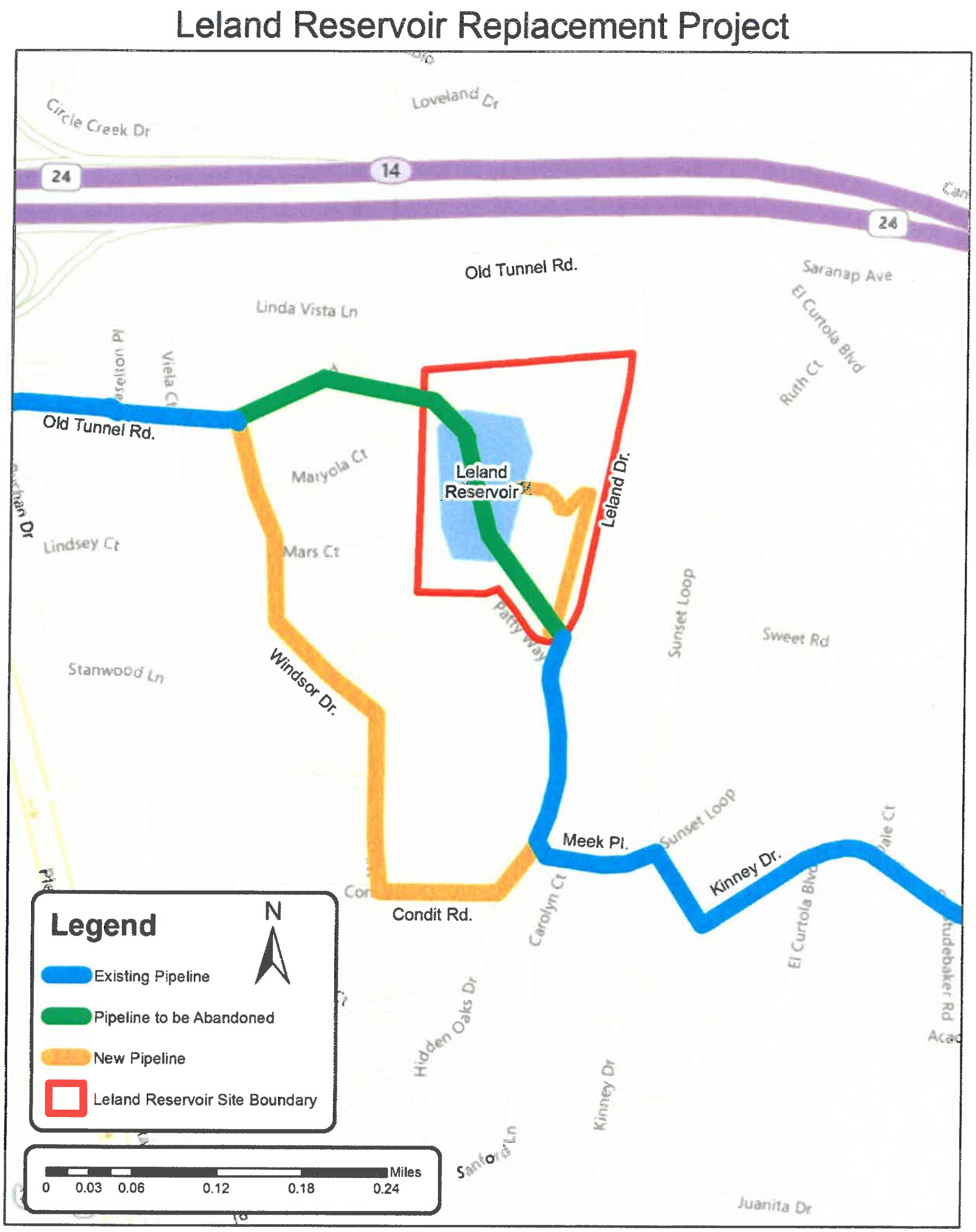


Figure 2: Location of Facilities



Agencies that Received Notice of Preparation

Agency	Contact Person/ Title	Address	City	State	Zip
Bay Area Air Quality Management District (BAAQMD	Alison Kirk, Environmental Planner	939 Ellis St.	San Francisco	CA	94109
California Department of Fish and Wildlife (CDFW) – Bay Delta Region	Scott Wilson, Regional Manager	7329 Silverado Trail	Napa	CA	94558
California Department of Toxic Substances Control - Headquarters	Elise Rothschild, Deputy Director	1001 I St.	Sacramento	CA	95814
California Department of Toxic Substances Control – Regional Office	Karen Toth, Unit Supervisor	700 Heinz Ave. Suite 100	Berkeley	CA	94710
California Department of Transportation (Caltrans) – District 4	Melanie Brent, District Deputy for Environmental Planning and Engineering	111 Grand Ave.	Oakland	CA	94612
City of Lafayette, Planning Department & Building Services Department	Niroop Srivatsa, Director	3675 Mt. Diablo Bv. #210	Lafayette	CA	94549
City of Lafayette, Engineering Department	Tony Coe, City Engineer	3675 Mt. Diablo Bv. #210	Lafayette	CA	94549
San Francisco Bay Regional Water Quality	Water Resources Control Engineer	1515 Clay St. Suite 1400	Oakland	CA	94612
U.S. Fish and Wildlife Service	Division of Ecological Services	2800 Cottage Way E-1803	Sacramento	CA	95825
County Connection	Yvette Moran, Manager of Transportation	2477 Arnold Industrial Way	Concord	CA	94520
County Connection	Rashidi Barnes, Senior Manager of Transportation	2477 Arnold Industrial Way	Concord	CA	94520
Contra Costa County, Department of Conservation and Development	Danielle Kelly, Secretarial Assistant to the Deputy Director	30 Muir Rd.	Martinez	CA	94553
Metropolitan Transportation Commission	Ken Kirkey, Director of Planning	101 8th St.	Oakland	CA	94607
Central Contra Costa Sanitary District	Russell Leavitt, Planner/ Environmental Coordinator	5019 Imhoff Pl.	Martinez	CA	94553
The Meher Schools	Ivy Summers, Co-Principal	999 Leland Dr.	Lafayette	CA	94549

Agency	Contact Person/ Title	Address	City	State	Zip
Sun Valley Bible Chapel		1031 Leland Dr.	Lafayette	CA	94549
Lafayette School District	Rachel Zinn, Superintendent	3477 School St.	Lafayette	CA	94549
Lafayette Library		3491 Mt. Diablo Bv.	Lafayette	CA	94549

East Bay Municipal Utility District

LELAND RESERVOIR REPLACEMENT PROJECT Initial Study

September 2016

East Bay Municipal Utility District
Water Distribution Planning Division – MS 701
375 11th Street
Oakland, CA 94607

Prepared with Assistance from:

RMC water and environment

RMC Water and Environment
2175 N. California Blvd., Suite 315
Walnut Creek, CA 94596

ENVIRONMENTAL CHECKLIST FORM
(Revised September 2016)

1.	Project Title:	Leland Reservoir Replacement Project
2.	Lead Agency Name and Address:	East Bay Municipal Utility District Water Distribution Planning Division – MS 701 375 11th Street Oakland, CA 94607
3.	Contact Person:	Oscar Herrera, Project Manager East Bay Municipal Utility District Water Distribution Planning Division – MS 701 375 11th Street Oakland, CA 94607 (510) 287-1005 lelandreservoir@ebmud.com
4.	Project Location:	In Lafayette, opposite 1050 Leland Drive. Pipeline work in Windsor Drive between Old Tunnel Road and Condit Road, Condit Road between Windsor Drive and Leland Drive, and Leland Drive between Condit Road and Meek Place.
5.	Project Sponsor's Name and Address:	East Bay Municipal Utility District Water Distribution Planning Division – MS 701 375 11th Street Oakland, CA 94607
6.	General Plan Designation:	Civic Use
7.	Zoning:	R-10 (Single Family Residential District-10)

8. Description of Project *(Describe the whole action involved, including, but not limited to later phases of the project, and any secondary, support, or off-site features necessary for its implementation. Attach additional sheets if necessary)*

The project includes replacement of the existing 18-million-gallon (MG) open-cut Leland Reservoir with two new 8-MG prestressed concrete tanks within the existing reservoir basin. The project also includes replacing approximately 1,700 linear feet of existing 36-inch transmission pipeline that currently runs beneath the reservoir with approximately 2,700 linear feet of pipeline to be constructed in Windsor Drive, Condit Road and a short section of Leland Drive between Condit Road and Meek Place, and approximately 950 feet of pipeline within the Leland Reservoir site. The current access road from Leland Reservoir up to and around the reservoir perimeter would be retained and improved. Figure 1 shows the project location and Figure 2 shows the reservoir site and proposed pipelines. Construction would involve demolition of the existing reservoir structure, removing vegetation and breaching the embankment to provide access into the existing reservoir basin, constructing two new tanks within the basin, and restoring and landscaping the site following construction. Construction would require stockpiling of soil from the embankment on the eastern portion of the site adjacent to Leland Drive.

9. Surrounding land uses and setting *(briefly describe project's surroundings)*:

   The Leland Reservoir site is surrounded to the east and west by single family residential homes. A church is adjacent to the southern property boundary of the reservoir site. The land between the northern property boundary and Old Tunnel Road is vacant land, zoned for single family residential use. The proposed pipeline route is under streets in single-family residential neighborhoods, and also passes a private elementary school, and a community swim center.

10. Other public agencies whose approval is required *(e.g., permits, financing approval, or participation agreement):*

Table 1 is a preliminary summary of the public agencies from which EBMUD may require approval and/or coordination is necessary in order to construct the proposed project. The EIR will confirm this list based upon input in response to the Notice of Preparation.

Table 1

Other Required Approvals and/or Coordination Necessary for the Proposed Project

Agency/ Stakeholder	Type of Jurisdiction	Type of Approval and/or Coordination Necessary
City of Lafayette	Local	Encroachment permit for construction within city streets. Approval for use of storm drains for dewatering activities.
Central Contra Costa County Sanitary District	Local	Approval for use of sewer line for dewatering activities.
Division of Safety of Dams	State	Review and approval of plans for modifying Leland Reservoir Dam

Figure 1: Project Location

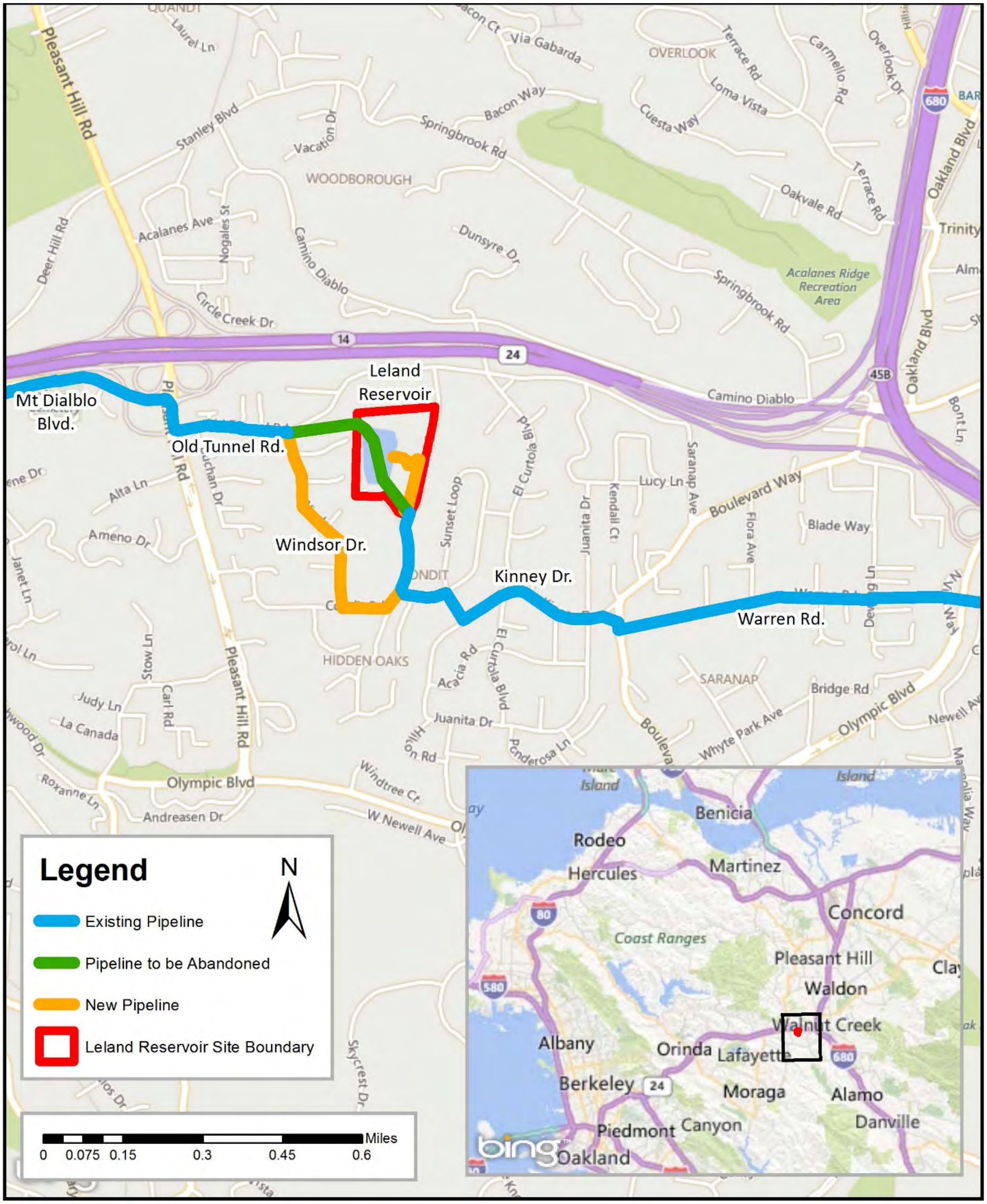


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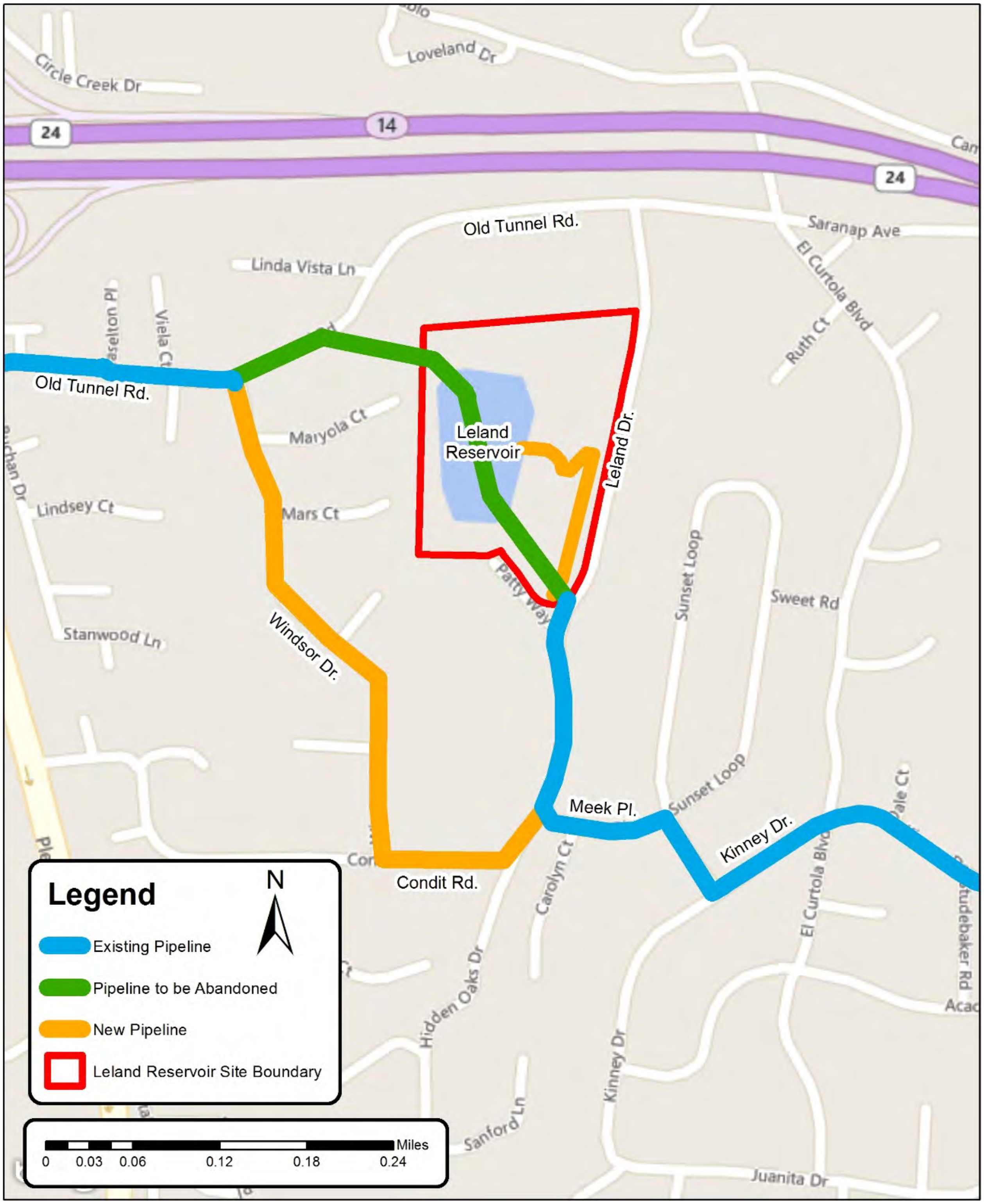
Figure 2: Project Facilities



ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED

The environmental factors checked below could potentially be affected by this project, but would be mitigated to a less than significant level as indicated by the checklist on the following pages.

☒	Aesthetics	☐	Agriculture and Forestry Resources	☒	Air Quality
☒	Biological Resources	☒	Cultural Resources	☐	Energy Use
☒	Geology/Soils	☒	Greenhouse Gas Emissions	☒	Hazards/Hazardous Materials
☒	Hydrology/Water Quality	☐	Land Use/Planning	☐	Mineral Resources
☒	Noise	☐	Population/Housing	☐	Public Services
☐	Recreation	☒	Transportation/Traffic	☐	Utilities/Service Systems
☒	Mandatory Findings of Significance				

DETERMINATION

On the basis of this initial evaluation:

☐ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

☐ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the applicant. A MITIGATED NEGATIVE DECLARATION will be prepared.

☒ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

☐ I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed project could have a significant effect on the environment because all potentially significant effects (a) have been analyzed adequately in an earlier Environmental Impact Report pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier Environmental Impact Report, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

EVALUATION OF ENVIRONMENTAL IMPACTS

1. A brief explanation is required for all answers except “No Impact” answers that are adequately supported by the information sources a lead agency cites in the parentheses following each question. A “No Impact” answer is adequately supported if the referenced information sources show that the impact simply does not apply to projects like the one involved (e.g., the project falls outside a fault rupture zone). A “No Impact” answer should be explained where it is based on project-specific factors as well as general standards (e.g., the project will not expose sensitive receptors to pollutants, based on a project-specific screening analysis).
2. All answers must take account of the whole action involved, including off-site as well as on-site, cumulative as well as project-level, indirect as well as direct, and construction as well as operational impacts.
3. “Potentially Significant Impact” is appropriate if there is substantial evidence that an effect may be significant. If there are one or more “Potentially Significant Impact” entries when the determination is made, an Environmental Impact Report (EIR) is required.
4. “Negative Declaration: Less Than Significant With Mitigation Incorporated” applies where the incorporation of mitigation measures has reduced an effect from “Potentially Significant Impact” to a “Less Significant Impact.” The lead agency must describe the mitigation measures, and briefly explain how they reduce the effect to a less than significant level (mitigation measures from Section XVII, “Earlier Analyses,” may be cross-referenced).
5. Earlier analyses may be used where, pursuant to the tiering, program EIR, or other CEQA process, an effect has been adequately analyzed in an earlier EIR or negative declaration. Section 15063(c)(3)(D). In this case, a brief discussion should identify the following:
   a) Earlier Analysis Used. Identify and state where they are available for review.
   b) Impacts Adequately Addressed. Identify which effects from the above checklist were within the scope of and adequately analyzed in an earlier document pursuant to applicable legal standards, and state whether such effects were addressed by mitigation measures based on the earlier analysis.
   c) Mitigation Measures. For effects that are "Less than Significant with Mitigation Measures Incorporated," describe the mitigation measures which were incorporated or refined from the earlier document and the extent to which they address site-specific conditions for the project.
6. Lead agencies are encouraged to incorporate into the checklist references to information sources for potential impacts (e.g., general plans, zoning ordinances). Reference to a previously prepared or outside document should, where appropriate, include a reference to the page or pages where the statement is substantiated.
7. Supporting Information Sources: A source list should be attached, and other sources used or individuals contacted should be cited in the discussion.
8. This is only a suggested form, and lead agencies are free to use different formats; however, lead agencies should normally address the questions from this checklist that are relevant to a project's environmental effects in whatever format is selected.
9. The analysis of each issue should identify:
   a) The significance criteria or threshold used to evaluate each question; and
   b) The mitigation measure identified, if any, to reduce the impact to less than significance.

ENVIRONMENTAL IMPACT CHECKLIST

I. Aesthetics **Would the Project:**	**Potentially Significant Impact**	**Less than Significant with Mitigation Incorporated**	**Less than Significant Impact**	**No Impact**
a) Have a substantial adverse effect on a scenic vista?	☐	☐	☐	☒
b) Substantially damage scenic resources, including but not limited to, trees, rock outcropping, and historic buildings within a state scenic highway?	☐	☐	☐	☒
c) Substantially degrade the existing visual character or quality of the site and its surroundings?	☒	☐	☐	☐
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☐	☐	☒	☐

DISCUSSION

a. No Impact. The project site is not within a designated scenic vista.

b. No Impact. State Route 24 from the Caldecott Tunnel to Interstate 680 is a designated scenic highway (Caltrans, 2016). The project site is located about 650 feet south of this scenic highway, but is not visible from State Route 24 because it is screened from the highway by the intervening topography.

c. Potentially Significant Impact. The Leland Reservoir property is visible to homes located across from the site on Leland Drive (1024-1074 Leland Drive) and to homes on Sunset Loop (1381 through 1451 Sunset Loop) and at the end of Ruth Drive (20 and 24 Ruth Drive), which are located above Leland Drive. The homes along Leland Drive currently view the access road to the reservoir, grassy hillsides and trees. Homes adjacent to the western boundary of the Leland Reservoir property (3143 Old Tunnel Road, 3134 and 3135 Maryola Court, 3131 and 3132 Mars Court) have views of the tree-covered reservoir embankment along the back of the property. Some of these homes may also have views of the existing security fencing surrounding the existing reservoir. The entire site perimeter is surrounded by barbed wire fencing.

The project would change the visual character of the site by removing trees along the western and southwestern areas of the property for the construction of a new access road and tanks, and by creating temporary excavated soil storage areas. The number of trees to be removed for construction would be determined during preparation of the EIR. The existing access road would be rebuilt and may be lowered to enter the reservoir basin. The new concrete tank roofs would sit approximately six feet above the existing roofline. The new concrete tanks would be partially buried with the soil material excavated for the construction of the new tanks. The EIR will provide a detailed evaluation of potential impacts to the existing visual character of the site. Mitigation measures will be identified, as appropriate, to minimize any potentially significant impacts.

The proposed 36-inch transmission pipeline installation in Windsor Drive, Condit Road, Leland Drive, and on the Leland Reservoir site would be installed underground and would not be visible, and, therefore would have no permanent impact on the visual character of the site or surrounding area. Any deterioration of existing public facilities resulting from construction (e.g., streets) would be restored by EBMUD to pre-construction condition upon completion of construction.

d. Less than Significant Impact. Any external lighting added to the project would be directed towards the reservoir valve pit and electrical equipment cabinet and would not be visible outside the reservoir site. The lighting would be used on a short-term, as-needed basis for emergency operation and/or repair of the valve pit or electrical equipment.

II. Agriculture and Forestry Resources **Would the project:**	**Potentially Significant Impact**	**Less than Significant with Mitigation Incorporated**	**Less than Significant Impact**	**No Impact**
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland) to non-agricultural use?	☐	☐	☐	☒
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	☒
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220[g]) or timberland (as defined in Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section51140 (g))	☐	☐	☐	☒
d) Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☒
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?	☐	☐	☐	☒

DISCUSSION

a. No Impact. The project site is not designated as prime Farmland, Unique Farmland, or Farmland of Statewide Importance. The California Department of Conservation designates the site as “Urban and Built-Up Land” (California Department of Conservation, 2014). The project site is located within an urban area surrounded by residential uses east and west of the project site, a church and elementary school to the south, and State Route 24 to the north.

b. No Impact. The project site is not currently zoned for agricultural use (City of Lafayette General Plan Land Use Map, 2002) nor is it under a Williamson Act contract for agricultural preservation.

c-d. No Impact. The project site is not designated as forest land or timberland.

e. No Impact. The project site would not involve changes that would result in loss of Farmland to non-agricultural use. The project site is located within an urban area surrounded by residential, religious, and school uses.

III. Air Quality **Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:**	**Potentially Significant Impact**	**Less Than Significant With Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a) Conflict with or obstruct implementation of the applicable air quality plan?	☒	☐	☐	☐
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	☒	☐	☐	☐
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?	☒	☐	☐	☐
d) Expose sensitive receptors to substantial pollutant concentrations?	☒	☐	☐	☐
e) Create objectionable odors affecting a substantial number of people?	☒	☐	☐	☐

DISCUSSION

a-d. Potentially Significant Impact. The proposed project would require the use of construction vehicles and machinery, which could result in temporary, but potentially significant emission of criteria pollutants. The EIR will include a detailed analysis, including air quality modeling of construction emissions, to assess the potential impacts. Mitigation measures will be identified, as appropriate, and could include implementing the Bay Area Air Quality Management District's (BAAQMD) recommended Basic Construction Mitigation Measures, which includes Best Management Practices (BMPs), such as minimizing idling time and ensuring proper maintenance of construction equipment. Operation of the project would require limited maintenance. Air quality impacts from maintenance vehicles are expected to be minimal.

e. Potentially Significant Impact. The proposed project would generate odors from diesel exhaust emission during project construction. Impacts would be temporary but could be potentially significant. The EIR will address odor impacts during construction. Mitigation measures will be identified, as appropriate, and could include reducing idling time of construction equipment that produces diesel exhaust emissions and requiring that all equipment comply with the California Air Resources Board's (CARB's) Airborne Diesel Air Toxic Measures (ATCMs). Operation of the project would have no significant odor impacts.

IV. Biological Resources **Would the project:**	**Potentially Significant Impact**	**Less Than Significant With Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a) Have a substantial adverse impact, either directly or through habitat modifications on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations or by the California Dept. of Fish & Game or U.S. Fish & Wildlife Service?	☐	☐	☐	☒
b) Have a substantial adverse impact on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Dept. of Fish & Game or U.S. Fish & Wildlife Service?	☐	☐	☐	☒
c) Have a substantial adverse impact on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☐	☐	☒
d) Interfere substantially with the movement of any resident or migratory fish or wildlife species or with established resident or migratory wildlife corridors, or impede the use of wildlife nursery sites?	☒	☐	☐	☐
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☒	☐	☐	☐
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Conservation Community Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☐	☒

DISCUSSION

The Biological Resource discussion is based upon a report titled *Leland Reservoir Replacement Project Biological Resources Assessment* (Biological Resources Assessment) prepared by EBMUD's Fisheries and Wildlife staff (updated May 2016).

a. No Impact. The project site does not contain any habitat suitable to support sensitive and special status plant, as identified in the Biological Resources Assessment (EBMUD, 2010). The project site is landscaped and regularly maintained. The habitats present within the project site are characteristic of disturbed and urban habitats and are dominated by planted landscape and other non-native species. No impacts to sensitive and special status plant species are anticipated.

b. No Impact. No riparian habitats or other sensitive natural community occur on or directly adjacent to the proposed project site. Therefore, the project would not result in any impacts to any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Wildlife (CDFW) or US Fish and Wildlife Service (USFWS).

c. No Impact. No federally-protected wetlands occur within the project site. Therefore, the project would not result in any impacts on federally-protected wetlands as defined by Section 404 of the Federal Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption or other means.

d. Potentially Significant Impact. The project site does not function as an important regional wildlife corridor because the site and adjacent areas have been developed, paved, or landscaped. The site is surrounded by residential development east and west sides, State Highway 24 on the north side, and a church and elementary school south of the project site. There would be no impact to wildlife movement corridors. However, nesting birds and roosting bats could use trees on the reservoir site.

Nesting and migratory birds that are protected under the Migratory Bird Treaty Act or the California Fish and Game Code Sections 3503 and 3503.5 have potential to nest within the project area. These species may use trees, shrubs, man-made structures or the ground for nesting habitat. Disruption of nesting special status avian species could occur as a result of increased human activity (e.g., due to the use of heavy equipment and human traffic) during the breeding season (approximately February through August). Construction activities could disturb nesting avian species and lead to nest abandonment or poor reproductive success.

Roosting habitats for special status bat species may be present in the project site. These species typically use buildings, trees, bridges, and rock crevices for roost habitat. Construction activities may result in the removal or disturbance of hibernation or maternal roost sites due to tree removal, ground disturbance, noise or human intrusion. This is a potentially significant impact as it may result in direct mortality and reduction in reproductive success.

The EIR will address impacts to special status bat species and migratory birds and include mitigation measures such as pre-construction surveys, establishment of work buffers for active nests, and on-site monitoring, if appropriate.

e. Potentially Significant Impact. The proposed project would require the trimming or removal of trees. The City of Lafayette has established ordinances for tree protection. EBMUD is not subject to permitting under these ordinances per California Code Section 53091; therefore, impacts associated with conflicting with local policies would be less than significant. However, where tree removal is required, EBMUD would replace established trees as necessary and would also implement standard practices consistent with tree protection ordinances for tree pruning and care. The EIR will evaluate the impact of tree removal and will recommend mitigation measures to address the loss of trees on the site.

f. No Impact. There are no adopted Habitat Conservation Plans (HCP), Natural Community Conservation Plans (NCCP), or other local, regional, or state habitat conservation plans within the proposed project area. There would be no impacts associated with conflicts with HCPs or NCCPs.

V. Cultural Resources **Would the project:**	**Potentially Significant Impact**	**Less Than Significant With Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a) Cause a substantial adverse change in the significance of a historical resource as defined in section 15064.5?	☒	☐	☐	☐
b) Cause a substantial adverse change in the significance of a unique archaeological resource as defined in section 15064.5?	☒	☐	☐	☐
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☒	☐	☐	☐
d) Disturb any human remains, including those interred outside of formal cemeteries?	☒	☐	☐	☐

DISCUSSION

a-c. Potentially Significant. Although the project site and pipeline routes are in substantially disturbed areas given the built environment, construction has the potential to disturb or damage buried and previously undiscovered archaeological, paleontological or historic resources in the project area. The EIR will provide a detailed evaluation of potential cultural resource impacts. An archeological and a historical study will be prepared to identify areas of moderate or high potential for buried cultural, historic, or paleontological resources. Mitigation measures would be implemented to avoid or minimize effects to any archaeological, paleontological or historic resources.

d. Potentially Significant Impact. The proposed project would involve trenching and excavation on the roadways and on the existing reservoir site. There is potential during trenching and excavation to uncover human remains. Impacts to human remains would be considered a potentially significant impact. The potential for impacts to human remains will be identified in the EIR. Mitigation measures will be implemented which would require EBMUD to implement state regulations, including Public Resources Code (PRC) Section 5097.98 and Health and Safety Code Section 7050.5.

VI. Energy Use **Environmental impacts may include:**	**Potentially Significant Impact**	**Less-than-Significant Impact with Mitigation Measures Incorporated**	**Less-than-Significant Impact**	**No Impact**
a) The project's energy requirements by amount and fuel type for each stage of the project including construction, operation, and maintenance	☐	☐	☒	☐
b) The effects of the project on local and regional energy supplies and on requirements for additional capacity	☐	☐	☐	☒
c) The effects of the project on peak and base period demands for electricity and other forms of energy	☐	☐	☐	☒
d) The degree to which the project complies with existing energy standards	☐	☐	☐	☒
e) The effects of the project on energy resources	☐	☐	☐	☒
f) The project's projected transportation energy use requirements and its overall use of efficient transportation alternatives	☐	☐	☐	☒

a-f. Less than Significant Impact. Construction for the proposed project would require the use of fuels, including gas, diesel, and motor oil for construction activities. In addition, indirect energy use would be required for the production of construction materials, including extraction of raw materials and manufacturing. Operation of the proposed project could also potentially require the use of energy for periodic flushing, anode replacement, leak detection, repair, and maintenance, but this is not expected to be materially different from the energy requirements for maintenance of the existing facility. Construction impacts would be temporary and are expected to be less than significant with implementation of standard practices, such as reducing idling time for construction equipment and vehicles.

VII. Geology and Soils **Would the project:**	**Potentially Significant Impact**	**Less Than Significant With Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:	☒	☐	☐	☐
i) 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? Refer to Division of Mines and Geology Special Publication 42.	☐	☐	☐	☒
ii) Strong seismic ground shaking?	☒	☐	☐	☐
iii) Seismic-related ground failure, including liquefaction?	☒	☐	☐	☐
iv) Landslides?	☒	☐	☐	☐
b) Result in substantial soil erosion or the loss of topsoil?	☒	☐	☐	☐
c) Be located on strata or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	☒	☐	☐	☐
d) Be located on expansive soil as defined in Table 18-1-B of the Uniform Building Code 1994, creating substantial risks to life or property?	☒	☐	☐	☐
e) Have soils incapable of supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?	☐	☐	☐	☒

DISCUSSION

Geology, geotechnical and seismicity assessments were conducted to evaluate potential environmental impacts for the proposed project based on review of available geological maps, reports and other related literature. From geotechnical and geological viewpoints, the project site is suitable for construction of the proposed project.

a. (i) No Impact. The project area is not within mapped fault zones (EBMUD, 2011).

a. (ii-iv) and b-d. Potentially Significant Impact. The proposed project may be susceptible to unstable soil or geologic conditions including liquefaction, ground shaking and erosion. The proposed pipeline route is in areas considered to have very low to moderate liquefaction potential, and the reservoir site is entirely within an area of very low liquefaction potential (City of Lafayette, 1976). The project site is not in an area of known landslides or ground susceptible to sliding (City of Lafayette, 1976), but there are some slopes on the project site that could be susceptible to sliding. Although the proposed project would be designed and constructed to meet the latest building code requirements to resist strong ground motions, the EIR will provide a detailed evaluation of potential geology and soil impacts and mitigation measures to mitigate significant impacts.

e. No Impact. Wastewater generation or disposal is not a part of the proposed project, therefor land would not be used for treatment or disposal of wastewater. During construction, temporary self-contained toilets and hand washing facilities would be located on site. Any wastewater generated by these facilities would be hauled off site for treatment and disposal.

VIII. Greenhouse Gas Emissions **Would the project:**	**Potentially Significant Impact**	**Less Than Significant With Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☒	☐	☐	☐
b) Conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	☒	☐	☐	☐

DISCUSSION

a-b. Potentially Significant Impact. Project construction would result in temporary emissions of greenhouse gases. The EIR will provide a detailed analysis of greenhouse gas emissions from construction. The air quality modeling prepared for the EIR will include an analysis of the potential increases in greenhouse gas emissions. Mitigation measures will be identified, as appropriate, and could include BMPs recommended by the BAAQMD and reduction of idling for vehicles and machinery. The EIR will identify the significance of greenhouse gas impacts and the mitigation measures that will be implemented to mitigate impacts.

IX. Hazards and Hazardous Materials **Would the project:**	**Potentially Significant Impact**	**Less Than Significant With Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☒	☐	☐	☐
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the likely release of hazardous materials into the environment?	☒	☐	☐	☐
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☒	☐	☐	☐
d) Be located on a site which is included on a list of hazardous materials sites complied pursuant to Government Code Section 65962.5 and as a result, would it create a significant hazard to the public or the environment?	☒	☐	☐	☐
e) For a project located within 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, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☒	☐	☐	☐
h) Expose people or structures to the risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	☐	☐	☐	☒

DISCUSSION

Leland Reservoir consists almost entirely of concrete slabs and beams, reinforced with steel rebar. The reservoir lining is a 4-inch concrete slab overlying a 3/16-inch impervious membrane, 4-inch asphalt plant mix base, and a 2.5-inch gravel blanket. The roof consists entirely of precast concrete roof panels supported by a precast concrete framing system of beams, girders, and columns.

The Hazards and Hazardous Materials discussion is based on past investigations conducted for EBMUD facilities. In 1994, lead was detected at high concentrations in a Leland Reservoir roof caulking material sample and in a soil sample (PES Environmental, 1994). Because of elevated lead concentration, additional sampling in 1996 was performed. The 1996 testing concluded there was no significant potential health or ecological risks and no remedial action or further investigation was required (PES Environmental, 1996). Samples collected at Leland Reservoir as part of a reservoir materials assessment of all EBMUD reservoirs (CH2MHill, 1995) did not exceed concentrations of contaminants that would require special Occupational Safety and Health Administration (OSHA) health and safety requirements or hazardous material disposal.

a-d. Potentially Significant Impact. Construction of the proposed project would require the use of typical construction-related hazardous materials (e.g., fuel, lubricants and solvents) that must be properly handled and disposed of to minimize effects on the environment. Although there are no mapped areas showing historical contamination in the California Department of Toxic Substance Control's EnviroStor Data Management System (accessed June 2016), soils in the project area may contain hazardous materials depending on historical land uses. Because the proposed project would include excavation and trenching, there is the potential for the release of contaminated soil and/or groundwater, if encountered. Although samples collected at Leland Reservoir as part of a reservoir materials assessment of all EBMUD reservoirs (CH2MHill, 1995) did not exceed concentrations of contaminants that would require special OSHA health and safety requirements or hazardous material disposal, sediment samples would need to be collected at Leland Reservoir and tested prior to disposal. EBMUD would comply with federal, state, and local laws regarding testing, management, and disposal of hazardous materials. Rupture of a subsurface gas pipeline, if present, during construction trenching could also generate a significant hazard. The EIR will provide a detailed evaluation of the potential hazards based on previous data available for hazardous material sites and contamination in soils. Mitigation measures will be identified such as implementation of a Safety Environmental Awareness Program; preparation and implementation of a Spill Prevention, Control, and Countermeasure Plan; implementation of Best Management Practices; and potholing to identify subsurface utilities.

e-f. No Impact. The closest airport is Buchanan Field Airport, located in Concord, approximately 8 miles from the project site. The proposed project would not use any aeronautical equipment and would therefore not interfere with the airspace for any airport. None of the activities for the proposed project would create any significant hazards for people residing or working in or near an airport. There would be no impact associated with creating hazards near a public or private airport.

g. Potentially Significant Impact. Construction of the pipelines would require temporary lane and roadway closures during laydown of the pipelines and trenching. Although there are alternative vehicle routes in the project vicinity, impacts to emergency access could be potentially significant. The EIR will provide a detailed evaluation of potential impacts and will identify measures to mitigate significant impacts such as coordination with local emergency providers, and identification of alternative routes where appropriate.

h. No Impact. The proposed project is located completely in an urban/suburban area and would not include work in wildlands. The proposed project would not expose people or structures to a potential wildfire. There would be no impact to the public from wildfires.

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

DISCUSSION

a. Less than Significant Impact. EBMUD water distribution system/facilities are designed, constructed, operated and maintained to conform to state and federal requirements for water treatment and discharge, thus no impacts to water treatment and discharge are anticipated.

b. Less than Significant Impact. The project would not deplete groundwater supplies or recharge, because there would be no groundwater extraction associated with the project. The project would not reduce groundwater recharge because the existing impermeable surface would be restored thus maintaining the status quo commensurate with infiltration (from precipitation), groundwater and recharge. No drinking water wells are located in the vicinity of the project site and thus no impacts to groundwater are anticipated.

c-e. Less than Significant Impact. Existing constructed and natural drainage features at the project site would be re-used and improved. Drainage patterns may be temporarily disrupted during construction. EBMUD Standard Construction Specifications require that the contractor develop and implement an erosion and sedimentation control plan for work performed in unpaved areas.

The existing roadway drainage pattern and system would not be altered by the pipeline construction by this project, and thus the project would not increase storm-water run-off.

f-h. No Impact. The project site is not located within a 100-year flood plain (FEMA, 1996).

i. Less than Significant. Prior to construction activity on the Leland Reservoir site, the existing reservoir would be drained. The existing dam embankment would be removed following the dewatering of the reservoir. Therefore, the proposed project would not cause flooding due to the failure of a dam or levee because there would be no water impounded behind the dam prior to its removal. EBMUD maintains a Dispatch Center and field crew 24 hours a day, 7 days a week to respond to emergencies. The pipelines would be designed with isolation valves that can be closed to interrupt the flow of water to a ruptured pipe. The pipelines would be designed to withstand substantial stress and pressures, and the possibility of a rupture is considered remote. Due to the remote possibility of rupture and the level of protection inherent in the design of the pipeline, this impact is considered to be less than significant and will be described further in the EIR.

j. No Impact. The proposed project is not located in an area susceptible to seiches, tsunamis, or mudflows; therefore, there would be no impact.

XI. Land Use and Planning **Would the project:**	**Potentially Significant Impact**	**Less Than Significant With Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a) Physically divide an established community?	☐	☐	☐	☒
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☒	☐
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?	☐	☐	☐	☒

DISCUSSION

a. No Impact. The proposed project would place pipelines underneath existing roadway and would replace an existing reservoir at a site already developed with a reservoir. There would be no impact to communities associated with the division of an established community.

b. Less than Significant Impact. Pursuant to California Government Code Section 53091(e), county and city zoning ordinances do not apply to the location or construction of facilities for the transmission of water. The EIR will, however, consider resource policies in the zoning ordinances and general plans for the City of Lafayette in corresponding EIR sections (e.g., Noise, Biological Resources). The reservoir site is designated as “Community Facilities/Civic Uses” in the City of Lafayette General Plan (City of Lafayette, 2002), and the use of the site would not change. The site is zoned R-10 (Single Family Residential District – 10) (City of Lafayette, 2013); publicly owned structures are allowed within this zoning district.

c. No Impact. There are no adopted HCPs, NCCPs, or other local, regional, or state habitat conservation plans within the proposed project area. There would be no impacts associated with conflicts with HCPs or NCCPs.

XII. Mineral Resources **Would the project:**	**Potentially Significant Impact**	**Less Than Significant With Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a) 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?	☐	☐	☐	☒
b) 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?	☐	☐	☐	☒

DISCUSSION

a-b. No Impact. The proposed project is located in an urban/ suburban environment. There are no mineral resources within the proposed project area. There would be no impact to mineral resources.

XIII. Noise **Would the project result in :**	**Potentially Significant Impact**	**Less Than Significant With Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☒	☐	☐	☐
b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	☒	☐	☐	☐
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☐	☒
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	☒	☐	☐	☐
e) For a project located within 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, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒
f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒

DISCUSSION

a, b and d. Potentially Significant Impact. Construction of the proposed project would require the use of machinery and equipment that would generate short-term noise and vibration. The EIR will include a detailed analysis of impacts. A technical noise study will be performed to identify existing noise levels and sensitive receptors and provide an assessment of future noise levels with construction, including the duration of impacts. Mitigation measures will be identified, if appropriate, and could include using noise blankets on machinery to reduce noise, minimizing idling time, notifying residents of upcoming construction work, and coordinating with nearby schools.

c. No Impact. The proposed project would include the installation of underground water pipelines and replacement of an existing open-cut reservoir with two concrete tanks, which would not generate a new source of ambient noise. There would be no impact associated with a permanent increase in ambient noise levels.

e-f. No Impact. The closest airport is Buchanan Field Airport, located in Concord, approximately 8 miles from the proposed project site. The proposed project would not expose people residing or working near the airport to excessive noise levels; therefore, there would be no impact associated with exposing people near a public or private airport to excessive noise levels.

XIV. Population and Housing **Would the project:**	**Potentially Significant Impact**	**Less Than Significant With Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☐	☒
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒

DISCUSSION

a-c. No Impact. The proposed project would not create infrastructure that would induce unanticipated population growth. The proposed project entails replacement of an existing 18-MG reservoir with two 8-MG tanks, and would thus not increase capacity to store water. The project would be constructed to meet water supply requirements for existing and projected future customer demands and to ensure long-term water supply to the Cities of Lafayette, Walnut Creek, and Pleasant Hill. There would, therefore, be no impacts to population and housing associated with inducing population growth from operation of the proposed project. In addition, none of the activities of the proposed project would displace housing or people. There would be no population and housing impacts associated with the proposed project.

XV. Public Services **Would the project:**	**Potentially Significant Impact**	**Less Than Significant With Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:	☐	☐	☐	☒
i) Fire protection?	☐	☐	☐	☒
ii) Police protection?	☐	☐	☐	☒
iii) Schools?	☐	☐	☐	☒
iv) Parks?	☐	☐	☐	☒
v) Other public facilities?	☐	☐	☐	☒

DISCUSSION

a. No Impact. The proposed project replaces an existing reservoir and water transmission pipeline. The project would not generate a need for any new public facilities (schools, fire or police protection, parks, or other public facilities) because it does not induce population and employment growth. Workers at the project site are likely to commute from the existing Bay Area labor supply. Any deterioration of existing public facilities resulting from construction (e.g., streets) would be restored by EBMUD to pre-construction condition upon completion of construction.

XVI. Recreation **Would the project:**	**Potentially Significant Impact**	**Less Than Significant With Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☐	☒
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	☐	☐	☐	☒

DISCUSSION

a. No Impact. The project would not generate or attract additional population, as would be associated with residential, commercial or industrial uses; therefore, it would not affect demand for recreational facilities. While the project would not increase use of recreational facilities, there could be short-term effects on the Sun Valley Swimming Pool, an existing recreational facility located on Leland Drive across the street from the reservoir site. Potential for construction to affect traffic and parking on Leland Drive, which provides access to the swimming pool, will be addressed in the EIR in the Traffic and Transportation section.

b. No Impact. The proposed project consists exclusively of water distribution system facilities and does not require the construction or expansion of recreational facilities.

XVII. Transportation / Traffic **Would the project:**	**Potentially Significant Impact**	**Less Than Significant With Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a) Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths and mass transit?	☒	☐	☐	☐
b) Conflict with an applicable congestion management program, including but not limited to level of service demands and travel demand measures, or other standards established by the county congestion management agency for designated roads an or highways?	☒	☐	☐	☐
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	☐	☐	☐	☒
d) Substantially increase hazards to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☒	☐	☐	☐
e) Result in inadequate emergency access?	☒	☐	☐	☐
f) Conflict with adopted policies, plans or programs regarding public transit, bicycle or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?	☒	☐	☐	☐

DISCUSSION

a-b. **Potentially Significant Impact**. The construction of the proposed project would result in temporary lane and road closures. In addition, the proposed project would generate vehicle trips during project construction, temporarily contributing to increased traffic on local roadways. Truck trips would be associated with hauling materials, construction debris and equipment to and/or from the site. Construction employees would also contribute to vehicle trips. The EIR will include a detailed analysis of traffic impacts. A traffic study will be prepared that will identify traffic impacts from construction, including road and lane closures and traffic impacts. Detour routes will be identified. Mitigation measures will be identified to minimize traffic impacts, as feasible.

c. No Impact. The proposed project would not include any aeronautical equipment and would not include any activities that would interfere with the airspace above the site. There would be no impact to the public associated with a safety risk from changes to air traffic patterns.

d. Potentially Significant Impact. The proposed project would require the use of heavy machinery, equipment, and materials in public roadways, which could pose a hazard to the public using these roadways. The EIR will provide a detailed analysis of hazards to traffic and the public and will identify mitigation measures to reduce those impacts, as appropriate.

e. Potentially Significant Impact. Construction of pipelines would require temporary lane and roadway closures during laydown of the pipelines and trenching. These land and roadway closures may impede emergency access, which would be considered a potentially significant impact. Impacts to emergency access would be potentially significant. The EIR will provide a detailed evaluation of potential impacts and will identify measures to mitigate significant impacts such as coordination with local emergency providers, and identification of alternative routes.

f. Potentially Significant Impact. Temporary lane and road closures could potentially affect bike lanes and pedestrian access, and haul truck traffic could increase traffic on streets served by public transit services. The EIR will include an evaluation of potential impacts to bike lanes, pedestrian access, and public transit services and will include mitigation measures to reduce impacts, as appropriate.

XVIII. Utilities and Service Systems **Would the project:**	**Potentially Significant Impact**	**Less Than Significant With Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	☐	☐	☐	☒
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☒
c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☒	☐
d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	☐	☐	☐	☒
e) Result in a determination by the wastewater treatment provider which serves or may serve the project, that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	☐	☒
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	☐	☐	☒	☐
g) Comply with federal, state, and local statutes and regulations related to solid waste?	☐	☐	☒	☐

DISCUSSION

a-b and d-e. No Impact. The proposed project would not include or require new expanded water or wastewater treatment facilities. In addition, the proposed project would not require additional water supplies; rather, the proposed project would ensure continuation of existing water supplies by replacing existing aging infrastructure, improving reliability and providing redundancy, as needed. There would be no impact to water or wastewater treatment facilities.

c. Less Than Significant. The project would include the design of on-site drainage facilities that would connect to the City of Lafayette's existing storm drainage system. Because impervious surface area would not increase, the volume of storm water would not increase, and thus the existing system would not need to be expanded.

f-g. Less than Significant Impact. The proposed project would generate construction debris from demolition of the existing reservoir, trenching and excavation of in-place soils. Construction debris would only be generated during constriction and not during operation and the impact would therefore be temporary. Some of this soil may be contaminated requiring special disposal. Impacts are anticipated to be less than significant if all applicable regulations are followed. The EIR will identify the approximate amount of debris that would be generated by the proposed project, will identify how the waste would be characterized and will identify the landfills that would serve the proposed project.

XIX. Mandatory Findings of Significance **Would the project:**	**Potentially Significant Impact**	**Less Than Significant With Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☒	☐	☐	☐
b) Does the project have impacts that are individually limited, but cumulatively considerable? (“Cumulatively considerable” means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?	☒	☐	☐	☐
c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	☒	☐	☐	☐

DISCUSSION

a. **Potentially Significant Impact.** The proposed project is located in an urban/suburban environment; therefore, it is unlikely that the proposed project would substantially degrade the quality of the environment or substantially reduce habitat for special-status species. The proposed project would include trenching and ground disturbance. Construction of the proposed project, therefore, has the potential to disturb or damage previously undiscovered buried archaeological, paleontological and historic resources if they are encountered during construction. The EIR will provide a detailed evaluation of potential cultural and paleontological resource impacts and mitigation measures to mitigate significant impacts.

b. **Potentially Significant Impact.** At this time, no other projects in the vicinity are anticipated to be underway during construction of the proposed project. However, the City of Lafayette will be contacted during preparation of the EIR to help identify other planned projects in the vicinity of the project. If any projects are identified, potential for cumulative traffic, noise, and air quality impacts could be significant. The EIR will include a description of projects that may overlap with the proposed project and will include an assessment of cumulative impacts. Mitigation measures will be identified, as appropriate.

c. **Potentially Significant Impact.** Construction of the proposed project would result in environmental impacts that have the potential to contribute to adverse effects on human beings such as from noise generation, generation of air quality impacts, and other safety hazards. The EIR will provide a detailed evaluation of potential impacts and mitigation measures to mitigate significant impacts.

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Print Form

Appendix C

Notice of Completion & Environmental Document Transmittal

Mail to: State Clearinghouse, P.O. Box 3044, Sacramento, CA 95812-3044 (916) 445-0613
For Hand Delivery/Street Address: 1400 Tenth Street, Sacramento, CA 95814

SCH #2016082082

Project Title: Leland Reservoir Replacement Project

Lead Agency: East Bay Municipal Utility District (EBMUD) Contact Person: Oscar Herrera
Mailing Address: 375 Eleventh Street, MS 701 Phone: 510-287-1005
City: Oakland Zip: 94607-4240 County: Alameda

Project Location: County: Contra Costa City/Nearest Community: Lafayette
Cross Streets: Leland Drive, Condit Road, Windsor Drive, Old Tunnel Road, Meek Place Zip Code: 94549
Longitude/Latitude (degrees, minutes and seconds): 37 ° 53 ′ 42 ″ N / 122 ° 05 ′ 18 ″ W Total Acres: 14.5
Assessor's Parcel No.: 185-052-001-4 Section: 33 Twp.: 1 North Range: 2 West Base: Mt. Diablo
Within 2 Miles: State Hwy #: 24 Waterways: Reliez Creek, Las Trampas Creek
Airports: None Railways: BART Schools: The Meher Schools

Document Type:

CEQA: ☐ NOP ☒ Draft EIR ☐ Early Cons ☐ Supplement/Subsequent EIR ☐ Neg Dec (Prior SCH No.) ____ ☐ Mit Neg Dec Other: ____

NEPA: ☐ NOI ☐ EA ☐ Draft EIS ☐ FONSI

Other: ☐ Joint Document ☐ Final Document ☐ Other: ____

Local Action Type:

☐ General Plan Update ☐ General Plan Amendment ☐ General Plan Element ☐ Community Plan
☐ Specific Plan ☐ Master Plan ☐ Planned Unit Development ☐ Site Plan
☐ Rezone ☐ Prezone ☐ Use Permit ☐ Land Division (Subdivision, etc.)
☐ Annexation ☐ Redevelopment ☐ Coastal Permit ☒ Other: Approval of new water facilities

Development Type:

☐ Residential: Units ____ Acres ____
☐ Office: Sq.ft. ____ Acres ____ Employees ____
☐ Commercial: Sq.ft. ____ Acres ____ Employees ____
☐ Industrial: Sq.ft. ____ Acres ____ Employees ____
☐ Educational: ____
☐ Recreational: ____
☒ Water Facilities: Type Storage MGD 16 MG
☐ Transportation: Type ____
☐ Mining: Mineral ____
☐ Power: Type ____ MW ____
☐ Waste Treatment: Type ____ MGD ____
☐ Hazardous Waste: Type ____
☒ Other: 36-inch water pipeline

Project Issues Discussed in Document:

☒ Aesthetic/Visual ☐ Agricultural Land ☒ Air Quality ☒ Archeological/Historical ☒ Biological Resources ☐ Coastal Zone ☐ Drainage/Absorption ☐ Economic/Jobs
☐ Fiscal ☐ Flood Plain/Flooding ☐ Forest Land/Fire Hazard ☒ Geologic/Seismic ☐ Minerals ☒ Noise ☐ Population/Housing Balance ☐ Public Services/Facilities
☒ Recreation/Parks ☐ Schools/Universities ☐ Septic Systems ☐ Sewer Capacity ☒ Soil Erosion/Compaction/Grading ☐ Solid Waste ☒ Toxic/Hazardous ☒ Traffic/Circulation
☒ Vegetation ☒ Water Quality ☒ Water Supply/Groundwater ☐ Wetland/Riparian ☐ Growth Inducement ☒ Land Use ☒ Cumulative Effects ☐ Other: ____

Present Land Use/Zoning/General Plan Designation:

Zoning: R-10, Single Family Residential District-10; Rep Land use designation: Civic Use

Project Description: *(please use a separate page if necessary)*
The project description is included in the DEIR. The project involves replacing the existing 18-million-gallon (MG) open-cut Leland Reservoir with two new 8 MG prestressed concrete tanks within the existing reservoir basin. The project also includes replacing approximately 1,700 linear feet of existing 36-inch transmission pipeline that currently runs beneath the existing reservoir with approximately 2,700 linear feet of 36-inch pipeline to be constructed in Windsor Drive, Condit Road and a short section of Leland Drive between Condit Road and Meek Place, and approximately 950 feet of 36-inch pipeline within the Leland Reservoir site. A new 30-inch storm drain pipeline would also be installed on site and connected to the City of Lafayette's existing storm drain system at the intersection of Leland Drive and Patty Way.

Note: The State Clearinghouse will assign identification numbers for all new projects. If a SCH number already exists for a project (e.g. Notice of Preparation or previous draft document) please fill in.

Reviewing Agencies Checklist

Lead Agencies may recommend State Clearinghouse distribution by marking agencies below with and "X".
If you have already sent your document to the agency please denote that with an "S".

X	Air Resources Board		Office of Historic Preservation
	Boating & Waterways, Department of		Office of Public School Construction
	California Emergency Management Agency		Parks & Recreation, Department of
	California Highway Patrol		Pesticide Regulation, Department of
X	Caltrans District #4		Public Utilities Commission
	Caltrans Division of Aeronautics	X	Regional WQCB #2
	Caltrans Planning		Resources Agency
	Central Valley Flood Protection Board		Resources Recycling and Recovery, Department of
	Coachella Valley Mtns. Conservancy		S.F. Bay Conservation & Development Comm.
	Coastal Commission		San Gabriel & Lower L.A. Rivers & Mtns. Conservancy
	Colorado River Board		San Joaquin River Conservancy
	Conservation, Department of		Santa Monica Mtns. Conservancy
	Corrections, Department of		State Lands Commission
	Delta Protection Commission		SWRCB: Clean Water Grants
	Education, Department of		SWRCB: Water Quality
	Energy Commission		SWRCB: Water Rights
X	Fish & Game Region #3		Tahoe Regional Planning Agency
	Food & Agriculture, Department of	X	Toxic Substances Control, Department of
	Forestry and Fire Protection, Department of		Water Resources, Department of
	General Services, Department of		
	Health Services, Department of	X	Other: Bay Area Air Quality Management District
	Housing & Community Development	X	Other: City of Lafayette
	Native American Heritage Commission		

Local Public Review Period (to be filled in by lead agency)

Starting Date January 25, 2018 Ending Date March 12, 2018

Lead Agency (Complete if applicable):

Consulting Firm: RMC Water and Environment
Address: 2175 North California Blvd., Suite 315
City/State/Zip: Walnut Creek, CA 94596
Contact: Robin Cort
Phone: 925-627-4100

Applicant: East Bay Municipal Utility District
Address: 375 Eleventh Street, MS 701
City/State/Zip: Oakland, CA 94607
Phone: 510-287-1005

Signature of Lead Agency Representative: [signature] **Date:** 1-25-18

Authority cited: Section 21083, Public Resources Code. Reference: Section 21161, Public Resources Code.

Appendix B: Public Comments Received on the NOP

Agencies, Organizations and Residents Submitting Comments during Scoping

California Department of Transportation (Caltrans) – District 4

California Department of Toxic Substances Control

Native American Heritage Commission

The Meher Schools

Roth Grossman and Erin Beaver, Old Tunnel Road/Windsor Drive Neighborhood Watch Association

Kathy McCann

DEPARTMENT OF TRANSPORTATION
DISTRICT 4
P.O. BOX 23660
OAKLAND, CA 94623-0660
PHONE (510) 286-5528
FAX (510) 286-5559
TTY 711
www.dot.ca.gov

Serious Drought.
Help save water!

September 26, 2016

04-CC-2016-00030
SCH# 2016082082

Mr. Oscar Herrara
East Bay Municipal Utility District
375 Eleventh Street
Oakland, CA 94623-4240

Dear Mr. Herrara:

LeLand Reservoir Replacement Project – Notice of Preparation

Thank you for including the California Department of Transportation (Caltrans) in the environmental review process for the project referenced above.

Traffic Impact Study
A Traffic Impact Study (TIS) or a lesser level of analysis may be required to assess the impact of the project construction activities on the adjacent road network, with specific attention to State Route 24. We recommend using Caltrans *Guide for the Preparation of Traffic Impact Studies* (TIS Guide) for determining which scenarios and methodologies to use in the analysis. The TIS Guide is a starting point for collaboration between the lead agency and Caltrans in determining when a TIS is needed. The guide is available at: http://www.dot.ca.gov/hq/tpp/offices/ocp/igr_ceqa_files/tisguide.pdf.

Please feel free to call or email Becky Frank at (510) 286-5536 or becky.frank@dot.ca.gov with any questions regarding this letter.

Sincerely,

Becky Frank for

PATRICIA MAURICE
District Branch Chief
Local Development - Intergovernmental Review

c: Scott Morgan, State Clearinghouse

McGregor, Jennifer

From: Murphy, Daniel@DTSC <Daniel.Murphy@dtsc.ca.gov>
Sent: Tuesday, September 13, 2016 10:05 AM
To: McGregor, Jennifer; Herrera, Oscar
Subject: RE: Leland Reservoir Replacement Initial Study

Mr. Herrera and Ms. McGregor:

Thanks for sending along the IS. After a quick read, the only thing that DTSC would offer by way of comment is that the caulking material and soil would need to be managed appropriately. IF it tests out as either California or RCRA hazardous waste, it should be disposed as such. Note that lead at concentrations that do not require removal from some particular application may still require extraordinary disposal practices.

I would prefer that this email suffice for consideration as a comment by DTSC in EIR preparation, but if you need a letter with DTSC letterhead, let me know.

From: McGregor, Jennifer [mailto:jennifer.mcgregor@ebmud.com]
Sent: Monday, September 12, 2016 3:00 PM
To: Murphy, Daniel@DTSC
Cc: Herrera, Oscar
Subject: Leland Reservoir Replacement Initial Study

Mr. Murphy:

Please see the attached Initial Study for the Leland Reservoir Replacement Project. My apologies for the delay in getting it to you. We'll also have it posted to our website in the next few days. Please contact Oscar Herrera, Project Manager, at (510) 287-1005 should you have any questions or need additional information. Thank you.

Regards,

Jeni McGregor, PE
Senior Civil Engineer | Water Service Planning | East Bay MUD
375 11th Street, Oakland, California 94607 – MS 701
Tel. 510-287-1030 | jennifer.mcgregor@ebmud.com

STATE OF CALIFORNIA

Edmund G. Brown Jr., Governor

NATIVE AMERICAN HERITAGE COMMISSION
1550 Harbor Blvd., Suite 100
West Sacramento, CA 95691
Phone (916) 373-3710
Fax (916) 373-5471
Email: nahc@nahc.ca.gov
Website: http://www.nahc.ca.gov
Twitter: @CA_NAHC

RECEIVED
SEP 16 2016
WATER SERVICE PLANNING

September 12, 2016

Oscar Herrara
East Bay Municipal Utility District
375 Eleventh Street
Oakland, CA 94623

RE: SCH#2016082082, Leland Reservoir Replacement Project, Contra Costa County

Dear Mr. Herrara:

The Native American Heritage Commission has received the Notice of Preparation (NOP) for the project referenced above. The California Environmental Quality Act (CEQA) (Pub. Resources Code § 21000 et seq.), specifically Public Resources Code section 21084.1, states that a project that may cause a substantial adverse change in the significance of an historical resource is a project that may have a significant effect on the environment. (Pub. Resources Code § 21084.1; Cal. Code Regs., tit.14, § 15064.5 (b) (CEQA Guidelines Section 15064.5 (b)). If there is substantial evidence, in light of the whole record before a lead agency, that a project may have a significant effect on the environment, an environmental impact report (EIR) shall be prepared. (Pub. Resources Code § 21080 (d); Cal. Code Regs., tit. 14, § 15064 subd.(a)(1) (CEQA Guidelines § 15064 (a)(1)). In order to determine whether a project will cause a substantial adverse change in the significance of a historical resource, a lead agency will need to determine whether there are historical resources with the area of project effect (APE).

CEQA was amended significantly in 2014. Assembly Bill 52 (Gatto, Chapter 532, Statutes of 2014) (AB 52) amended CEQA to create a separate category of cultural resources, "tribal cultural resources" (Pub. Resources Code § 21074) and provides that a project with an effect that may cause a substantial adverse change in the significance of a tribal cultural resource is a project that may have a significant effect on the environment. (Pub. Resources Code § 21084.2). Public agencies shall, when feasible, avoid damaging effects to any tribal cultural resource. (Pub. Resources Code § 21084.3 (a)). **AB 52 applies to any project for which a notice of preparation or a notice of negative declaration or mitigated negative declaration is filed on or after July 1, 2015.** If your project involves the adoption of or amendment to a general plan or a specific plan, or the designation or proposed designation of open space, on or after March 1, 2005, it may also be subject to Senate Bill 18 (Burton, Chapter 905, Statutes of 2004) (SB 18). **Both SB 18 and AB 52 have tribal consultation requirements**. If your project is also subject to the federal National Environmental Policy Act (42 U.S.C. § 4321 et seq.) (NEPA), the tribal consultation requirements of Section 106 of the National Historic Preservation Act of 1966 (154 U.S.C. 300101, 36 C.F.R. § 800 et seq.) may also apply.

The NAHC recommends consultation with California Native American tribes that are traditionally and culturally affiliated with the geographic area of your proposed project as early as possible in order to avoid inadvertent discoveries of Native American human remains and best protect tribal cultural resources. Below is a brief summary of portions of AB 52 and SB 18 as well as the NAHC's recommendations for conducting cultural resources assessments. **Consult your legal counsel about compliance with AB 52 and SB 18 as well as compliance with any other applicable laws.**

AB 52

AB 52 has added to CEQA the additional requirements listed below, along with many other requirements:

1. Fourteen Day Period to Provide Notice of Completion of an Application/Decision to Undertake a Project: Within fourteen (14) days of determining that an application for a project is complete or of a decision by a public

agency to undertake a project, a lead agency shall provide formal notification to a designated contact of, or tribal representative of, traditionally and culturally affiliated California Native American tribes that have requested notice, to be accomplished by at least one written notice that includes:

   a. A brief description of the project.
   b. The lead agency contact information.
   c. Notification that the California Native American tribe has 30 days to request consultation. (Pub. Resources Code § 21080.3.1 (d)).
   d. A "California Native American tribe" is defined as a Native American tribe located in California that is on the contact list maintained by the NAHC for the purposes of Chapter 905 of Statutes of 2004 (SB 18). (Pub. Resources Code § 21073).

2. Begin Consultation Within 30 Days of Receiving a Tribe's Request for Consultation and Before Releasing a Negative Declaration, Mitigated Negative Declaration, or Environmental Impact Report: A lead agency shall begin the consultation process within 30 days of receiving a request for consultation from a California Native American tribe that is traditionally and culturally affiliated with the geographic area of the proposed project. (Pub. Resources Code § 21080.3.1, subds. (d) and (e)) and prior to the release of a negative declaration, mitigated negative declaration or environmental impact report. (Pub. Resources Code § 21080.3.1(b)).
   a. For purposes of AB 52, "consultation shall have the same meaning as provided in Gov. Code § 65352.4 (SB 18). (Pub. Resources Code § 21080.3.1 (b)).

3. Mandatory Topics of Consultation If Requested by a Tribe: The following topics of consultation, if a tribe requests to discuss them, are mandatory topics of consultation:
   a. Alternatives to the project.
   b. Recommended mitigation measures.
   c. Significant effects. (Pub. Resources Code § 21080.3.2 (a)).

4. Discretionary Topics of Consultation: The following topics are discretionary topics of consultation:
   a. Type of environmental review necessary.
   b. Significance of the tribal cultural resources.
   c. Significance of the project's impacts on tribal cultural resources.
   d. If necessary, project alternatives or appropriate measures for preservation or mitigation that the tribe may recommend to the lead agency. (Pub. Resources Code § 21080.3.2 (a)).

5. Confidentiality of Information Submitted by a Tribe During the Environmental Review Process: With some exceptions, any information, including but not limited to, the location, description, and use of tribal cultural resources submitted by a California Native American tribe during the environmental review process shall not be included in the environmental document or otherwise disclosed by the lead agency or any other public agency to the public, consistent with Government Code sections 6254 (r) and 6254.10. Any information submitted by a California Native American tribe during the consultation or environmental review process shall be published in a confidential appendix to the environmental document unless the tribe that provided the information consents, in writing, to the disclosure of some or all of the information to the public. (Pub. Resources Code § 21082.3 (c)(1)).

6. Discussion of Impacts to Tribal Cultural Resources in the Environmental Document: If a project may have a significant impact on a tribal cultural resource, the lead agency's environmental document shall discuss both of the following:
   a. Whether the proposed project has a significant impact on an identified tribal cultural resource.
   b. Whether feasible alternatives or mitigation measures, including those measures that may be agreed to pursuant to Public Resources Code section 21082.3, subdivision (a), avoid or substantially lessen the impact on the identified tribal cultural resource. (Pub. Resources Code § 21082.3 (b)).

7. Conclusion of Consultation: Consultation with a tribe shall be considered concluded when either of the following occurs:
   a. The parties agree to measures to mitigate or avoid a significant effect, if a significant effect exists, on a tribal cultural resource; or
   b. A party, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached. (Pub. Resources Code § 21080.3.2 (b)).

8. Recommending Mitigation Measures Agreed Upon in Consultation in the Environmental Document: Any mitigation measures agreed upon in the consultation conducted pursuant to Public Resources Code section 21080.3.2 shall be recommended for inclusion in the environmental document and in an adopted mitigation monitoring and reporting program, if determined to avoid or lessen the impact pursuant to Public Resources Code section 21082.3, subdivision (b), paragraph 2, and shall be fully enforceable. (Pub. Resources Code § 21082.3 (a)).

9. Required Consideration of Feasible Mitigation: If mitigation measures recommended by the staff of the lead agency as a result of the consultation process are not included in the environmental document or if there are no agreed upon mitigation measures at the conclusion of consultation, or if consultation does not occur, and if substantial evidence demonstrates that a project will cause a significant effect to a tribal cultural resource, the lead agency shall consider feasible mitigation pursuant to Public Resources Code section 21084.3 (b). (Pub. Resources Code § 21082.3 (e)).

10. Examples of Mitigation Measures That, If Feasible, May Be Considered to Avoid or Minimize Significant Adverse Impacts to Tribal Cultural Resources:
    a. Avoidance and preservation of the resources in place, including, but not limited to:
        i. Planning and construction to avoid the resources and protect the cultural and natural context.
        ii. Planning greenspace, parks, or other open space, to incorporate the resources with culturally appropriate protection and management criteria.
    b. Treating the resource with culturally appropriate dignity, taking into account the tribal cultural values and meaning of the resource, including, but not limited to, the following:
        i. Protecting the cultural character and integrity of the resource.
        ii. Protecting the traditional use of the resource.
        iii. Protecting the confidentiality of the resource.
    c. Permanent conservation easements or other interests in real property, with culturally appropriate management criteria for the purposes of preserving or utilizing the resources or places.
    d. Protecting the resource. (Pub. Resource Code § 21084.3 (b)).
    e. Please note that a federally recognized California Native American tribe or a nonfederally recognized California Native American tribe that is on the contact list maintained by the NAHC to protect a California prehistoric, archaeological, cultural, spiritual, or ceremonial place may acquire and hold conservation easements if the conservation easement is voluntarily conveyed. (Civ. Code § 815.3 (c)).
    f. Please note that it is the policy of the state that Native American remains and associated grave artifacts shall be repatriated. (Pub. Resources Code § 5097.991).

11. Prerequisites for Certifying an Environmental Impact Report or Adopting a Mitigated Negative Declaration or Negative Declaration with a Significant Impact on an Identified Tribal Cultural Resource: An environmental impact report may not be certified, nor may a mitigated negative declaration or a negative declaration be adopted unless one of the following occurs:
    a. The consultation process between the tribes and the lead agency has occurred as provided in Public Resources Code sections 21080.3.1 and 21080.3.2 and concluded pursuant to Public Resources Code section 21080.3.2.
    b. The tribe that requested consultation failed to provide comments to the lead agency or otherwise failed to engage in the consultation process.
    c. The lead agency provided notice of the project to the tribe in compliance with Public Resources Code section 21080.3.1 (d) and the tribe failed to request consultation within 30 days. (Pub. Resources Code § 21082.3 (d)).

The NAHC's PowerPoint presentation titled, "Tribal Consultation Under AB 52: Requirements and Best Practices" may be found online at: http://nahc.ca.gov/wp-content/uploads/2015/10/AB52TribalConsultation_CalEPAPDF.pdf

SB 18

SB 18 applies to local governments and requires local governments to contact, provide notice to, refer plans to, and consult with tribes prior to the adoption or amendment of a general plan or a specific plan, or the designation of open space. (Gov. Code § 65352.3). Local governments should consult the Governor's Office of Planning and Research's "Tribal Consultation Guidelines," which can be found online at: https://www.opr.ca.gov/docs/09_14_05_Updated_Guidelines_922.pdf

Some of SB 18's provisions include:

1. Tribal Consultation: If a local government considers a proposal to adopt or amend a general plan or a specific plan, or to designate open space it is required to contact the appropriate tribes identified by the NAHC by requesting a "Tribal Consultation List." If a tribe, once contacted, requests consultation the local government must consult with the tribe on the plan proposal. **A tribe has 90 days from the date of receipt of notification to request consultation unless a shorter timeframe has been agreed to by the tribe.** (Gov. Code § 65352.3 (a)(2)).
2. No Statutory Time Limit on SB 18 Tribal Consultation. There is no statutory time limit on SB 18 tribal consultation.
3. Confidentiality: Consistent with the guidelines developed and adopted by the Office of Planning and Research pursuant to Gov. Code section 65040.2, the city or county shall protect the confidentiality of the information concerning the specific identity, location, character, and use of places, features and objects described in Public Resources Code sections 5097.9 and 5097.993 that are within the city's or county's jurisdiction. (Gov. Code § 65352.3 (b)).
4. Conclusion of SB 18 Tribal Consultation: Consultation should be concluded at the point in which:
    a. The parties to the consultation come to a mutual agreement concerning the appropriate measures for preservation or mitigation; or
    b. Either the local government or the tribe, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached concerning the appropriate measures of preservation or mitigation. (Tribal Consultation Guidelines, Governor's Office of Planning and Research (2005) at p. 18).

Agencies should be aware that neither AB 52 nor SB 18 precludes agencies from initiating tribal consultation with tribes that are traditionally and culturally affiliated with their jurisdictions before the timeframes provided in AB 52 and SB 18. For that reason, we urge you to continue to request Native American Tribal Contact Lists and "Sacred Lands File" searches from the NAHC. The request forms can be found online at: http://nahc.ca.gov/resources/forms/

NAHC Recommendations for Cultural Resources Assessments

To adequately assess the existence and significance of tribal cultural resources and plan for avoidance, preservation in place, or barring both, mitigation of project-related impacts to tribal cultural resources, the NAHC recommends the following actions:

1. Contact the appropriate regional California Historical Research Information System (CHRIS) Center (http://ohp.parks.ca.gov/?page_id=1068) for an archaeological records search. The records search will determine:
    a. If part or all of the APE has been previously surveyed for cultural resources.
    b. If any known cultural resources have been already been recorded on or adjacent to the APE.
    c. If the probability is low, moderate, or high that cultural resources are located in the APE.
    d. If a survey is required to determine whether previously unrecorded cultural resources are present.

2. If an archaeological inventory survey is required, the final stage is the preparation of a professional report detailing the findings and recommendations of the records search and field survey.
    a. The final report containing site forms, site significance, and mitigation measures should be submitted immediately to the planning department. All information regarding site locations, Native American human remains, and associated funerary objects should be in a separate confidential addendum and not be made available for public disclosure.
    b. The final written report should be submitted within 3 months after work has been completed to the appropriate regional CHRIS center.

3. Contact the NAHC for:
    a. A Sacred Lands File search. Remember that tribes do not always record their sacred sites in the Sacred Lands File, nor are they required to do so. A Sacred Lands File search is not a substitute for consultation with tribes that are traditionally and culturally affiliated with the geographic area of the project's APE.

b. A Native American Tribal Consultation List of appropriate tribes for consultation concerning the project site and to assist in planning for avoidance, preservation in place, or, failing both, mitigation measures.

4. Remember that the lack of surface evidence of archaeological resources (including tribal cultural resources) does not preclude their subsurface existence.
    a. Lead agencies should include in their mitigation and monitoring reporting program plan provisions for the identification and evaluation of inadvertently discovered archaeological resources per Cal. Code Regs., tit. 14, section 15064.5(f) (CEQA Guidelines section 15064.5(f)). In areas of identified archaeological sensitivity, a certified archaeologist and a culturally affiliated Native American with knowledge of cultural resources should monitor all ground-disturbing activities.
    b. Lead agencies should include in their mitigation and monitoring reporting program plans provisions for the disposition of recovered cultural items that are not burial associated in consultation with culturally affiliated Native Americans.
    c. Lead agencies should include in their mitigation and monitoring reporting program plans provisions for the treatment and disposition of inadvertently discovered Native American human remains. Health and Safety Code section 7050.5, Public Resources Code section 5097.98, and Cal. Code Regs., tit. 14, section 15064.5, subdivisions (d) and (e) (CEQA Guidelines section 15064.5, subds. (d) and (e)) address the processes to be followed in the event of an inadvertent discovery of any Native American human remains and associated grave goods in a location other than a dedicated cemetery.

If you have any questions, please contact me at my email address: sharaya.souza@nahc.ca.gov.

Sincerely,

Sharaya Souza
Staff Services Analyst
cc: State Clearinghouse

THE MEHER SCHOOLS
999 LELAND DRIVE
LAFAYETTE, CA 94549

September 26, 2016

Oscar Herrera, P.E.
East Bay Municipal Utility District
275 Eleventh Street, MS 701
Oakland, CA 94607-4240

Dear Mr. Herrera,

We are writing regarding the Leland Reservoir Replacement Project. We are the co-principals of The Meher Schools, located at 999 Leland Drive, just down the street from the Leland Reservoir. We have followed this project with interest and have attended the two public meetings held to date.

Replacing the ageing Leland Reservoir with two concrete tanks seems reasonable, and replacing the pipeline also seems reasonable for ensuring the long-term reliability of the water system. The proposed landscaping seems harmonious with the surrounding area. We do not have concerns about the operation of the completed project.

While we are supportive of the project, we do have concerns about the construction phase, as traffic and road closures will impact our school community. We ask EBMUD to consider our school hours and calendar in construction planning. The great majority of our families travel to school by car, and **closing Leland Drive or Condit Road during the school year would be very challenging**. Staging equipment on Leland or Condit could also be difficult, if it resulted in traffic diversion.

To serve working families, we have an extended daycare program and are in session from 7:00 a.m. to 6:30 p.m. year-round. Our school year runs from just after Labor Day through mid-June, and we also offer summer programs. During the school year, on weeks that are "winter break" and "spring break" for many schools, we offer a daycare program. In fact, our campus is closed for only about a week in late June and another week in late August, so teachers can prepare for the upcoming term.

Some staff and students arrive as early as 7:00 a.m., and departures begin at noon and continue through 6:30 p.m. The heaviest periods for pickup and drop-off traffic are 8:00 to 9:00 a.m. and 1:45 to 2:45p.m.

We have attached our school calendar for this year to assist with planning. In future years, we anticipate that the specific dates will change but the general timing will remain the same. From our perspective, **construction during the months of July and August would be least disruptive to our school community**. We understand that you have many factors to balance and appreciate your consideration. We are happy to speak with you further, and look forward to seeing how the EIR addresses traffic concerns during the construction phase.

Sincerely,

Ivy Summers, Ed.D.
Co-Principal

Vince d'Assis, M.A.
Co-Principal

THE MEHER SCHOOLS 2016–17 CALENDAR

5 Labor Day
8 Fall session begins

SEPTEMBER 2016

S	M	T	W	Th	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	

10 October holiday
No school or daycare

OCTOBER 2016

S	M	T	W	Th	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

23–25 Thanksgiving
No school or daycare

NOVEMBER 2016

S	M	T	W	Th	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

19–22 Winter daycare
23 **No school or daycare**
26–29 Winter daycare
30 **No school or daycare**

DECEMBER 2016

S	M	T	W	Th	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

2 **No school or daycare**
3 Classes resume
16 Martin Luther King, Jr. Day
No school or daycare

JANUARY 2017

S	M	T	W	Th	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

FEBRUARY 2017

S	M	T	W	Th	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28				

17, 20 Presidents Day weekend
No school or daycare

MARCH 2017

S	M	T	W	Th	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

APRIL 2017

S	M	T	W	Th	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

3–7 Spring daycare

MAY 2017

S	M	T	W	Th	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

29 Memorial Day
No school or daycare

JUNE 2017

S	M	T	W	Th	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	

16 End of elementary year
23 End of preschool year
19–23 Elementary daycare
26–30 **No school or daycare**

Summer dates to be announced

Start date
No school or daycare
No school; daycare available
End of elementary year
End of preschool year; end of elementary daycare

From:	Ruth Grossman
To:	Leland Reservoir Replacement EIR
Cc:	Erin Lynn Beaver; Horn, Kathryn; Srivatsa, Niroop
Subject:	Public comment regarding Leland Reservoir Replacement project
Date:	Friday, September 30, 2016 2:20:37 PM
Attachments:	PublicComments_20160930.pdf

Dear Mr. Herrera:

We are attaching a letter to you (in a .pdf format) which lays out the concerns of the Old Tunnel Road/Windsor Drive Neighborhood Watch group regarding the reservoir replacement/pipeline project referenced above.
Thank you for your consideration. Please feel free to contact us should you have any questions.

--
Ruth M. Grossman, NW Co-Coordinator
nw.lafayette.ca.rg@gmail.com
Erin Beaver, NW Co-Coordinator
nw.lafayette.ca.eb@gmail.com

Old Tunnel Road/Windsor Drive Neighborhood Watch

September 30, 2016

Oscar Herrera, Associate Civil Engineer
EBMUD
375 Eleventh Street, M/S 701
Oakland, CA 94607

Dear Sir:

The Old Tunnel Road/Windsor Drive Neighborhood Watch is a group of approximately 75 homes located in Lafayette, CA. Our neighborhood group includes homes near the intersection of Old Tunnel Road and Windsor Drive plus the following streets off of Windsor Drive: Maryola Court, Mars Court, Windsor Court, and Buckeye Court. We were formed several years ago as a response to a series of home break-ins, but we work as a group on any matter that affects the safety and security of our neighborhood.

To that end, the following are our comments regarding the “Leland Reservoir and Pipeline Replacement” project currently under consideration.

1. As a neighborhood that includes both commuters and families with school-age children, the proposed construction hours of 7 am - 7 pm is incompatible for most of us. Even if actual constuction doesn’t begin until 8:00 am, the arrival of noisy vehicles at 7:00 am is unwelcome. We propose construction hours of 8 am - 6 pm.

2. Residents in homes that abut the reservoir are concerned about the noise from the demolition of same. How will that noise be mitigated?

3. Residents are concerned regarding the impact construction will have on Windsor Drive, Condit Road and Leland Drive with respect to school bus access, access to Sun Valley Bible Chapel, access to Meher School and access to the Sun Valley Swimming Pool. It should be noted that the latter hosts swim meets that involve hundreds of families, not to mention daily swim practices.

4. Residents on Windsor Drive have concerns about access to/from their homes during construction.

5. Will Windsor Drive be closed at both ends on occasion during construction? What is meant by/who determines local traffic access?

6. The group is concerned that no matter how EMBUD accesses the reservoir from Pleasant Hill Road (via Old Tunnel Road or via Condit Road) that trees along the route be protected from heavy trucks/equipment traffic. There are a number of heritage oaks on both routes that our group feels strongly about protecting.

7. Inasmuch as Old Tunnel Road is so heavily trafficked, our group encourages EBMUD to use the route to the reservoir from Pleasant Hill Road via Condit to Leland to balance out the congestion. Moreover, Old Tunnel Road is far too narrow for many large construction trucks. There is, by the way, a City of Lafayette ordinance forbidding large trucks on Old Tunnel Road. While EBMUD can disregard this ordinance, we request that you take this matter into consideration in the draft EIR. Finally, in consideration of its parallel location to Highway 24, Old Tunnel Road is frequently used as a frontage road during the hours of 7-9:30 am and 2:30-6:30 pm when the freeway is clogged with commuter traffic.

8. With the pending development of new commercial and residential space in Saranap, our group is concerned about the cumulative impact of concurrent construction on the neighborhood, especially with regard to heavy trucks and equipment.

9. It is the opinion of our group that the landscape plan for the reservoir is sadly lacking. We are opposed to the removal of any heritage oaks. We believe that for every tree removed, four should be planted as replacements. Moreover, the suggested size of the replacements (24” box-sized oaks) is totally inadequate. The group is also desirous that the landscape design for the back side of the reservoir (e.g., facing Maryola and Mars Courts) be expanded so that the replacement tanks are not so visible as to invite potential grafitti artists. Our neighborhood is semi-rural in nature, so the impact of the removal of existing trees/vegetation on wildlife is a concern, especially if the replacement plan is inadequate.

10. Inasmuch as the residents of Windsor Drive will be terribly inconvenienced during the pipeline construction phase of the project, it seems appropriate that rather than repairing the street “at the level at which (it) existed prior to project construction,” that Windsor Drive be entirely repaved at the end of construction (not merely slurried) and that Old Tunnel Road also be repaved, especially if it is used consistently over the two + year period for contruction traffic.

11. The neighborhood group is also concerned that overnight and on weekends that heavy equipment is not parked on our streets but removed either to the reservoir site or, alternatively, to the City of Lafayette maintenance yard on the other side of Highway 24, e.g. Camino Diablo. The presence of heavy equipment, while not in use, is a safety issue for many families.

12. The group wants the name/contact information for an EBMUD employee whom we can contact during construction if there is an issue with construction equipment or personnel.

13. The issues of changes to drainage, enviromental hazards, and geological reports should be addressed in the draft EIR.

14. The duration of pipeline construction needs to be addressed in the draft EIR as well.

15. The issue of any possible water shut-down during constuction is of concern to the neighborhood.

16. Will the movement of soil during pipeline construction have a negative impact on the primary sewer line and/or on the lateral sewer lines to homes along the construction route? We believe EBMUD should assess any damage to existing sewer laterals post-construction.

17. What steps will EBMUD take with respect to dust mitigation during the construction process?

18. Will the installation of the two tanks reduce flood risk? Will the neighborhood remain a flood plain and/or an inundation zone? These particulars need to be spelled out in the draft EIR.

Sincerely yours,

Erin Beaver, 3169 Old Tunnel Road - Lafayette
Ruth Grossman, 3167 Old Tunnel Road - Lafayette
Co-Coordinators, Old Tunnel Road/Windsor Drive Neighborhood Watch

From: Kathy Mccann
To: Leland Reservoir Replacement EIR
Subject: Comments to the project
Date: Friday, September 30, 2016 2:31:36 PM

Oscar,

Although my name is on the neighborhood comments, I would like to emphasize the following concerns:

1) Safety of everyone, especially the elderly who walk and the neighborhood children going to and from school bus, area schools, church, the pool on Leland, etc. Although it may not look like it, our neighborhood is very active with walkers and biking. A

2) Street repair, sewer lines, etc. We discussed this at the meeting, but we would like EBMUD to factor in the cost of completely re paving, and properly grading, at least the following streets:

Old Tunnel Rd, Leland, Windsor and Condit. Also, making sure that the sewer lines are not damaged or that the weight of the equipment causes "off-sets".

3) Trees-Larger and more trees need to be planted around the new tanks so that they will get established quicker.

4) Requesting that the trucks and equipment use Condit as Old Tunnel Rd is very busy.

Thank you!

Kathy McCann

Appendix C: Conceptual Architecture and Landscape Design Report

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EAST BAY MUNICIPAL UTILITY DISTRICT

LELAND RESERVOIR

REPLACEMENT PROJECT CONCEPTUAL ARCHITECTURE AND LANDSCAPE DESIGN REPORT

EBMUD

RMC water and environment

rhaa LANDSCAPE ARCHITECTURE + PLANNING

Burks Toma Architects

EBMUD

LELAND RESERVOIR

REPLACEMENT PROJECT
CONCEPTUAL ARCHITECTURE
AND LANDSCAPE DESIGN REPORT

Lafayette, California

PREPARED FOR:

East Bay Municipal Utility District

PREPARED BY:

RMC / Woodard & Curran
RHAA Landscape Architecture + Planning
Burks Toma Architects

15 June 2017

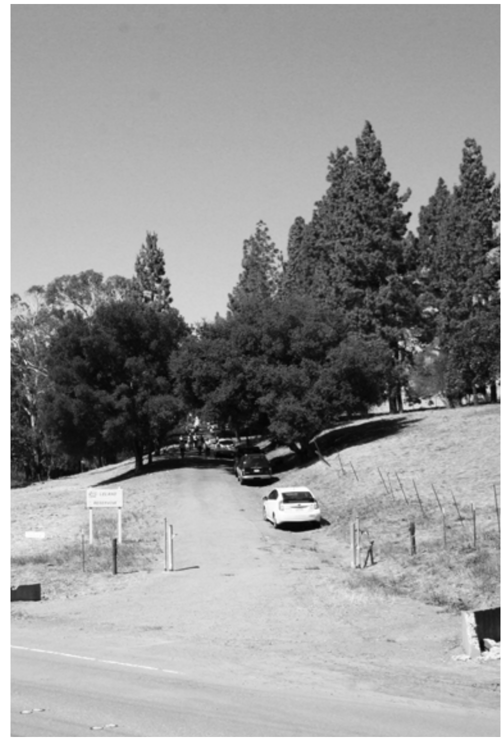
EBMUD RMC water and environment rhaa LANDSCAPE ARCHITECTURE + PLANNING Burks Toma Architects

LELAND RESERVOIR REPLACEMENT PROJECT

Project Overview

The East Bay Municipal Utility District (EBMUD) Leland Reservoir has provided drinking water to the communities of Lafayette, Walnut Creek, and Pleasant Hill for over 60 years. The replacement of this structure is critical to maintaining a reliable system that is accessible to maintenance and repairs, safe for personnel access, seismically secure, and current with today's needs and requirements.

The Leland Reservoir Replacement Project will replace the existing 18-million-gallon open-cut reservoir with two 8.0 million-gallon concrete tanks. Approximately 1,700 linear feet of 36-inch water transmission pipeline that traverses under the existing open cut reservoir will be replaced with approximately 2,700 linear feet of 36-inch pipeline that will be installed in Windsor Drive, Condit Road, and a short section of Leland Drive between Condit Road and Meek Place. Approximately 950 linear feet of additional 36-inch pipeline will be installed within the Leland Reservoir property. The pipeline will extend from the new concrete tanks down the new site access road and then parallel Leland Drive, within the site property boundary, and connect to an existing 36-inch transmission main on the southeast side of the property. All tank infrastructure will be located within the existing basin, simplifying site security and maintenance. Access from Leland Drive to the upper perimeter road around the tanks will be provided by an additional access road.



Maintenance Access Road
View from Leland Drive

PROJECT GOALS AND OBJECTIVES

The goal of the architecture and landscape conceptual design for the Leland Reservoir Replacement Project is to develop conceptual plan alternatives that address the replacement of the Leland Reservoir while maintaining privacy for neighboring properties and preserving the overall physical character of the site.

GOALS

1. Modernize the Leland Reservoir facilities
2. Mitigate construction impacts
3. Maintain landscape quality
4. Maintain facility privacy and security

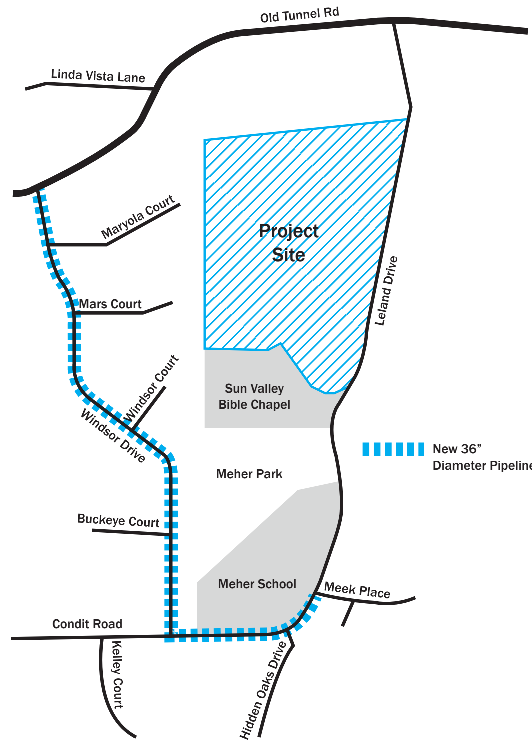
OBJECTIVES

1. Modernize the Leland Reservoir facilities
   - Replace existing reservoir
   - Replace existing pipelines
2. Mitigate construction impacts
   - Provide alternative routes for traffic through duration of construction to maintain local access
   - Provide daily access to local residents
   - Maintain emergency vehicle access
   - Control dust and noise
   - Mitigate impacts to sewer laterals and utilities
3. Maintain landscape quality
   - Replant with native grassland species
   - Hydroseed impacted constructed areas
   - Remove dead/dying trees
   - Protect healthy native trees outside of construction zone
   - Limit tree removal within construction zone
   - Protect oaks with trunk diameters of 12 inches or more, where possible
   - Replant with native, non-invasive tree species
4. Maintain facility privacy and security
   - Replace existing security fence
   - Replace trees that provide visual screening
   - Install access gates at both the tank perimeter road entrance and the basin maintenance entrance
   - Install bar gate at site entrance

EXISTING CONDITIONS

Reservoir Property

Leland Reservoir is located on a 14.5-acre site along Leland Drive in the City of Lafayette, California. The access road into the site is opposite 1050 Leland Drive.



Native Landscape

The site surrounding Leland Reservoir hosts a native Oak Savannah landscape. The most common species are Coast Live Oak (Quercus agrifolia) and Valley Oak (Quercus lobata). Pine species, including Canary Island Pines (Pinus canariensis), Monterey Pine (Pinus radiata), and Gray Pine (Pinus sabiniana) are the second most prevalent. Two varieties of eucalyptus, Blue Gum eucalyptus (Eucalyptus globulus) and Red Ironbark (Eucalyptus sideroxylon), make up the third most prevalent species.

The site understory is comprised of a native grass mix, including oatgrass and bromes, whose root systems contribute to slope stabilization.

The vegetation and elevation change are valuable natural defenses for security and site screening. The height and shape of the hills help visually obscure the reservoir and inhibit public entry. Maintaining these defenses is key in developing both a visual and physical separation from the adjacent neighbors.

Existing Site

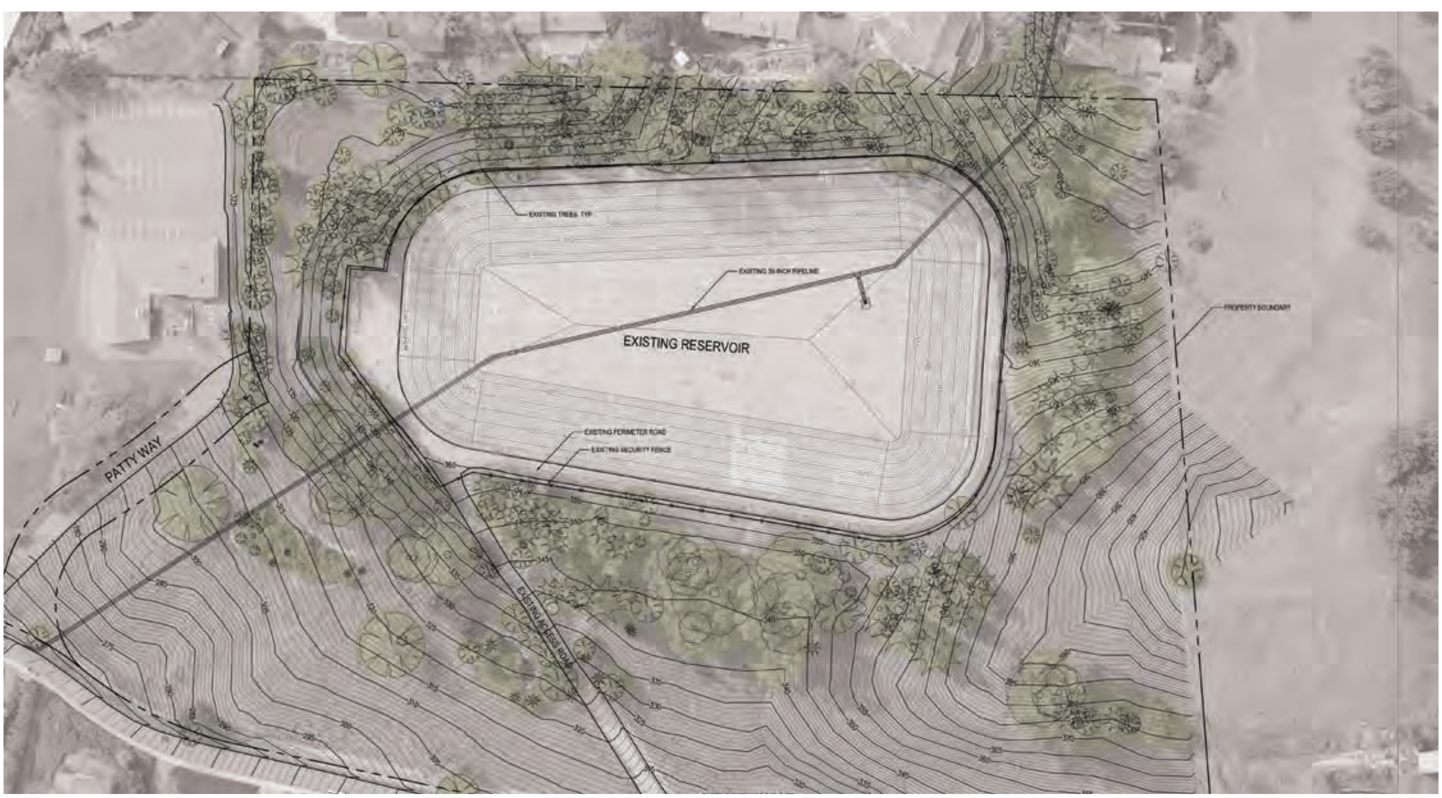


Figure 1.0

SITE CONSTRAINTS

The following are some of the constraints associated with the Leland Reservoir site:

Steep slopes limit construction storage, staging, and stockpiling. Slopes steeper than 3:1 (33%) are not appropriate for tree planting.

Existing trees conflict with construction access, proposed infrastructure, and soil stockpiling locations.

The main access road into the facility must be secure.

Site security must be maintained during and after construction.

Approximately 16 trees with a designated "protected" status are located within the critical limit of work. Trees are identified as "protected" based on their unique size and species by Lafayette City Code 6-1702

The facility should be screened from adjacent properties to the extent practicable.

LANDSCAPE PRESERVATION

Tree Inventory

Trees on site were inventoried by Arborist Dennis Yniguez to determine their health and prioritize their preservation. The Arborist Report is dated July 2016, and 467 trees were surveyed. Trees were identified by species and given a conditional rating from 1 to 7 with 1 indicating optimal tree health.

Tree Preservation

To maintain the native landscape, it is important to preserve as many trees as possible. Trees were inventoried based on their condition, health, Diameter at Breast Height (DBH), crown spread, and native species status. These factors contributed to their conditional rating. Additional arborist comments related to removal, pruning recommendations, and structural weaknesses were also noted.

Tree Removal

Tree removal is necessary for project construction and safety (hazardous limbs and fire fuel load). Subsequently, trees were categorized as safety related removal or project construction related removal.

Twenty-three (23) trees are proposed to be removed for safety reasons. Trees with conditional ratings from 5 (fair), 6 (poor), and 7 (dead) were likely to drop limbs. Trees with conditional ratings 3 (good) and 4 (moderate) posed a threat to fire prevention management due to the high oil content of their species or fuel load of their branches.

Eighty-eight (88) trees are slated to be removed due to construction, including those that would interfere with the replacement of site infrastructure. During construction, soil will need to be stockpiled on site. Steep topography limits the locations where stockpiling is feasible; therefore, trees in identified stockpiling locations as shown in the following section will be removed.

SITE CONSTRUCTION STOCKPILING

Below are the stockpile locations where soil will be stored and moved during the construction process.

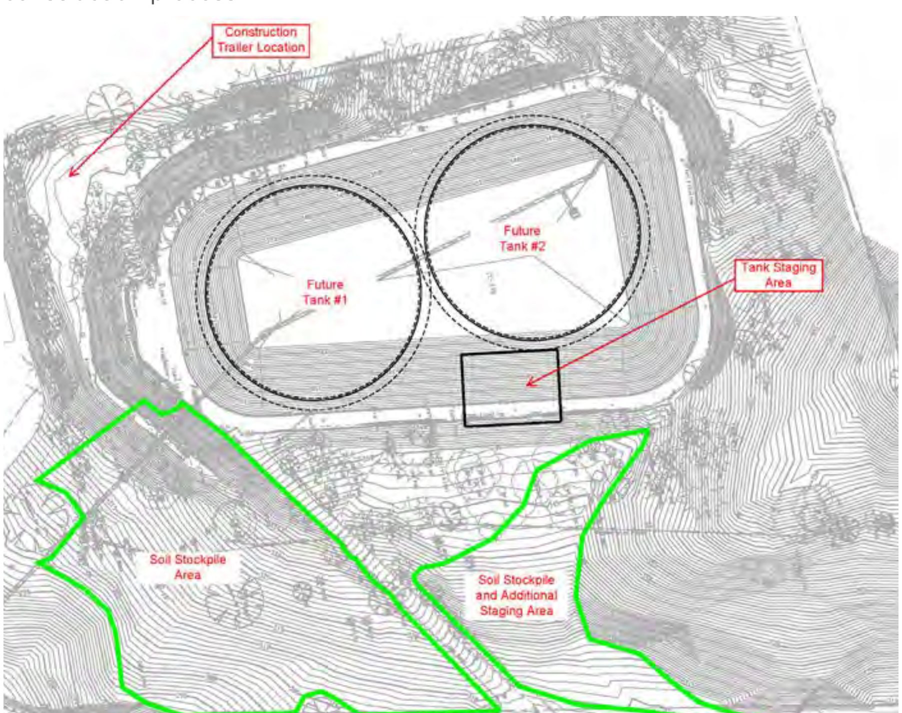
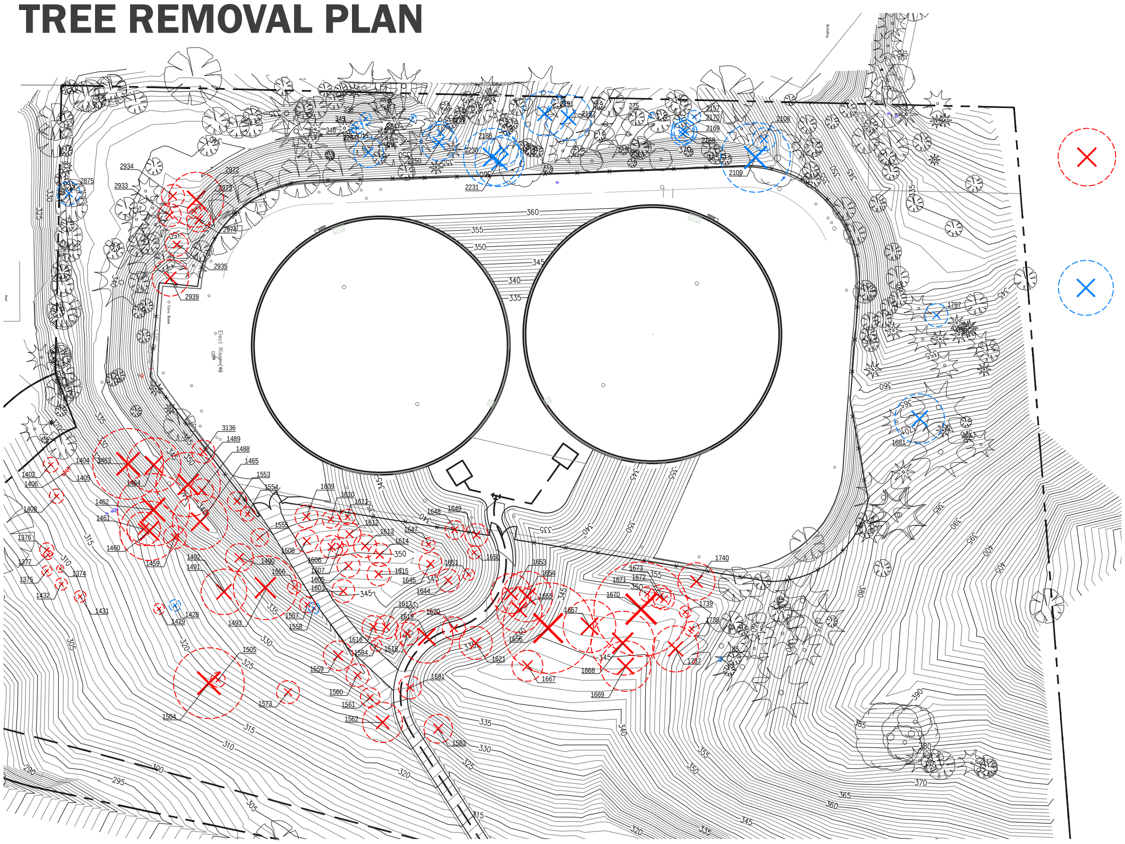


Figure 2.0

TREE REMOVAL PLAN



Tree removed for construction
QTY 88

Tree removed for safety / fire prevention
QTY 23

TOTAL REMOVAL
QTY 111

Figure 3.0

TREES REMOVED

The following are trees to be removed as described above.

Tree Inventory

QTY	ID#	COMMON	SCIENTIFIC NAME	DBH	COND	FOR
1	1374	Valley Oak	Quercus lobata	8.5”	2	C
2	1375	Valley Oak	Quercus lobata	10.5”	2	C
3	1376	Valley Oak	Quercus lobata	8”	2	C
4	1377	Firethorn	Pyracantha sp.	4.5”	4	C
5	1402	Valley Oak	Quercus lobata	9.5”	2	C
6	1404	Buckthorn	Rhamnus sp.	4”	3	C
7	1405/1406	Buckthorn	Rhamnus sp.	3”	4	C
8	1408	Almond	Prunus dulcis	8”	3	C
9	1428	Buckthorn	Rhamnus sp.	4.5”	6	S
10	1429	Coast Live Oak	Quercus agrifolia	7.5”	2	C
11	1431	Buckthorn	Rhamnus sp.	5”	4	C
12	1432	Valley Oak	Quercus lobata	8.5”	3	C
13	1459	Gray Pine	Pinus sabiniana	10.5”	2	C
14	1460	Blue Gum	Eucalyptus globulus	39”	4	C
15	1461	Blue Gum	Eucalyptus globulus	24”	3	C
16	1462	Blue Gum	Eucalyptus globulus	48”	3	C
17	1463	Blue Gum	Eucalyptus globulus	49”	2	C
18	1464	Blue Gum	Eucalyptus globulus	26.5”	4	C
19	1465	Blue Gum	Eucalyptus globulus	36”	3	C
20	1488	Blue Gum	Eucalyptus globulus	13”	4	C
21	1489	Blue Gum	Eucalyptus globulus	44”	3	C
22	1490	Eucalyptus	Eucalyptus sp.	21”	4	C
23	1491/1492	Eucalyptus	Eucalyptus sp.	36”	3	C

Key

QTY = QUANTITY
ID# = IDENTIFICATION NUMBER
DBH = DIAMETER AT BREAST HEIGHT
COND = CONDITIONAL RATING
FOR = REASON FOR REMOVAL
C = CONSTRUCTION
S = SAFETY

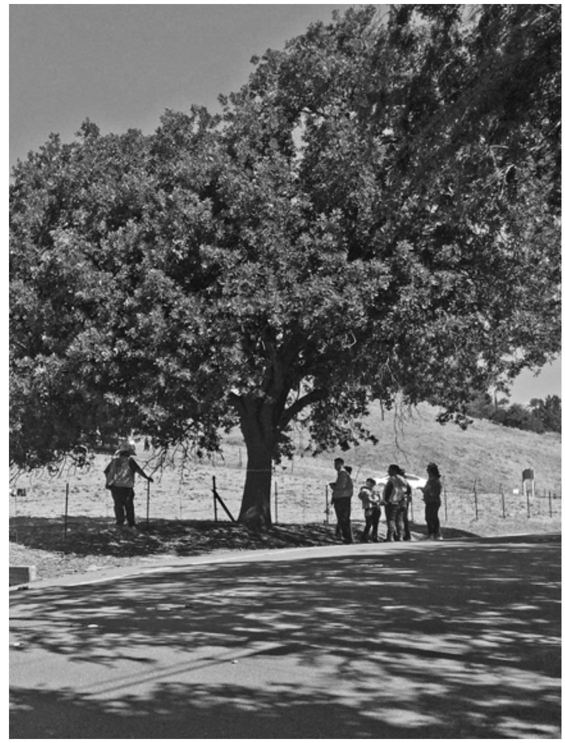
Conditional Rating

1 = EXCELLENT
2 = VERY GOOD
3 = GOOD
4 = MODERATE
5 = FAIR
6 = POOR
7 = DEAD

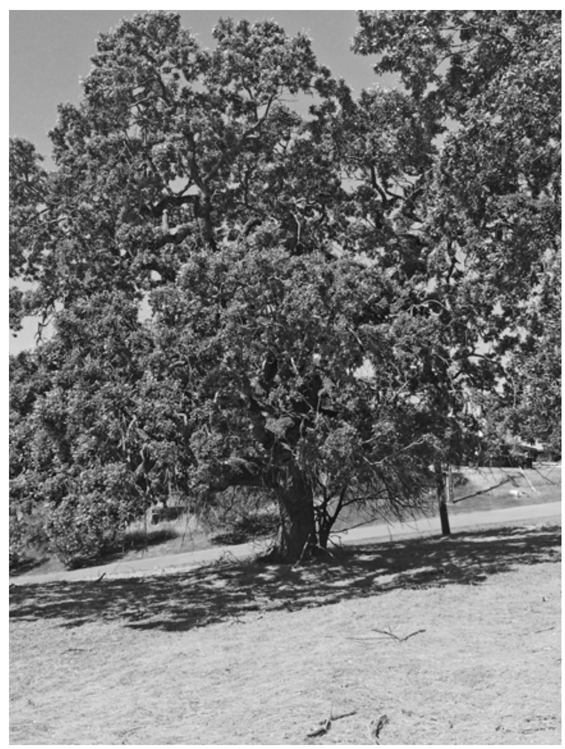
TREES REMOVED

Continued...

QTY	ID#	COMMON	SCIENTIFIC NAME	DBH	COND	FOR
24	1493	Eucalyptus	Eucalyptus sp.	45”	4	C
25	1504	Valley Oak	Quercus lobata	44”	1	C
26	1505	Valley Oak	Quercus lobata	7.5”	1	C
27	1553	Coast Live Oak	Quercus agrifolia	14.7”	1	C
28	1554	Coast Live Oak	Quercus agrifolia	7”	2	C
29	1555	Coast Live Oak	Quercus agrifolia	10.5”	2	C
30	1556	Coast Live Oak	Quercus agrifolia	7.5”	2	C
31	1557	Coast Live Oak	Quercus agrifolia	10.5”	2	C
32	1558	Valley Oak	Quercus lobata	6”	5	S
33	1559	Valley Oak	Quercus lobata	17.0”	3	C
34	1560	Canary Isl Pine	Pinus canariensis	18.5”	2	C
35	1561	Valley Oak	Quercus lobata	10”	3	C
36	1562	Coast Live Oak	Quercus agrifolia	23.5”	2	C
37	1573	Valley Oak	Quercus lobata	16.5”	2	C
38	1581	Coast Live Oak	Quercus agrifolia	12”	2	C
39	1583	Coast Live Oak	Quercus agrifolia	32.3”	1	C
40	1584	Almond	Prunus dulcis	5.5”	3	C
41	1603	Valley Oak	Quercus lobata	15”	2	C
42	1604	Valley Oak	Quercus lobata	4”	2	C
43	1605	Canary Isl Pine	Pinus canariensis	18.5”	3	C
44	1606	Canary Isl Pine	Pinus canariensis	20”	2	C
45	1607	Coast Live Oak	Quercus agrifolia	7”	2	C
46	1608	Coast Live Oak	Quercus agrifolia	16.5”	2	C
47	1609	Canary Isl Pine	Pinus canariensis	20.5”	3	C
48	1610	Valley Oak	Quercus lobata	8”	3	C
49	1611	Coast Live Oak	Quercus agrifolia	9”	3	C
50	1612	Canary Isl Pine	Pinus canariensis	24”	2	C
51	1613	Canary Isl Pine	Pinus canariensis	16.5”	5	C
52	1614	Canary Isl Pine	Pinus canariensis	22.5”	3	C
53	1615	Canary Isl Pine	Pinus canariensis	20”	2	C
54	1616	Canary Isl Pine	Pinus canariensis	12”	3	C
55	1617	Canary Isl Pine	Pinus canariensis	9”	3	C
56	1618	Canary Isl Pine	Pinus canariensis	9.5”	4	C
57	1619	Canary Isl Pine	Pinus canariensis	26”	2	C
58	1620	Canary Isl Pine	Pinus canariensis	12”	3	C
59	1621	Valley Oak	Quercus lobata	24.7”	2	C
60	1644	Canary Isl Pine	Pinus canariensis	24”	2	C
61	1645	Canary Isl Pine	Pinus canariensis	20”	2	C
62	1647	Valley Oak	Quercus lobata	8.5”	2	C
63	1648	Coast Live Oak	Quercus agrifolia	12.5”	2	C
64	1649	Valley Oak	Quercus lobata	14.7”	2	C
65	1650	Valley Oak	Quercus lobata	7”	2	C
66	1651	Valley Oak	Quercus lobata	6.5”	2	C
67	1653	Blue Gum	Eucalyptus globulus	32.5”	3	C
68	1654	Blue Gum	Eucalyptus globulus	36.5”	3	C
69	1655	Blue Gum	Eucalyptus globulus	35”	3	C
70	1656	Blue Gum	Eucalyptus globulus	74.5”	3	C
71	1657	Blue Gum	Eucalyptus globulus	21.5”	4	C
72	1667	Blue Gum	Eucalyptus globulus	38”	3	C
73	1668	Blue Gum	Eucalyptus globulus	41.5”	3	C



Oak Tree ID #1170
Valley Oak to be protected and preserved



Oak Tree ID #1365
Valley Oak to be protected and preserved

TREES REMOVED

Continued...

QTY	ID#	COMMON	SCIENTIFIC NAME	DBH	COND	FOR
74	1669	Blue Gum	Eucalyptus globulus	36.5”	4	C
75	1670	Blue Gum	Eucalyptus globulus	53”	3	C
76	1671	Blue Gum	Eucalyptus globulus	11.5”	5	C
77	1672	Blue Gum	Eucalyptus globulus	17”	3	C
78	1673	Coast Live Oak	Quercus agrifolia	16”	2	C
79	1681	Gray Pine	Pinus sabiniana	25”	3	S
80	1737	Valley Oak	Quercus lobata	23.7”	1	C
81	1738	Valley Oak	Quercus lobata	4”	3	C
82	1739	Valley Oak	Quercus lobata	6”	2	C
83	1740	Valley Oak	Quercus lobata	14”	1	C
84	1797	Gray Pine	Pinus sabiniana	32”	5	S
85	2108	Canary Isl Pine	Pinus canariensis	18.5”	5	S
86	2109	Blue Gum	Eucalyptus globulus	56”	3	S
87	2157	Coast Live Oak	Quercus agrifolia	6”	3	S
88	2168/2169/ 2170	Blue Gum	Eucalyptus globulus	20”	3	S
89	2188	Canary Isl Pine	Pinus canariensis	12”	4	S
90	2191	Monterey Pine	Pinus radiata	35”	3	S
91	2192	Gray Pine	Pinus sabiniana	19”	6	S
92	2230	Blue Gum	Eucalyptus globulus	43”	3	S
93	2231	Blue Gum	Eucalyptus globulus	26”	4	S
94	2247	Valley Oak	Quercus lobata	4”	6	S
95	2249	Red Ironbark	Eucalyptus sideroxylon	12”	5	S
96	2250	Red Ironbark	Eucalyptus sideroxylon	15”	5	S
97	2264	Valley Oak	Quercus lobata	13.7”	6	S
98	2875	Cherry Plum	Prunus cerasifera	8”	7	S
99	2933	Canary Isl Pine	Pinus canariensis	18”	2	C
100	2934	Canary Isl Pine	Pinus canariensis	18”	2	C
101	2935	Canary Isl Pine	Pinus canariensis	17”	2	C
102	2939	Canary Isl Pine	Pinus canariensis	18.5”	1	C
103	2972	Valley Oak	Quercus lobata	18.7”	3	C
104	2973	Coast Live Oak	Quercus agrifolia	5”	3	C
105	2974	Gray Pine	Pinus sabiniana	22”	3	C
106	3136	Coast Live Oak	Quercus agrifolia	11.7”	2	C
107	NA	Almond	Prunus dulcis	3.5”	5	S
108	NA	Canary Isl Pine	Pinus canariensis	3.5”	5	S
109	NA	Valley Oak	Quercus lobata	7.5”	5	S
110	NA	Valley Oak	Quercus lobata	3”	4	S
111	NA	Valley Oak	Quercus lobata	3”	6	S

Eucalyptus globulus
Invasive species among trees to be removed

DESIGN PROCESS

The design process included preparing landscape concepts based on the needs of the reservoir infrastructure and the goal to visually screen the project. Different alternatives were explored and presented to the community. After several meetings and obtaining feedback, a preferred plan was developed.

Design Alternatives for Community Meeting #1

The first community meeting occurred on August 3, 2016 at Meher School. Two alternatives, as shown in Figure 4.0 and Figure 5.0, were presented with plans and perspectives of visual impacts of the new tanks and are described below.

Both alternative designs proposed replanting native tree species: Quercus agrifolia (Coast Live Oak) and Quercus lobata (Valley Oak). Proposed native shrubs included Ceanothus 'Julia Phelps' (Small Leaf Mountain Lilac), Dendromecon rigida (Bush Poppy), Festuca californica (Fescue), Heteromeles arbutifolia (Toyon), Leymus condensatus (Giant Wild Rye), Muhlenbergia rigens (Deer Grass), Myrica californica (Pacific Wax Myrtle), Rhamnus californica (Coffeeberry), and Ribes sanguineum (Redflower Currant). Disturbed areas were proposed to receive a hydroseed mix of native grasses.

Design Alternative 1

Alternative 1 proposed partially backfilling the concrete tanks with the excavated soil and demolition debris from the open cut reservoir demolition. Partially backfilling the tanks would provide access to the bottom of the tanks and valve pits via a maintenance road through the existing slope. The top of the tanks would be accessed by a perimeter road. Forty-five new trees were proposed where slopes did not exceed 3:1.

Design Alternative 2

Alternative 2 proposed completely backfilling the concrete tanks which would be a more challenging and expensive grading and staging process. This alternative maintained access to the top of the tanks with a perimeter road. An access pad at a lower elevation, east of the tanks, would house the valve pit. Alternative 2 also proposed adding 45 trees.

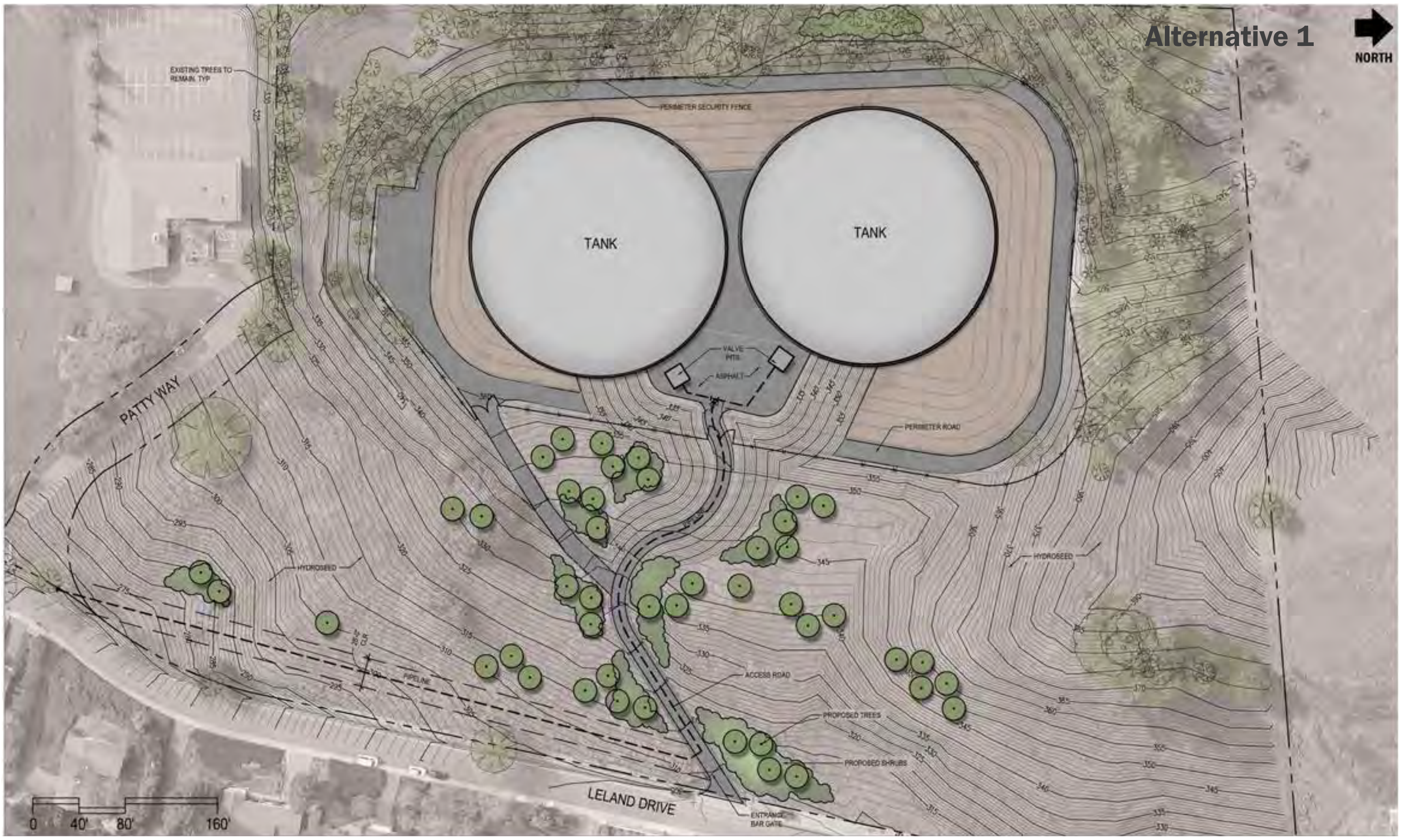


Figure 4.0

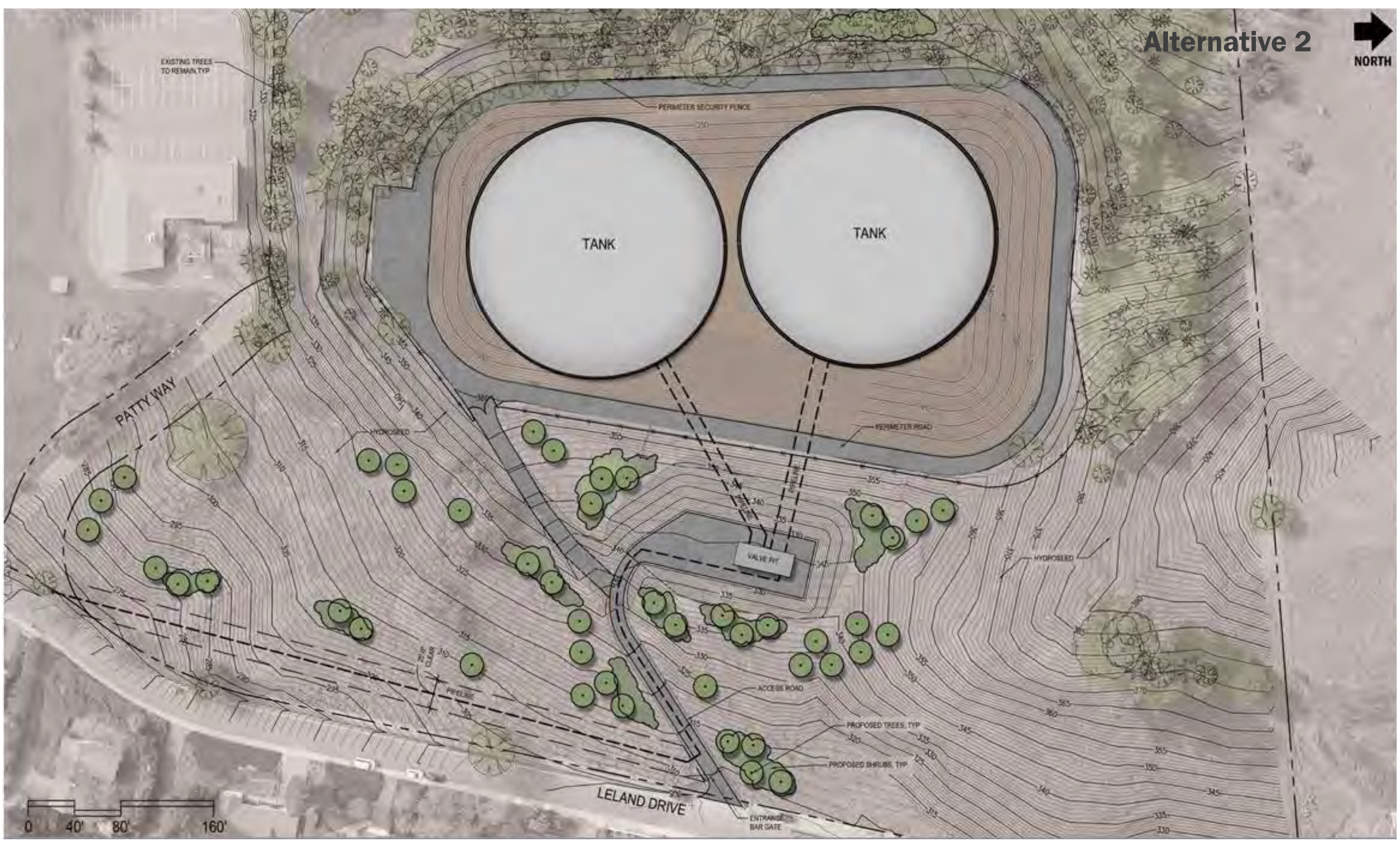


Figure 5.0

DESIGN PROCESS

Visual Impact Assessment for Community Meeting #1

A series of visual simulations were created to assess potential views into the site for both design alternatives. Digital models simulated the site landscaping 15 years after installation and were compared to an existing conditions model and photographs. The visual assessment helped determine the minimum number of replacement trees needed for screening along Leland Drive. During this process, it was determined that Alternative 1, with its curvilinear road and adjacent berm, better screened the new tanks.

The steep site topography greatly limited the amount of excavated soil material and demolition debris associated with the open cut reservoir demolition that could be temporarily stockpiled on site. The construction stockpile limitations did not allow for enough material to be stored on site to completely backfill around the tanks as proposed in Alternative 2. Alternative 1 maximized reusing the excavated demolition material that could be stored on site to partially backfill the concrete tanks.

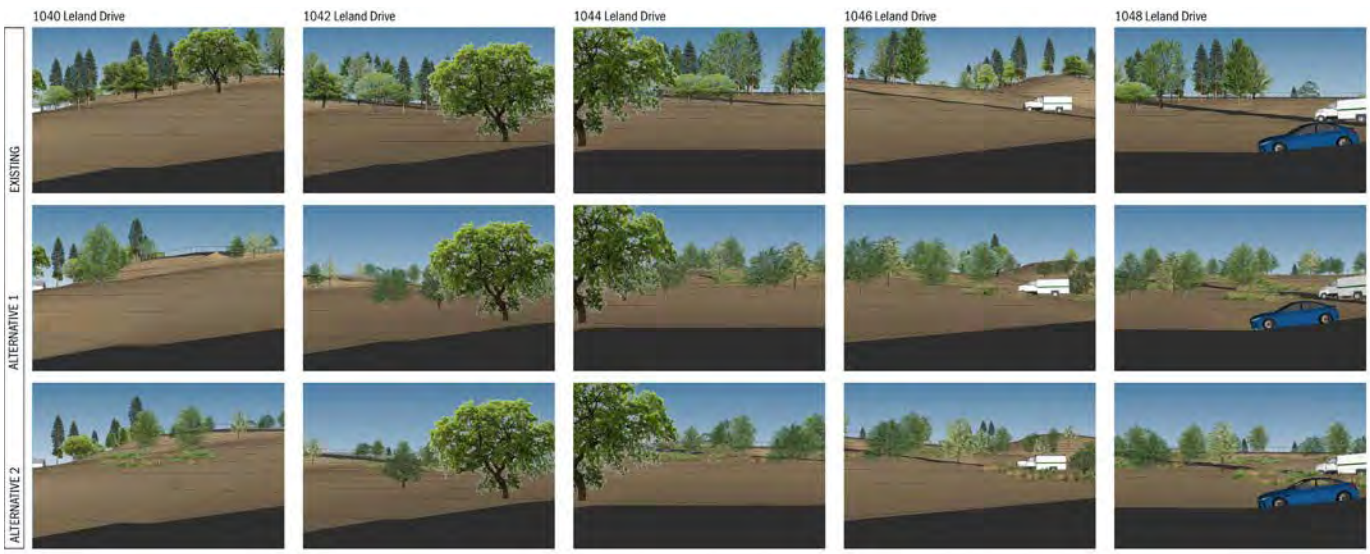


Figure 6.0

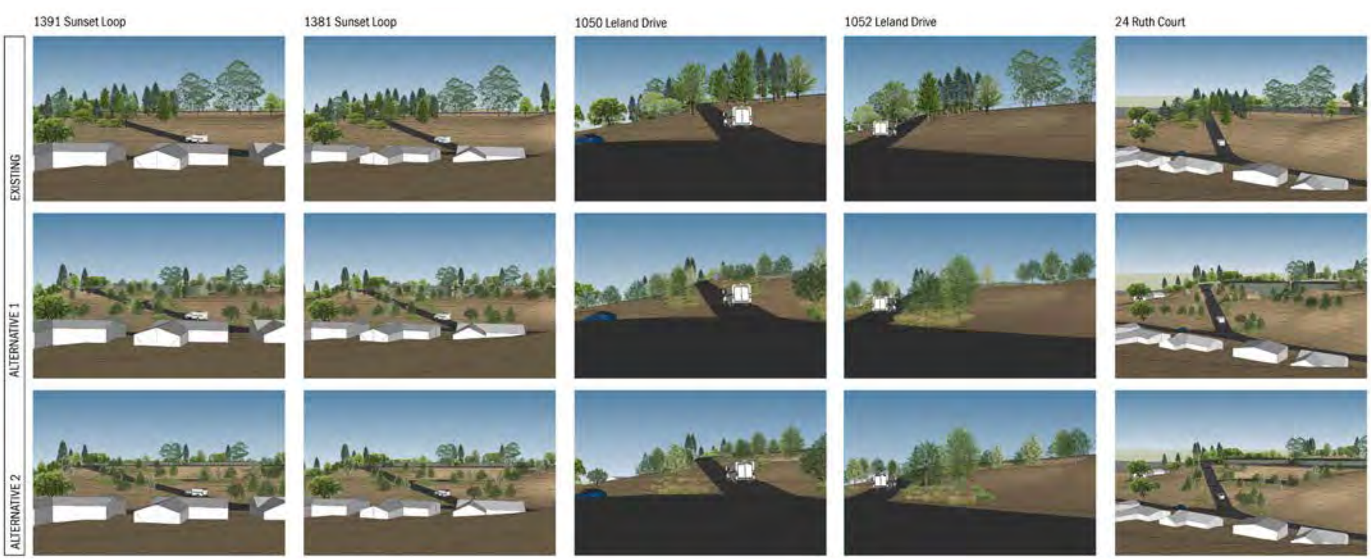


Figure 7.0

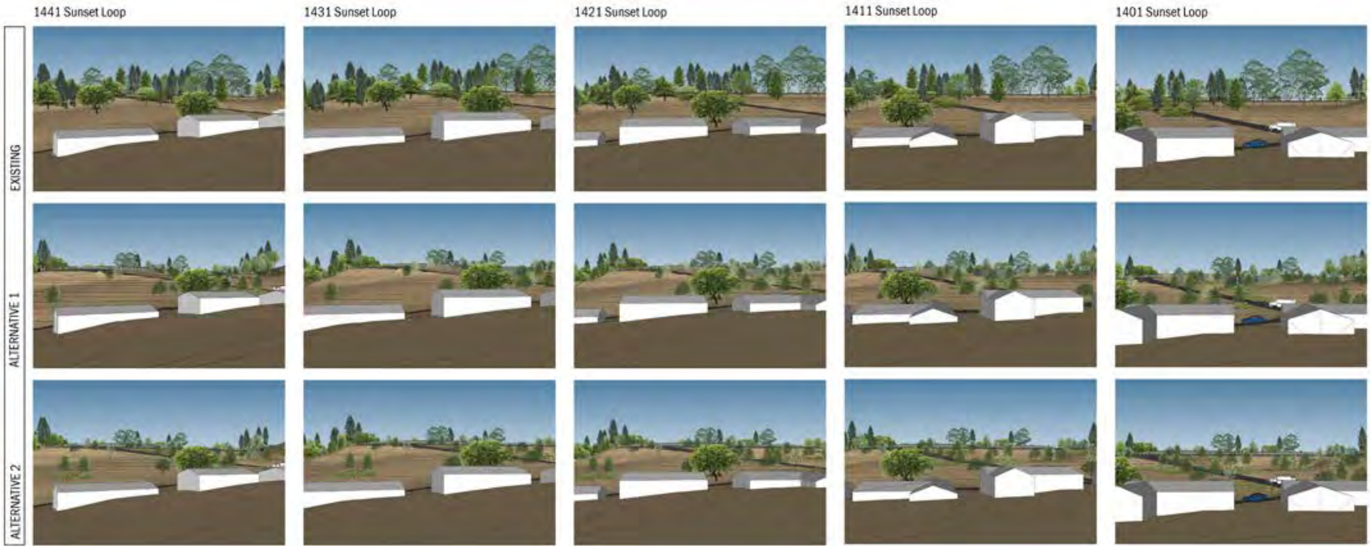


Figure 8.0

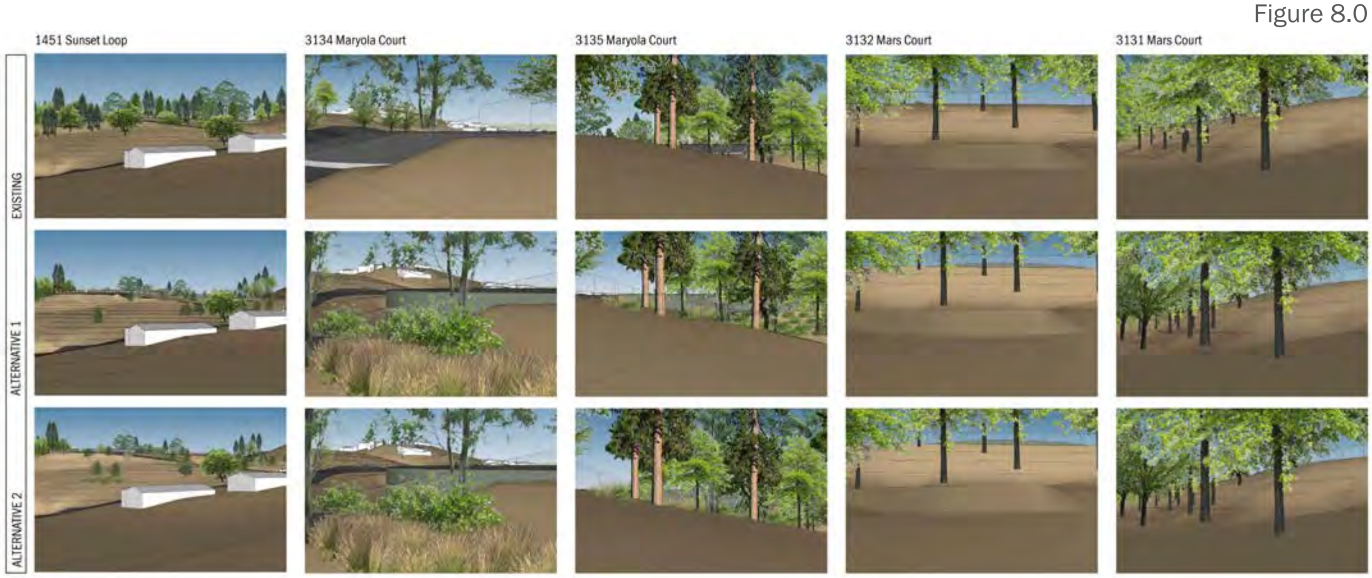


Figure 9.0

Community Meeting #1 Feedback

The first community meeting was attended by neighboring residents with direct views into the site and by those who may be affected by the pipeline installation and road closures. The two alternatives and visual simulations were presented to the community to obtain feedback.

The primary concerns of attendees were construction inconveniences which included road closures, access, traffic control on detour routes, damage to roadways due to heavy construction machinery, damage to utilities, visual/audio impact of construction, length of the construction process, storage of machinery and materials, construction staging, and control of wildlife that may be displaced during the construction process. Additional concerns received during the Question and Answer process after the public meeting focused on tree removal and visual impact.

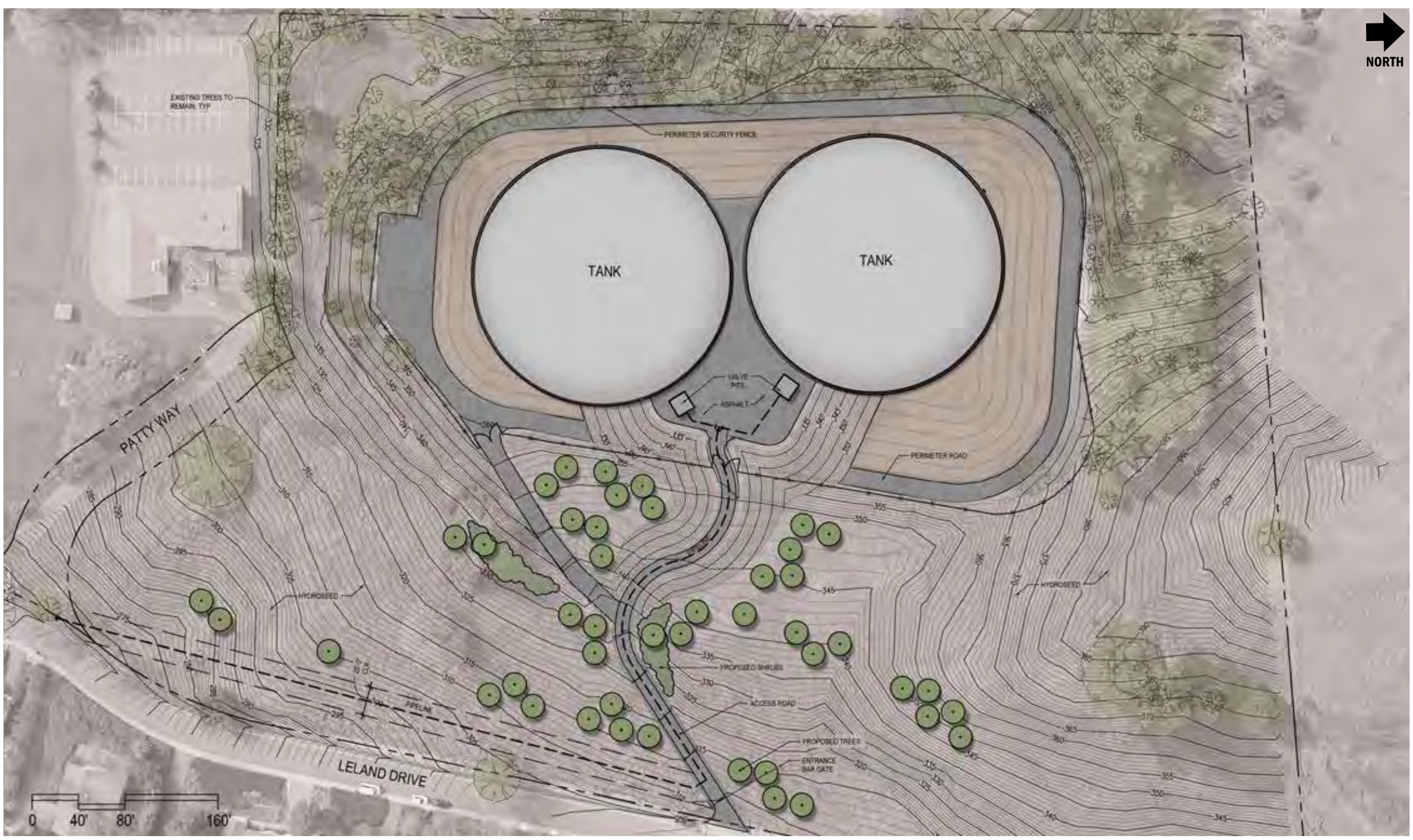
At the conclusion of the meeting, the community preferred Alternative 1. The feedback received from the first community meeting was used to refine Alternative 1 and study the visual impacts in greater detail.

DESIGN PROCESS

Refining the Design Selection for Community Meeting #2

The second community meeting was held on September 15, 2016. Alternative 1 from the first community meeting had been selected as the preferred design. Minor changes were made to the design including a reduction in the overall quantity of shrubs and variety of species that was made as a response to maintenance concerns.

At the first community meeting, attendees wanted to see in more detail how the design would affect their views. In response, more refined photo-realistic renderings and models (where access to properties was not feasible) were provided at this meeting to help neighbors visualize the proposed conditions. Five locations were explored with views into the site.



Alternative 1 as presented at Community Meeting #2

Figure 10.0

Community Meeting #2 Feedback

At the conclusion of the meeting, the community accepted the views, the reservoir location, the access road configuration, the existing tree removal, the security fence location, and the elimination of proposed shrubs. However, they did request additional trees for visual screening. One attendee requested a photo-realistic rendering of the view from their property.

With the feedback received, 30 additional trees were added to the plan in strategic locations to better screen the reservoir, and a photo-realistic view from the property requested was included in the final preferred design package.

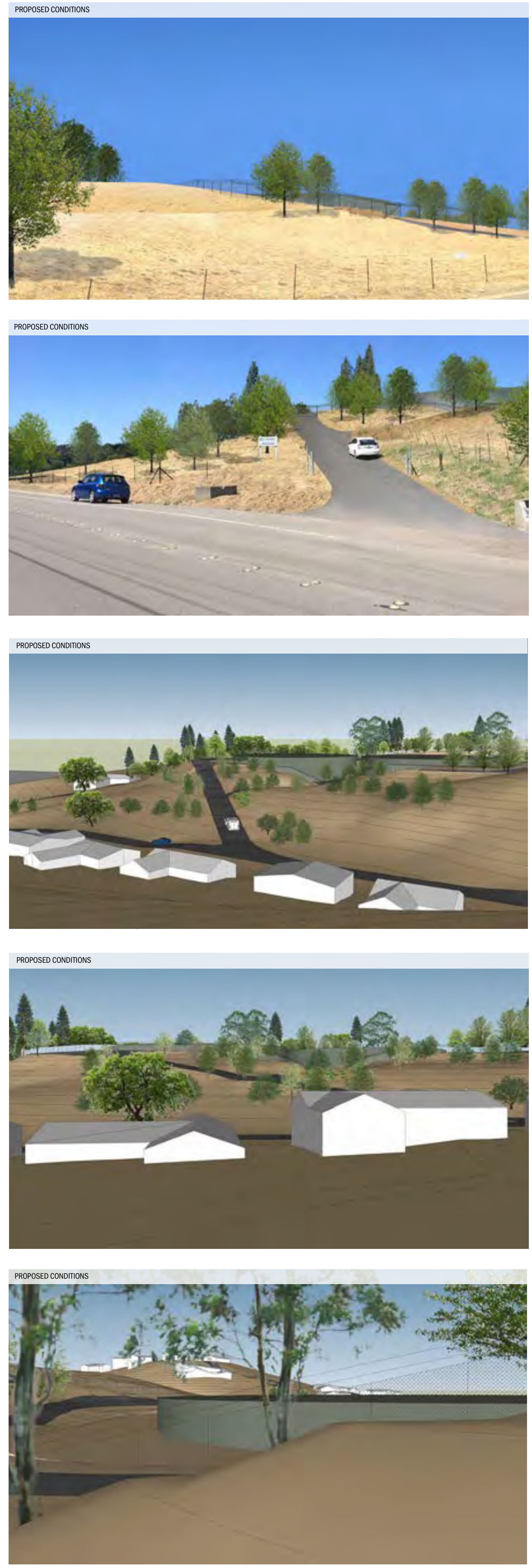


Photo-realistic renderings and models presented at meeting

Figure 11.0

PREFERRED DESIGN

The final conceptual design considers the visual impact to the community. The placement of trees maintains a naturalized pattern and addresses views into the site and compatibility with slope. The functional relationships between the structures, access requirements, efficient circulation, and preservation of open space were considered in the design as developed by EBMUD.

Maintenance Access

The new access road from Leland Drive to the reservoir tanks and valve pit will be constructed of asphalt and is 12 feet wide. Intercepting this road will be a 15-foot wide maintenance road that connects to the upper perimeter road. An 8-foot security fence with barbed wire will be constructed adjacent to the upper perimeter road. The entrance to the overall site will be controlled by a manual bar gate at Leland Drive. The entrance to the perimeter road and the entrance to the valve pit will be secured with additional gates. Personnel can access the tanks by stairs from the perimeter road.

Access to new utility easements is maintained. Proposed trees are planted clear of the easement to avoid any future conflict with tree roots when maintaining equipment.

Tree and Grass Selection

Plants were selected based on their native status to the site. Two varieties, Coast Live Oak (Quercus agrifolia) and Valley Oak (Quercus lobata), were chosen as replacement trees for the site. The two species are currently the most prevalent on site. Both are low water use and California natives. Additionally, Coast Live Oak is an evergreen species and will provide screening year round.

Replacement trees are recommended to be 24-inch box size. A 24-inch box tree provides the greatest balance between tree size at installation and eventual adaptability and success. Smaller trees, while often better able to respond to transplant stress due to smaller, less constrained root systems, take time to provide the needed vegetative screening. Larger trees, while providing a more immediate visual impact, typically have a slower growth rate and are more commonly affected by transplant stress, root damage, and general structural damage.

During the design process, individual shrubs were eliminated due to the associated cost and maintenance. A hydroseed mix of native grasses was selected in lieu of individual shrubs to ensure full coverage of disturbed areas and reduce maintenance costs.

Tree Locations

Tree locations were determined during the visual simulation process. The iterative 3D modeling process studied tree placement based on views and slope steepness. The proposed layout establishes tree plantings in a naturalized pattern of clumped, staggered groupings. Trees are clear from the 25-foot pipeline and stormdrain easement. Plantings were limited to slopes that were less that 3:1. Seventy-five (75) new trees are proposed.

PREFERRED DESIGN - SITE PLAN

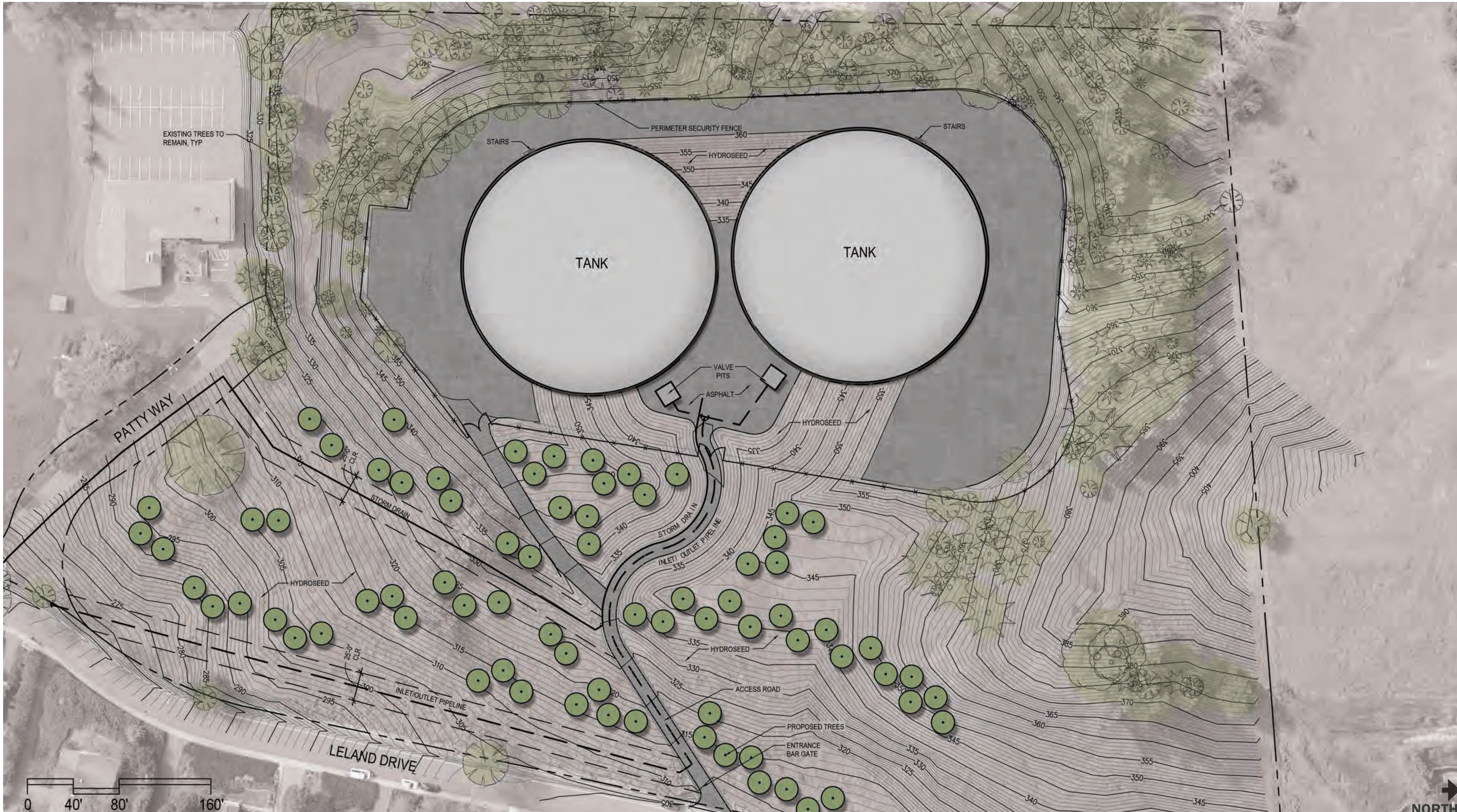


Figure 12.0

PLANT SPECIES

TREES

QUERCUS AGRIFOLIA
Coast Live Oak

QUERCUS LOBATA
Valley Oak

HYDROSEED MIX

NATIVE GRASS MIX
Bromus carinatus, California Brome
Elymus glaucus, Blue Wildrye
Vulpia microstachys, Three Weeks Fescue
Trifolium obtusiflorum, Native Clover

FENCE

SECURITY FENCE
8-foot high, 1-inch black vinyl coated mesh
with barbed wire

Figure 13.0

Final Visual Simulations

Visual simulations of the final design were developed for five adjacent locations. Where access was provided, a photo-realistic visualization was developed. Properties that could not be accessed were studied using a 3D model of the site's existing and proposed conditions.

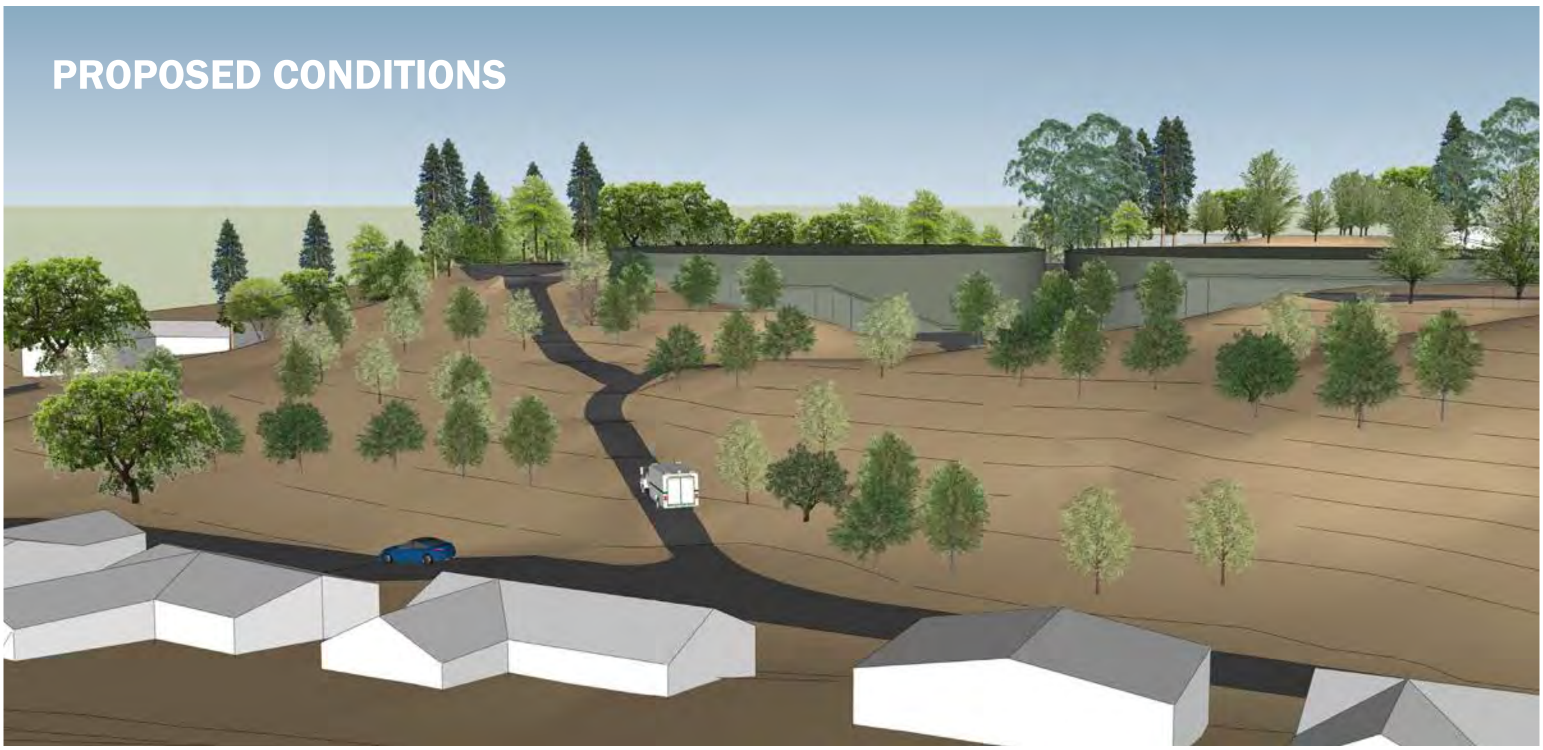

1050 LELAND DRIVE
EXISTING CONDITIONS


PROPOSED CONDITIONS


RESERVOIR
STATE ROUTE 24
LELAND DRIVE

Figure 14.0


24 RUTH COURT
EXISTING CONDITIONS


PROPOSED CONDITIONS

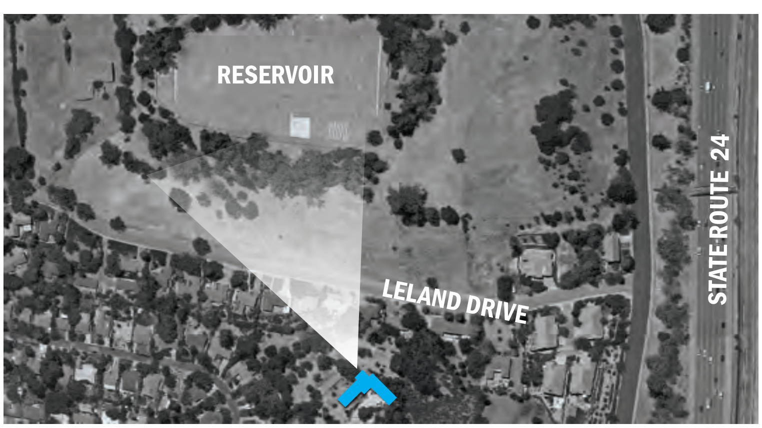

RESERVOIR
LELAND DRIVE
STATE ROUTE 24

Figure 15.0

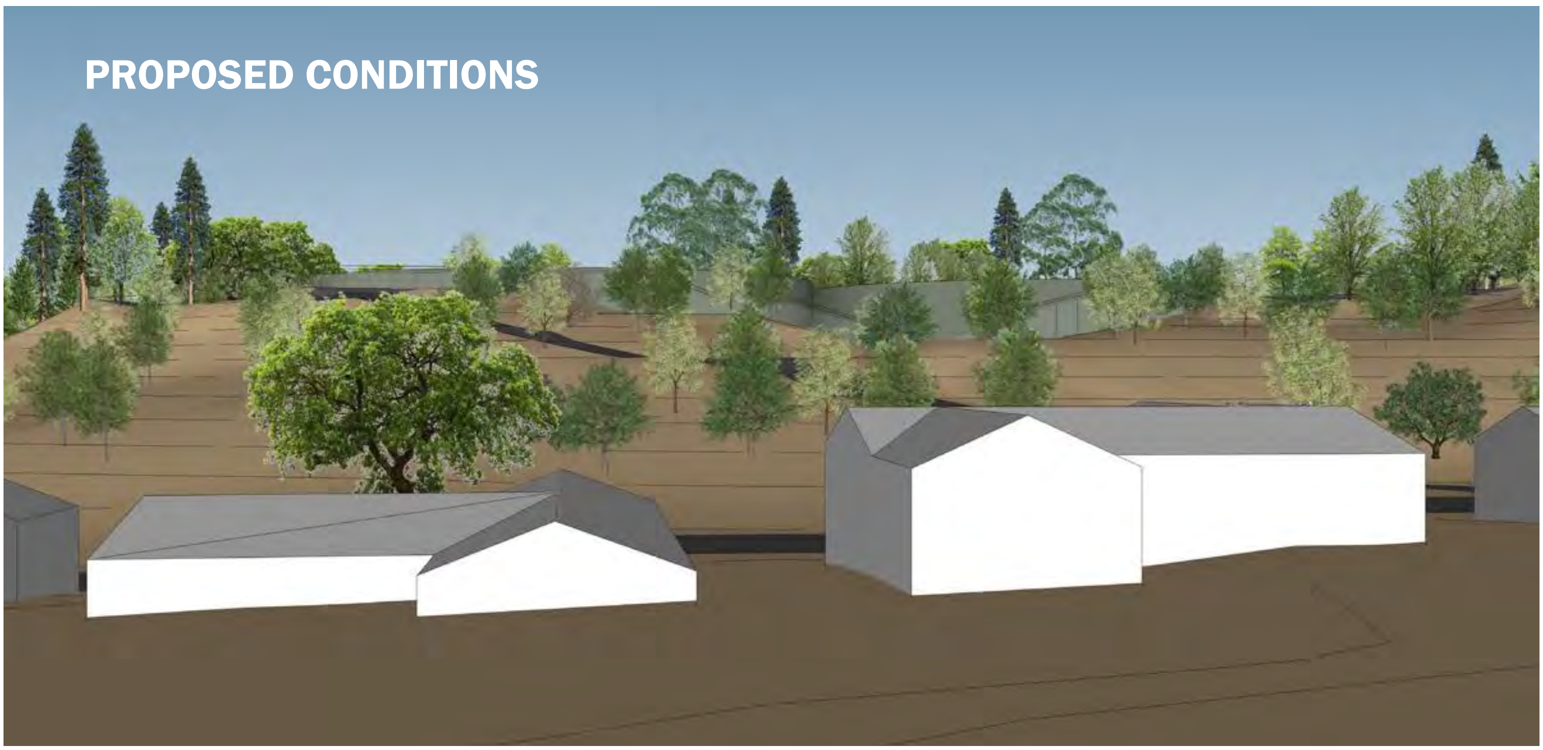


Figure 16.0

EBMUD RMC water and environment rhaa LANDSCAPE ARCHITECTURE + PLANNING Burks Toma Architects


3134 MARYOLA COURT
EXISTING CONDITIONS


PROPOSED CONDITIONS


RESERVOIR
STATE ROUTE 24
LELAND DRIVE

Figure 17.0

Site Overview

Figure 18.0

Computer generated bird's-eye model of the proposed replacement reservoir

OPINION OF COST

Opinion of Probable Cost

The Opinion of Probable Cost includes elements related to landscape preparation, planting, irrigation, and fencing. It excludes costs related to reservoir construction including but not limited to cut/fill, paving, roadways, utilities, and reservoir infrastructure.

Landscape Costs

Landscape demolition is limited to the removal of previously specified trees throughout the site. This removal includes the physical removal of the tree as well as chipping for reuse as mulch on site. Considerations based on ease of accessibility have not yet been incorporated and may affect the total cost.

Soil stabilization assumes a hydroseed mix will be applied to all disturbed areas, that is the limit of work minus the total area of hardscape and site infrastructure.

New 8-foot chain link fence and gates with barbed wire are designed to border the upper perimeter road of the reservoir. Replacement fencing at Leland Drive, if desired, has not been designed or included in the costs.

Irrigation is intended for tree establishment only and would consist of bubblers. These bubblers may be decommissioned after a 3-year establishment period pending annual weather conditions. Hydroseeded areas are not irrigated and are recommended to be seeded in winter months.

Seventy-five (75) replacement trees have been designed for the site. To increase the likelihood of tree establishment and success, all trees are assumed to be a 24-inch box. Each tree has been outfitted with cobble rock mulch to prevent rodent damage, deer protection fencing, and soil amendment.

OPINION OF PROBABLE COSTS LANDSCAPE

			QTY	UNIT	COST	TOTAL
1.0	DEMOLITION					
1.1	Tree Removal - 6 to 8" dia	inc stump ripped out with tractor and disposed off-site, easy access	32	EA	$275.00	$8,800.00
1.2	Tree Removal - 9 to 14" dia	inc stump ripped out with tractor and disposed off-site, easy access	30	EA	$460.00	$13,800.00
1.3	Tree Removal - 15 to 30" dia	inc stump ripped out with tractor and disposed off-site, easy access	53	EA	$1,330.00	$70,490.00
					Subtotal	$93,090.00
2.0	SOIL STABILIZATION					
2.1	Hydroseed	Native Grasses, inc soil prep	229,340	SF	$0.45	$103,203.00
					Subtotal	$103,203.00
3.0	FENCING					
3.1	Chainlink Fence	8 ft high, 9-gauge top and bottom rails, posts 10 ft oc, vinyl coated, security barbed wire	1670	LF	$115.00	$192,050.00
3.2	Chainlink Vehicular Gate	8 ft high, 9-gauge top and bottom rails, vinyl coated, security barbed wire	45	LF	$145.00	$6,525.00
					Subtotal	$198,575.00
4.0	IRRIGATION					
4.1	Backflow	inc cage	1	EA	$5,000.00	$5,000.00
4.2	Meter		1	EA	$5,000.00	$5,000.00
4.3	Irrigation Controller	inc cabinet	1	EA	$6,000.00	$6,000.00
4.4	Flow Meter		1	EA	$1,500.00	$1,500.00
4.6	Mainline	2"	2000	LF	$10.00	$20,000.00
4.7	Remote Control Valves	2"	6	EA	$600.00	$3,600.00
4.8	Bubblers	2 per tree, includes lateral line	150	EA	$200.00	$30,000.00
					Subtotal	$71,100.00
5.0	PLANTING					
5.1	24" Box Tree	inc double stake	75	EA	$330.00	$24,750.00
5.2	Rodent Protection	8 ft dia cobble rock @ 3" depth = 50 SF @ $2.50/SF	75	EA	$125.00	$9,375.00
5.3	Deer Protection	trunk protection	75	EA	$15.00	$1,125.00
5.4	Planting Soil Amendment	at trees, 16 SF at $0.50	75	EA	$8.00	$600.00
					Subtotal	$35,850.00
	Total					$501,818.00
	Contingency				25%	$125,454.50
	Grand Total					$627,272.50

Note: This Opinion of Probable Cost excludes cut/fill, paving, roadway, utilities, and reservoir infrastructure.

Figure 19.0

Appendix D: Technical Memorandum - Aesthetics

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Appendix D - Technical Memorandum Aesthetics

National Experience. Local Focus.

Leland Reservoir Replacement Project

Subject:	Aesthetics
Prepared For:	East Bay Municipal Utility District
Prepared by:	Rudy Calderon, RMC Water and Environment
Reviewed by:	Robin Cort, RMC Water and Environment
Date:	November 17, 2017
Reference:	0061-009.00

Table of Contents

List of Acronyms

CEQA	California Environmental Quality Act
EBMUD	East Bay Municipal Utility District
MG	Million Gallons
ROW	Right-of-Way
SR 24	State Route 24
TM	Technical Memorandum

1 Introduction

This Technical Memorandum (TM) addresses aesthetic and visual quality impacts associated with construction and operation of the proposed Leland Reservoir Replacement Project (Project) proposed by the East Bay Municipal Utility District (EBMUD). The TM includes a description of visual conditions in the Project area and an evaluation of the Project's potential effects on visual resources using photorealistic visual simulations for publicly accessible viewpoints. Simulated views from private viewpoints, which were developed using a 3D computer model, are also discussed, based on existing visual conditions at the Project site and the site's surroundings.

2 Project Background

The existing 18-million-gallon (MG), open-cut Leland Reservoir, constructed in 1955, is a critical drinking water facility for the Leland Pressure Zone, which serves the cities of Pleasant Hill, Walnut Creek, and Lafayette. The reservoir is at the end of its useful service life, and its replacement is necessary due to the deteriorated condition of the pre-cast concrete roof (including rainwater ponding), mature trees growing in the earthen embankment, obsolete mechanical and electrical equipment, and the reservoir's criticality in serving the Leland Pressure Zone.

The Project includes replacement of the reservoir with two new 8-MG pre-stressed concrete tanks within the existing reservoir basin. The Project would also include replacing approximately 1,700 linear feet of existing 36-inch transmission pipeline that is currently located beneath the reservoir with approximately 2,700 linear feet of 36-inch pipeline to be constructed within the public right-of-way (ROW) in Windsor Drive, Condit Road and Leland Drive and about 950 feet of 36-inch pipeline within the Leland Reservoir site. The access road from Leland Drive to the reservoir would also be improved. Approximately 1,000 linear feet of 30-inch new storm drain pipeline would also be installed on site and connect to the City of Lafayette's existing storm drain system at the intersection of Leland Drive and Patty Way.

2.1 Approach

This TM provides an analysis of the Project's effects on visual resources based on criteria specified in Appendix G, Environmental Checklist of the California Environmental Quality Act (CEQA) Guidelines. The Project involves replacement of an existing storage reservoir and associated pipelines. The TM evaluates short term Project related effects that would occur during the construction period, as well as effects of Project implementation that would be noticeable over a longer term.

3 Environmental Setting, Impacts and Mitigation

3.1 Environmental Setting

The following sections describe existing environmental conditions relative to visual resources and potential effects the Project may have on those resources.

3.1.1 Regional Setting

The Project site and surrounding area 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 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.

Leland Reservoir is located on a 14.5-acre site opposite 1050 Leland Drive, south of Old Tunnel Road in a residential area of the City of Lafayette. The City of Lafayette is primarily a residential community and it is the residential neighborhoods that largely define its character. Residential development is located on either side of the Mt. Diablo Boulevard corridor, along valley floors and on the surrounding hillsides. Residential neighborhoods present a diverse visual environment, offering a variety of housing types, and architecture that is sensitive to the hilly landscape. Most of the City of Lafayette's commercial and institutional development is concentrated in the City's downtown, which is located about one mile west of the Project site along the State Route 24 (SR 24) corridor. SR 24 is a major highway that bisects the City of Lafayette, passing through the City from west to east. Areas of the City of Lafayette located in the immediate vicinity of SR 24 are characterized by a more urban visual character that is dominated by the large scale physical features of the highway, in contrast to other parts of the City of Lafayette that retain a development pattern that is smaller in scale and blends in with surrounding natural landscape features. **Figure 1** shows the Project site within its regional context.

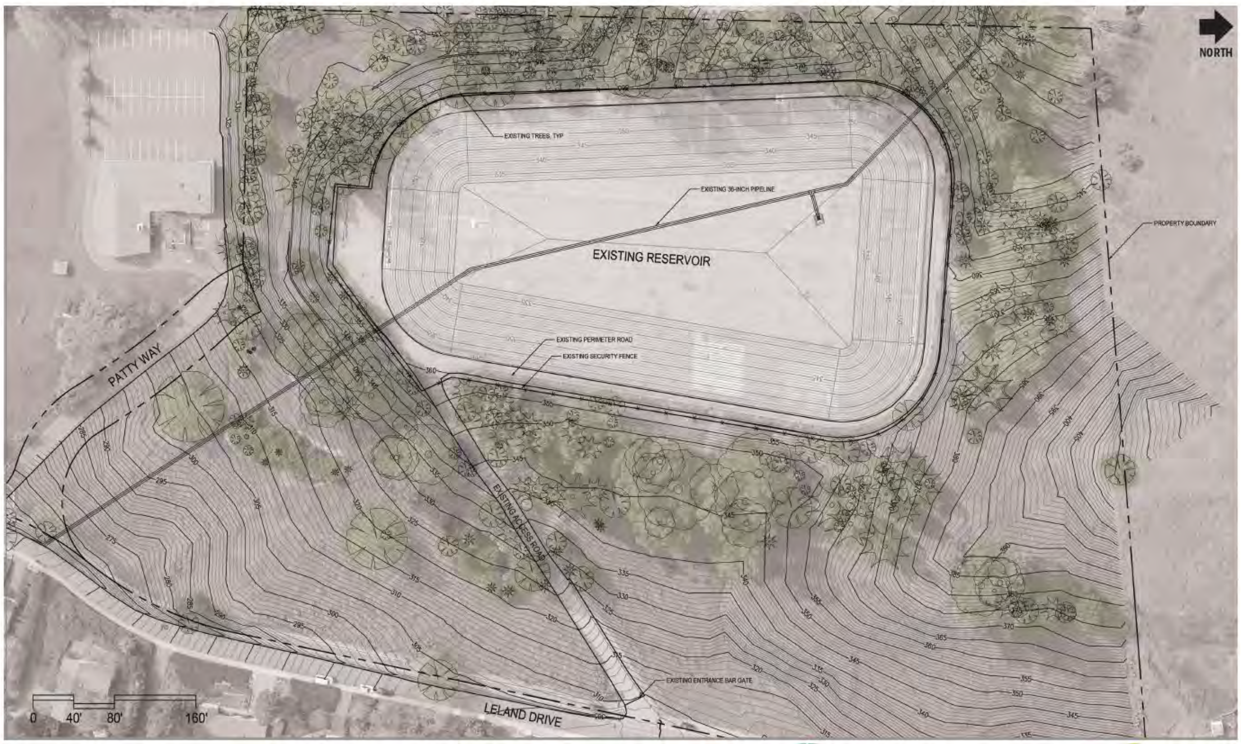
Figure 1: Leland Reservoir Replacement Site – Regional Context

Source: RHAA,2017

3.1.2 Leland Reservoir Project Site Setting

Leland Reservoir is surrounded by embankments that screen it from view from the adjacent streets. The reservoir is about 700 feet south of SR 24, but is not visible from the highway because there is a hill between the freeway and the Project site that obstructs views of the reservoir. There are about a dozen homes on the east side of Leland Drive that are at higher elevations and therefore have views of the reservoir site, but not the reservoir itself. Homes at the end of Maryola Court, Mars Court and Windsor Court have backyards that are immediately adjacent to the west side of the reservoir site, but are also screened from the reservoir itself by the intervening embankment. The Sun Valley Bible Chapel is immediately south of the reservoir site. The reservoir is not visible from the Sun Valley Bible Chapel, because intervening vegetation and an elevation change between the two locations obscure sight lines from the Chapel to the reservoir. The reservoir itself is only visible from homes at higher elevations at the end of Ruth Court and Sunset Loop, east of the Project site. The site is vegetated with scattered mature native oak trees, along with oak, pine, redwood and eucalyptus trees that were planted by EBMUD to screen the reservoir. The visual character of the site changes slightly due to seasonal patterns that affect the color of vegetation on the embankments that surround the site. The grasses on the embankments are a golden brown during the dry summer and fall seasons and normally change to green during wetter months of the year. Trees on the site are a combination of deciduous and evergreen trees. During the late fall and winter, the deciduous trees lose their leaves, and re-grow them in the spring, resulting in visual character variability during the year. **Figure 2** shows the Leland Reservoir site and its existing features.

Figure 2: Leland Reservoir Replacement Site – Existing Features



Source: RHAA, 2017

The area surrounding Leland Reservoir hosts a native Oak Savannah landscape. The most common tree species on the site are Coast Live Oak and Valley Oak, and other trees include various pine and eucalyptus species. The site's understory is comprised of native grasses. The site's vegetation and elevation above most of the surrounding area are valuable natural defenses for security and site screening, and the height and shape of the hills help to visually obscure the reservoir and inhibit public entry. Maintaining these defenses is key in developing both a visual and physical separation between the site and adjacent neighbors. However, steep slopes at the site limit the area available for construction storage, staging and stockpiling of materials, and existing trees constrain construction access and availability of soil stockpiling locations.

3.2 Regulatory Framework

There are no federal regulations regarding visual resources relevant to the proposed Project.

3.2.1 State Policies and Regulations

California State Scenic Highways Program

California's Scenic Highway Program was created by the Legislature in 1963. Its purpose is to protect and enhance the natural scenic beauty of California highways and adjacent corridors, through special conservation treatment. A highway may be designated scenic depending upon how much of the natural landscape can be seen by travelers, the scenic quality of the landscape, and the extent to which development intrudes upon the traveler's enjoyment of the view. SR 24, which passes approximately 700 feet north of the reservoir site, is a state designated scenic highway (California Department of Transportation, 2017).

3.2.2 Local Policies and Regulations

Overview

Pursuant to California Government Code § 53091, EBMUD, as a local agency and utility district serving a broad regional area, is not subject to building and land use zoning ordinances (e.g., tree ordinances) for projects involving facilities for the production, generation, storage, or transmission of water. However, it is the practice of EBMUD to work with local jurisdictions and neighboring communities during project planning, and to consider local environmental protection policies for guidance. At the local level, aesthetic quality is addressed through implementation of General Plan policies and compliance with the City of Lafayette's Tree Ordinance, which provide guidelines for preserving and enhancing the visual character and scenic resources of the area. Applicable local policies regarding aesthetics are identified below.

City of Lafayette General Plan

Chapter I: Land Use

Policy LU-1.1 Scale: Development shall be compatible with the scale and pattern of existing neighborhoods.

Policy LU-2.3: Preservation of Views: Structures in the hillside overlay area shall be sited and designed to be substantially concealed when viewed from below from publicly owned property. The hillsides and ridgelines should appear essentially undeveloped, to the maximum extent feasible.

Policy LU-15.1 Review Capital and Public Improvements: Review capital and public improvements to ensure that they are designed and built in a manner sensitive to the surrounding area.

Policy LU-15.2 Inter-Agency Coordination: Work with agencies who carry out capital improvements in the City to ensure that they are aware of, and comply with, the city's aesthetic standards and review procedures.

Chapter III: Open Space and Conservation

Policy OS-3.1 Protect Natural Features of the Lands: The character and natural features of hills, steep slopes, riparian areas, woodlands, and open areas will be preserved in as natural a condition as feasible.

Policy OS-3.2 Preserve the predominant views of the hill areas: Require that structures in identified environmentally sensitive areas be substantially concealed by existing vegetation or terrain when viewed from lower elevations, to the maximum extent feasible.

Policy LU-4.1 Infrastructure Design: Public and private infrastructure should reinforce the semi-rural qualities of residential neighborhoods.

City of Lafayette Municipal Code – Tree Ordinance

Title 6: Planning and Land Use, Chapter 6-17

6-1703 Destruction of a Protected Tree: It is a violation of this chapter for any person to remove or destroy a protected tree without a category I or category II permit under Section 6-1706 or 6-1707, or without the approval of an exception under Section 6-1705.

6-1704 Permit Required to Remove a Protected Tree: A category I or category II permit under Section 6-1706 or 6-1707 is required to remove or destroy a protected tree.

6-1707 Permit Category II: Protected Tree on Developed or Undeveloped Property Associated with Development Application: A category II permit is required if the proposed construction may result in the destruction or removal of a protected tree.

EBMUD Standard Construction Specifications

EBMUD's Standard Construction Specification 01 35 44 requires controls on site activities and describes measures that shall be implemented to reduce the potential for damage to native and non-native protected trees, which play an important role in defining the visual character of the Project site. Measures to protect trees as required by the specification include:

- Locations of trees to be removed and protected are shown in the drawings. Pruning and trimming shall be completed by the Contractor and approved by the Engineer. Pruning shall adhere to the Tree Pruning Guidelines of the International Society of Arboriculture.
- Erect exclusion fencing five feet outside of the drip lines of trees to be protected. Erect and maintain a temporary minimum 3-foot high orange plastic mesh exclusion fence at the locations as shown in the drawings. The fence posts shall be six-foot minimum length steel shapes, installed at 10-feet minimum on center, and be driven into the ground. The Contractor shall be prohibited from entering or disturbing the protected area within the fence except as directed by the Engineer. Exclusion fencing shall remain in place until construction is completed and the Engineer approves its removal.
- No grading, construction, demolition, trenching for irrigation, planting or other work, except as specified herein, shall occur within the tree protection zone established by the exclusion fencing installed shown in the drawings. In addition, no excess soil, chemicals, debris, equipment or other materials shall be dumped or stored within the tree protection zone.
- In areas that are within the tree dripline and outside the tree protection zone that are to be traveled over by vehicles and equipment, the areas shall be covered with a protective mat composed of a 12-inch thickness of wood chips or gravel and covered by a minimum ¾-inch thick steel traffic plate. The protective mat shall remain in place until construction is completed and the Engineer approves its removal.

EBMUD's Standard Construction Specification 01 35 44 and Standard Construction Specification 01 74 05 require controls on site activities relative to the cleanliness of construction areas and describe measures that shall be implemented to ensure that the Project site is maintained in as clean a condition as possible. Measures related to construction site maintenance required by the specifications include:

- …When operations are completed, excess materials or debris shall be removed from the work area as specified in the Construction and Demolition Waste Disposal Plan.
- Excess material shall be disposed of in locations approved by the Engineer consistent with all applicable legal requirements and disposal facility permits.
- At all times maintain areas covered by the Contract and public properties free from accumulations of waste, debris, and rubbish caused by construction operations.
- During execution of work, clean site and public properties and legally dispose of waste materials, debris, and rubbish to assure that buildings, grounds, and public properties are maintained free from accumulations of waste materials and rubbish. All soil and any other material tracked onto the streets by the Contractor shall be cleaned immediately. The Contractor shall comply with all rules and regulations as applicable for its cleaning method.
- Dispose of all refuse off District property as often as necessary so that at no time shall there be any unsightly or unsafe accumulation of rubbish.

3.3 Impact Analysis

3.3.1 Methodology for Analysis

For purposes of the analysis, visual 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 combination of natural landscape features, including landform, water, and vegetation patterns, as well as the presence of built features such as buildings, roads, and other structures.

This analysis considers view obstruction, negative aesthetic effects, and light and glare effects. As part of the analysis, computer-generated visual simulations were produced to illustrate conceptual “before” and “after” visual conditions as seen from key public and private viewpoints. The visual simulations provide a clear depiction of the location, scale, and general appearance of proposed Project changes. Digitized photographs and computer modeling and rendering techniques were used to prepare the simulation images. The visual analysis is also based on field observations of the Project site and its surroundings, in addition to a review of Project drawings, and aerial and ground-level photographs of the Project area.

3.3.2 Viewpoints – Existing and Proposed Conditions

Figure 3 is a plan view rendering of the Project site after Project implementation which illustrates the location and dimensions of the proposed reservoir tanks, the alignment of the road that would surround the tanks, the new site access road, and proposed replacement trees that would be planted as part of the Project.

Computer-generated visual simulations and renderings are tools that are helpful in evaluating a project’s anticipated impacts on visual resources, especially when the simulations of views after project implementation are compared to images of existing views. **Figure 4** is an aerial image of the Project area showing the viewpoint locations and view directions using arrows on the image. **Figure 5** (View 1) and **Figure 6** (View 2) illustrate before and after views toward the Project site from two publicly accessible viewpoints located along Leland Drive, while **Figure 7** (View 3) presents a rendering of a private view from the backyard of a residence located at 24 Ruth Court. Because the private backyard is not publicly accessible, both the existing and proposed conditions for the view from 24 Ruth Court are based on computer renderings.

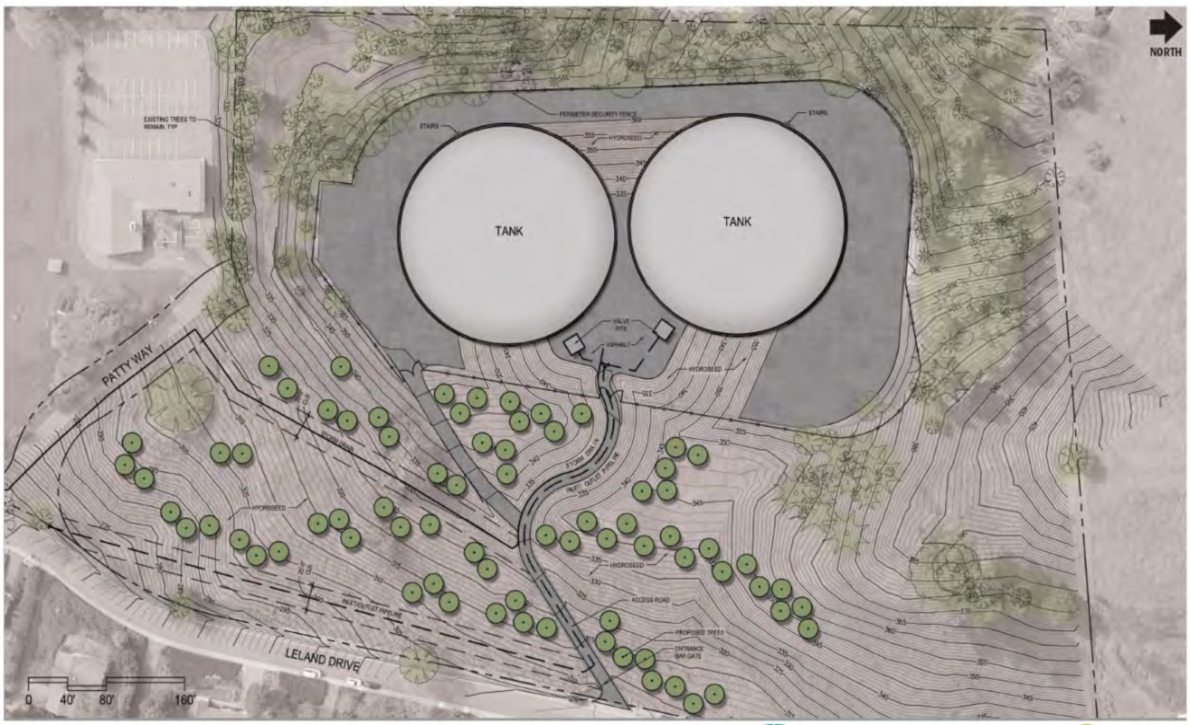
3.3.3 Thresholds of Significance

Consistent with Appendix G of the *CEQA Guidelines* an impact to visual resources would be considered significant if the Project would:

- Have a substantial, adverse effect on a scenic vista;
- Substantially damage scenic resources, including but not limited to trees, rock outcroppings, and historic buildings within a state scenic highway;
- Substantially degrade the existing visual character or quality of the site and its surroundings; 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 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.

Figure 3: Leland Reservoir Replacement Site – Plan View Design Concept



Source: RHAA, 2017

Figure 4: Existing Conditions and Viewpoints Locations Map

Source: RMC, 2017

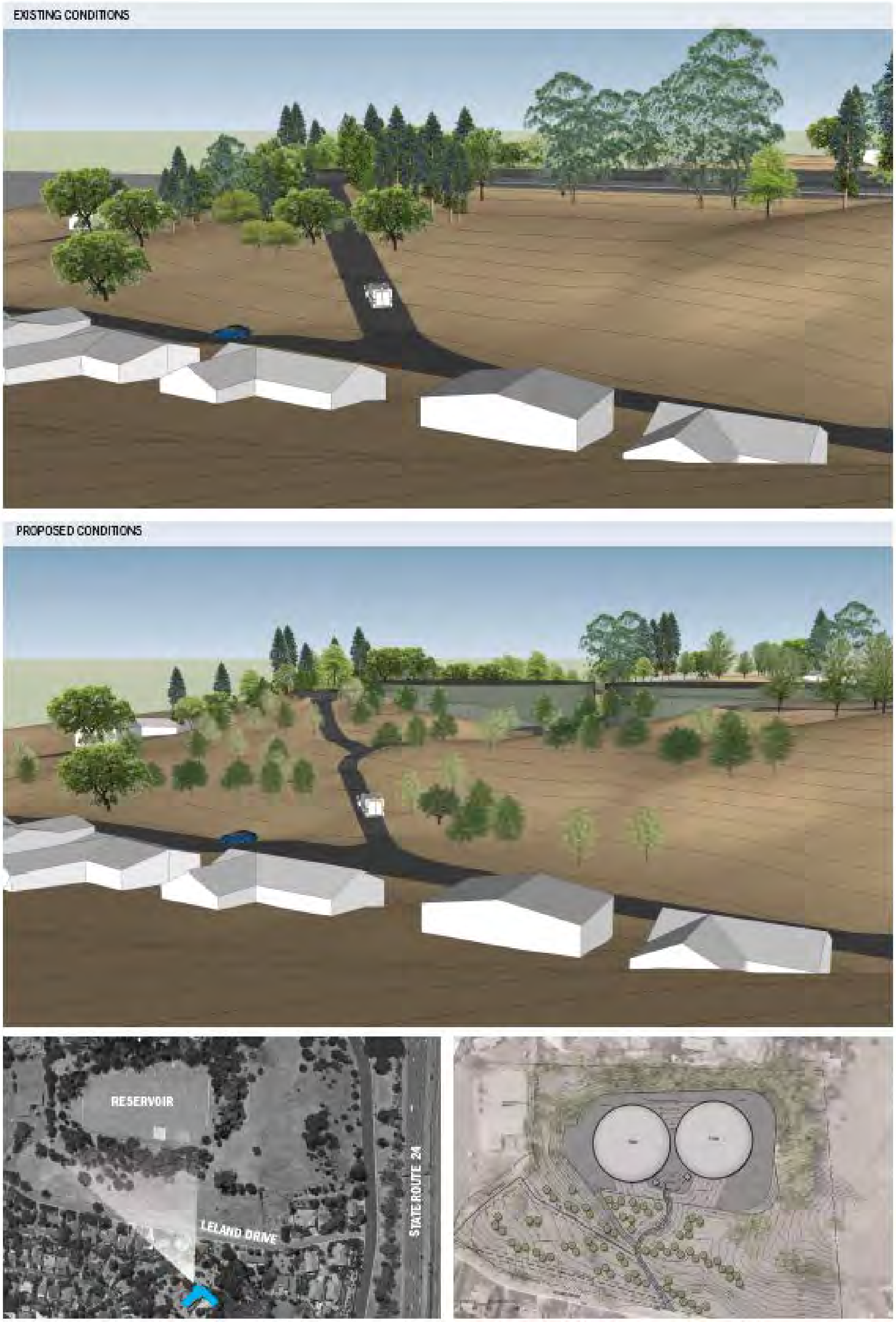
Figure 5: View 1 – Existing and Simulated Views from 1040 Leland Drive

Source: RHAA, 2017

Figure 6: View 2 – Existing and Simulated Views from 1050 Leland Drive

Source: RHAA, 2017

Figure 7: View 3 – Existing and Simulated Views from 24 Ruth Court



Source: RHAA, 2017

3.3.4 Impacts and Mitigation Measures

Impact AES-1 Substantial adverse effect on a scenic vista

Construction

The Project site is not located within an officially designated scenic vista. The site's elevated topography and perimeter vegetation prevent views into the Project site for most viewers. Construction activities involving soil disturbance, vegetation removal, excavation, cutting/filling, stockpiling and grading at the reservoir site, as well as in public ROWs where construction would take place, could result in temporary effects on the visual quality of the Project site and its surroundings. However, none of these effects would occur within a designated scenic vista. The Project would result in no impact to a designated scenic vista, and no mitigation is required.

Operation

As discussed above, the Project site is not located within an officially designated scenic vista; therefore, activities occurring during the Project's operational period would have no impact on a designated scenic vista, and no mitigation is required.

Significance Determination before Mitigation

No Impact

Mitigation Measures

No mitigation measures are required.

Impact AES-2 Substantially damage scenic resources, including but not limited to trees, rock outcroppings, and historic buildings within a state scenic highway

Construction

SR 24, which passes within approximately 700 feet north of the reservoir site, is a state designated scenic highway (California Department of Transportation, 2017). Travel along some portions of SR 24 offers sweeping, scenic views of the East Bay hills, including occasional unobstructed views of Mt Diablo. Due to the topography of the area near the Project site, it is not possible for travelers on SR 24 to view Leland Reservoir as they drive along the highway in either the westbound or eastbound direction. The hill upon which Leland Reservoir was constructed, as well as perimeter vegetation located on the hill, obstruct any views toward the reservoir site. In addition, views from the highway toward the public ROWs where pipeline construction would occur are similarly obstructed by the area's topography. Project construction activities would remove approximately 90 trees from the Project site, none of which would be visible from the highway. Therefore, the Project would result in no impact to scenic resources within a state scenic highway.

Operation

Activities occurring during the Project's operational period would have no impact on a state scenic highway because it is not possible for travelers on SR 24 to view Leland Reservoir as they drive along the highway in either the westbound or eastbound direction. In addition, the hill upon which Leland Reservoir was constructed, as well as perimeter vegetation located on the hill, obstruct any views toward the reservoir site from SR 24. No mitigation is required.

Significance Determination before Mitigation

No Impact

Mitigation Measures

No mitigation measures are required.

Impact AES-3 Substantially degrade the existing visual character or quality of the site and its surroundings

A total of approximately 90 trees would be removed for construction of the Project, sixteen of which are designated “protected” status by the City of Lafayette. Approximately 30 additional trees would be removed from the site prior to the reservoir replacement project due to being in fair, poor or dead condition, or because they pose a threat to fire prevention management efforts.

Construction activities associated with the Project would require vegetation removal, earthwork, stockpiling of material and the use of heavy equipment. The degree to which construction activities would be noticeable would vary, depending on the views experienced by residents, pedestrians and motorists, and on the type and location of those activities. Pipeline construction, vegetation removal and soil stockpiling on hill embankments would be highly visible to viewers directly adjacent to the work area, and though temporary, would occur over an extended time. The proximity and high visibility of construction activities would be a potentially significant impact of the Project. However, as detailed in the Project Description, a number of EBMUD standard practices and procedures, applicable to all EBMUD projects, have been incorporated into the Project, including Standard Construction Specification 01 35 44. Section 3.7, Tree Protection, of Standard Construction Specification 01 35 44, which would ensure that trees on the reservoir site that do not need to be removed for construction would be protected from damage and that trees along Windsor Drive, Condit Road and Leland Drive would not be adversely affected by pipeline construction; tree protection measures included erection of exclusion fencing around trees, and completing any necessary pruning of limbs or roots according to the guidelines of the International Society of Arboriculture. EBMUD Standard Construction Specifications 01 74 05 and 01 35 44, Section 1.1(B) require construction practices that will ensure the site is maintained in as orderly and clean condition as possible throughout the construction period.

Because Section 3.7, Tree Protection, and Section 1.1(B), Site Activities, of Standard Construction Specification 01 35 44, and Standard Construction Specification 01 74 25, Cleaning, have been incorporated into the Project and include measures to maintain an orderly construction site and to protect trees, and because visual disruption during construction would be temporary, the degradation of visual character from construction activities would be less than significant.

Once the pipeline is constructed the visual character of the pipeline alignment along Windsor Drive, Condit Road and Leland Drive would be restored to existing conditions and would be essentially unchanged, other than some minor pruning of trees, similar to what might occur regularly for maintenance of power lines. The new tanks at the reservoir site would be screened from view by the reservoir embankment, which would be remain in place after Project construction. Design of the tanks is thus consistent with Lafayette General Plan policies regarding hillside overlay areas, which state that structures should be designed to be substantially concealed from view when viewed from below from publicly owned property.

However, due to physical changes to the vegetation at the reservoir site resulting from the Project, there would initially be a major alteration in the appearance of the site at completion of construction. The Project’s effect on the visual character and quality of the Project site and its surroundings would be attributable primarily to changes caused by the proposed removal of approximately 90 trees from the site.[1] Views toward the site would be significantly altered due to removal of the many mature trees that currently provide screening and are assets in terms of the area's visual quality. However, as part of the Project EBMUD would plant 75 coast live oak and valley oak trees on the reservoir site, as described in the Project Description and depicted in Figure 3. The Project's impact would be less than significant because replacement vegetation would become established and the site would be restored to be visually comparable to its existing condition. Over time, components of the proposed Project's landscape design would replicate, to the extent possible, the role vegetation plays in terms of the area's visual character under current conditions.

Visual changes associated with the Project would be most noticeable in the early years after Project implementation, given that replacement trees would not have grown sufficiently to provide a level of screening and aesthetic value that is similar to current site conditions. Trees would initially be fairly small (approximately 6 to 12 feet in height) because the optimal size for replacement trees is 24-inch box size. Smaller trees, while often better able to respond to transplant stress due to smaller, less constrained root systems, take time to provide the needed vegetative screening. Larger trees, while providing a more immediate visual impact, typically have a slower growth rate and are more commonly affected by transplant stress, root damage, and general structural damage.

Visual simulations were prepared (see Figures 5 through 7) and illustrate conditions as they would appear 15 years after planting of replacement trees. Figure 5 (View 1) and Figure 6 (View 2) illustrate before and after views toward the Project site from two publicly accessible viewpoints located along Leland Drive, while Figure 7 (View 3) presents a rendering of a private view from the backyard of a residence located at 24 Ruth Court. Both the existing and proposed conditions for the view from 24 Ruth Court are based on computer renderings because the area is not publicly accessible. As shown in the simulations, views toward the Project site from View 1 and View 2 would mimic the current tree distribution pattern, and in the case of View 2, a portion of the western storage tank and perimeter security fence would be visible through the replacement vegetation. From View 3, even after 15 years, replacement vegetation would not conceal the proposed Project's infrastructure because it is not possible to screen views from above the site. However, the difference between the site's existing and proposed visual character as viewed from the three Views 15 years after Project completion would not be substantial because the proposed landscape design would result in site conditions that would be very similar to existing conditions relative to visual character and quality.

Significance Determination before Mitigation

Less than Significant

Mitigation Measures

No mitigation measures are required

Impact AES-4 Create a new source of substantial light or glare that would adversely affect day or nighttime views in the area.

Construction

The proposed new 36-inch water transmission pipelines would connect to the EBMUD existing water transmission pipelines. The work to connect the new pipelines to existing pipelines would require the excavation of a trench or pit at each connection location: Old Tunnel Road/Windsor Drive, Leland

[1] Approximately 30 additional trees would be removed from the site for maintenance purposes, not for reasons directly related to the proposed reservoir replacement Project. Trees removed for maintenance purposes would not be an impact of the Project.

Drive/Meek Place, and at the southern edge of the reservoir site at Leland Drive. The proposed tie-ins would be located within street ROWs. Construction of the connections is estimated to require a continuous 71- to 76-hour period, and night work would be necessary.

Night lighting would be used, but would be removed when the tie-in process is complete. Nighttime construction would affect views from adjacent residences in that it could be visible from residences along Old Tunnel Road, Windsor Drive, Condit Road, Meek Place and Leland Drive. Exposure of nearby residences to nighttime construction lighting would be a potentially significant impact of the Project. Implementation of **Mitigation Measure AES-1** would reduce this impact to a less than significant level. The Project would not introduce reflective surfaces such as glass or metal that has the potential to reflect light. Therefore, the Project would not result in permanent new sources of glare.

Operation

The Project would not include installation of new permanent exterior night lighting fixtures at the Leland Reservoir site.

Significance Determination before Mitigation

Potentially Significant

Mitigation Measures

Mitigation Measure AES-1: Nighttime Lighting Controls

> To the extent possible, EBMUD will ensure that temporary stationary lighting used during nighttime construction is of limited duration, shielded and directed downward or oriented such that little or no light is directly visible from nearby residences.

Significance Determination after Mitigation

Less than Significant

4 References

California Department of Transportation. 2017. California Scenic Highway Mapping System. Available at: http://www.dot.ca.gov/hq/LandArch/16_livability/scenic_highways/index.htm, accessed on May 19, 2017.

City of Lafayette. 2002. City of Lafayette General Plan. Available at: http://www.lovelafayette.org/city-hall/city-departments/planning-building/general-master-specific-plans/general-plan, accessed on May 18, 2017.

RHAA Landscape Architecture + Planning (RHAA). 2017. EBMUD Leland Reservoir Replacement Project: Conceptual Architecture and Landscape Design Report. June 15, 2017.

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Appendix E: Technical Memorandum - Air Quality and Greenhouse Gases

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Technical Memorandum (Final)

Leland Reservoir Replacement Project

Subject:	Air Quality and Greenhouse Gases
Prepared For:	East Bay Municipal Utility District
Prepared by:	Valerie Chew Geier, Orion Environmental Associates
Reviewed by:	Robin Cort, RMC Water and Environment
Date:	November 30, 2017
Reference:	0061-009.00

Table of Contents

List of Terms and Acronyms

ADT	Average Daily Traffic
ASF	Age Sensitivity Factor
BAAQMD	Bay Area Air Quality Management District
BMPs	Best Management Practices
CARB	California Air Resources Board
CalEEMod®	California Emission Estimator Model
Cal/EPA	California Environmental Protection Agency
CO_2e	Carbon Dioxide Equivalent
DPM	Diesel Particulate Matter
EMFAC2014	Emissions Estimator Model (2014 version)
GHG	Greenhouses Gases
HI	Hazard Index
MEI	Maximally Exposed Individual
MT	Metric Tons
NO_X	Nitrogen Oxides ($NO + NO_2$)
OEHHA	Office of Environmental Health Hazard Assessment
$PM_{2.5}$	Particulate Matter Less Than 2.5 Micrometers in Aerodynamic Diameter
PM_{10}	Particulate Matter Less Than 10 Micrometers in Aerodynamic Diameter
ROG	Reactive Organic Gas
TACs	Toxic Air Contaminants
USEPA	United States Environmental Protection Agency
VDEC	Verified Diesel Emission Control Strategy
VOCs	Volatile Organic Compounds
$\mu g/m^3$	Microgram per Cubic Meter

1 Introduction

This Technical Memorandum (TM) provides information on air quality that will be used in the evaluation of environmental impacts associated with the Leland Reservoir Replacement Project (Project), which is proposed by the East Bay Municipal Utility District (EBMUD).

2 Project Description

Project Location

The Project site is located in the City of Lafayette (**Figure 1**). State Route 24 (SR 24), located north of the project site, provides regional access to the site. Pleasant Hill Road, Old Tunnel Road, and Leland Drive provide local access to the site. Windsor Drive and Condit Road also provide local access.

Project Construction

The Project includes two primary elements: demolition and replacement of the existing open-cut reservoir with two new concrete 8-MG storage tanks and replacement of the existing pipeline that is located under the reservoir. A 36-inch critical transmission pipeline that is located beneath the existing reservoir basin would be demolished and removed as part of the reservoir demolition. In addition, the 36-inch pipeline that extends beyond the reservoir basin would be abandoned in place along with a 30-inch pipeline in an unimproved right-of-way, west of the property boundary.

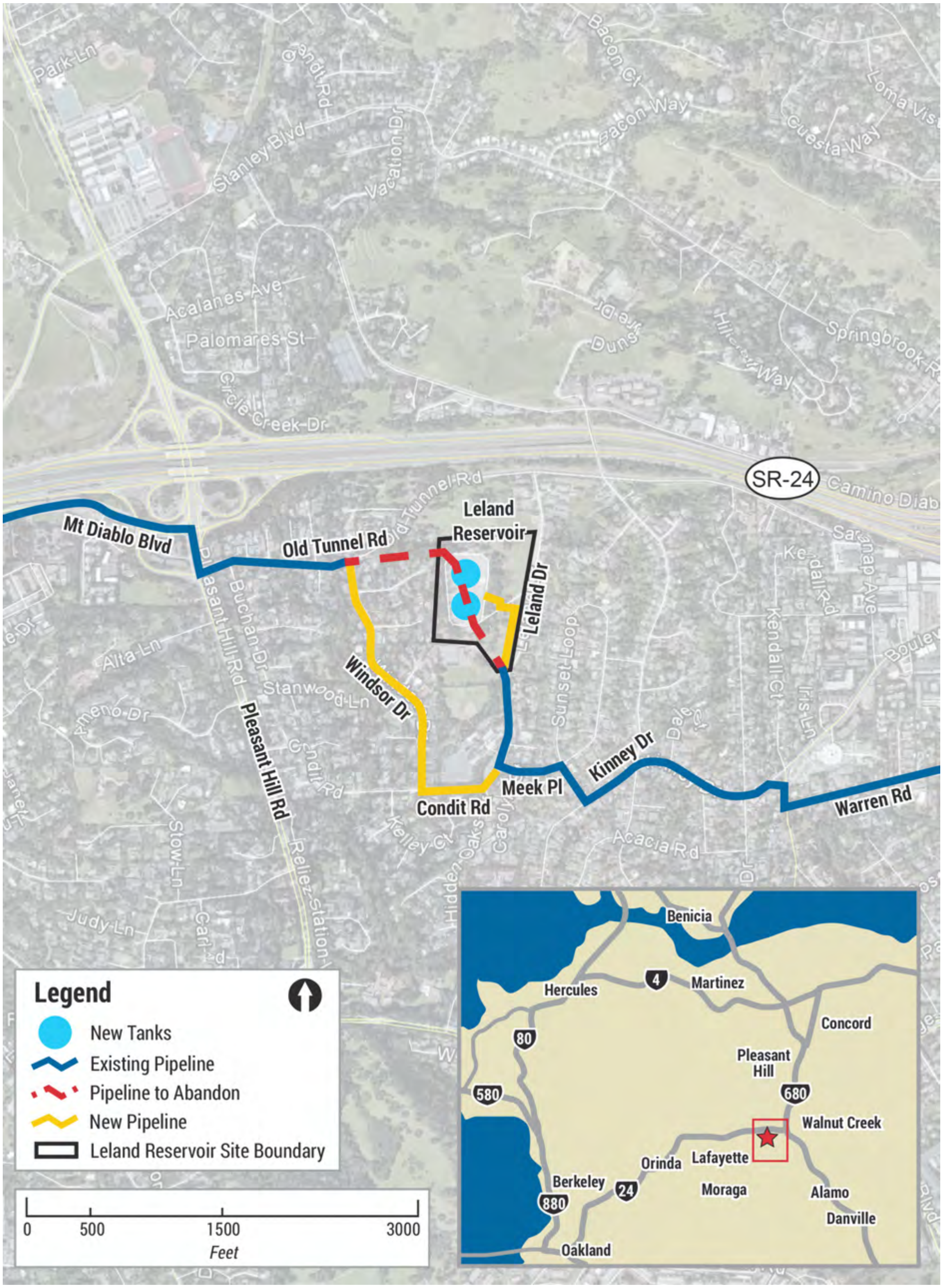
Construction Phasing. Construction would occur in phases. The first phase would involve construction of approximately 2,700 feet of 36-inch diameter pipeline in Windsor Drive, Condit Road, and Leland Drive, which replaces the existing transmission pipeline located beneath the existing reservoir. Once the new pipeline is completed and in service, the second phase would begin, which includes demolition of the reservoir, abandonment of this existing pipeline, and construction of the new tanks. An additional 950 feet of 36-inch pipeline would be constructed on the reservoir site, connecting the new tanks to the existing transmission main on the southeast side of the project site. Approximately 1,000 feet of 30-inch storm drain would also be constructed on the reservoir site. **Figure 2** indicates the locations of the proposed pipeline alignments, while **Figure 3** shows the proposed reservoir conceptual plan (including storm drain location).

The pipeline in Windsor Drive and Condit Road would be constructed using open-trench construction method. After construction of this new pipeline is complete, the work to connect the new pipeline to existing pipelines (pipeline tie-ins) would require the excavation of a trench or pit at each connection location: on Old Tunnel Road at Windsor Drive and on Leland Drive at Meek Place. The entire pipeline construction process from start to finish could take approximately six months, out of which active construction[1] would occur over approximately 16 weeks, proceeding along the alignment at a rate of approximately 80 linear feet per day.

Prior to the start of reservoir construction, trees would be removed from the existing embankment on the east side and southwest side of the reservoir, and the existing reservoir would be drained. Once the reservoir is fully drained and sediments are disposed of, the east side embankment would be breached and approximately 42,000 cubic yards (CY) of excavated soil would be stockpiled and approximately 66,000 CY of excavated soil and demolition debris would be hauled off site. The existing reservoir and pipeline beneath the existing reservoir basin would be demolished and construction of the new tanks could begin. Existing pipelines beyond the reservoir basin and in an unimproved right-of-way (R/W 1002), west of the property boundary, would be abandoned in place. The abandonment process would include filling

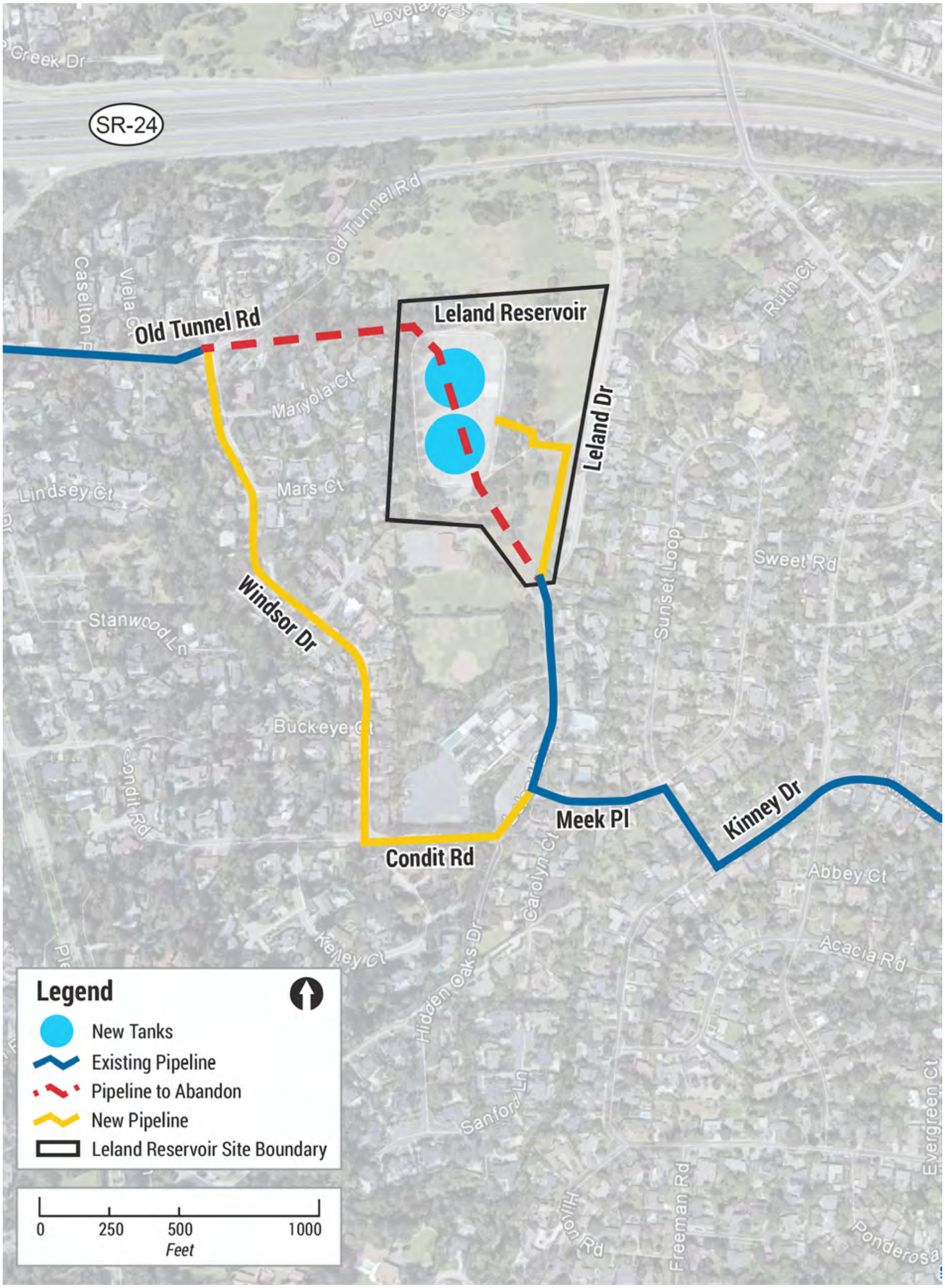
[1] Active construction time does not include down time, submittal review, material procurement, and fabrication inspection and approval process.

Figure 1 Project Location



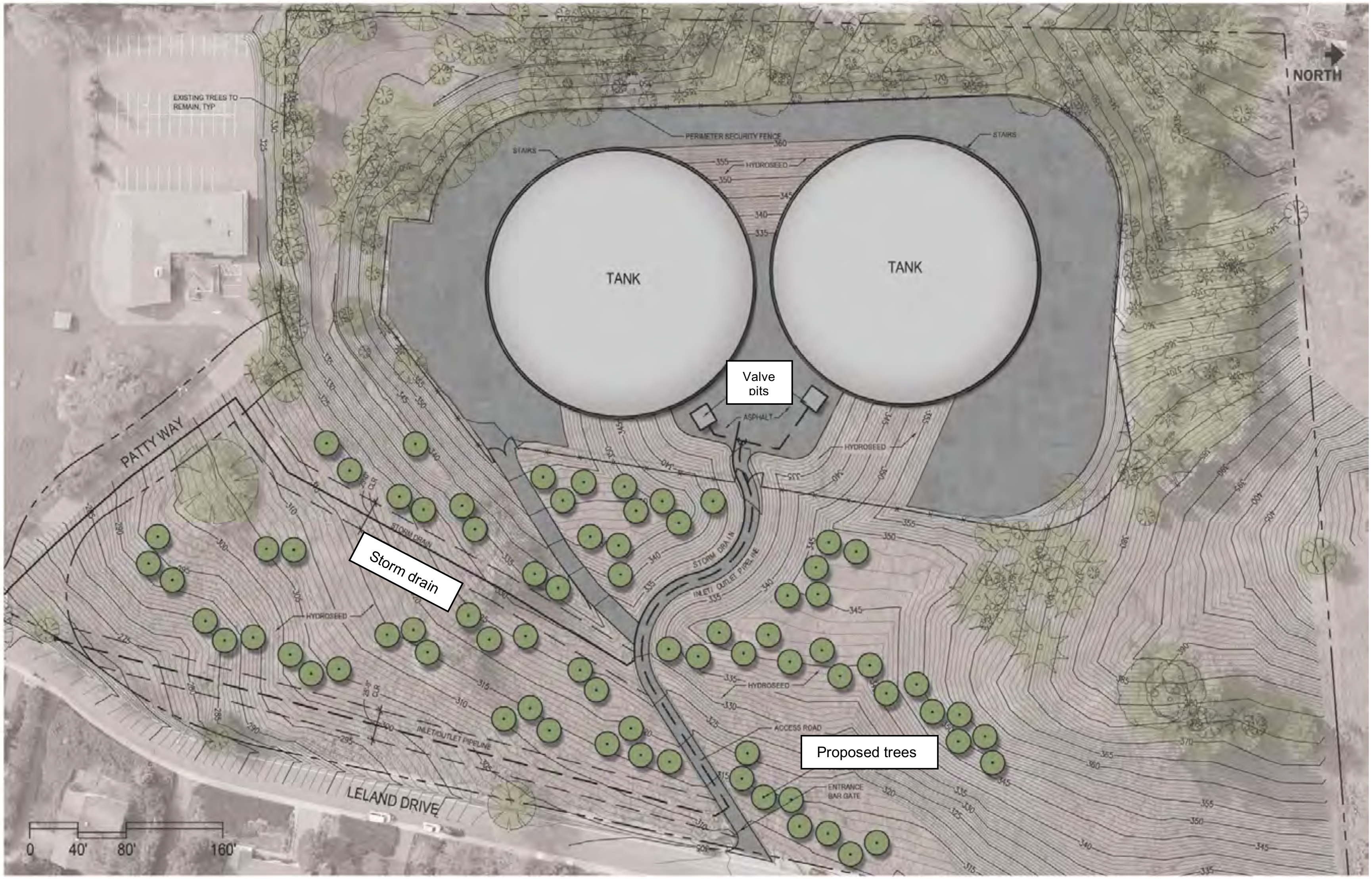
Source: Compiled by RMC, a Woodard & Curran company, 2017

Figure 2 Proposed Pipeline Alignments



Source: Compiled by RMC, a Woodard & Curran company, 2017

Figure 3: Reservoir Conceptual Plan



Source: RHAA Landscape Architecture + Planning, 2017 the pipelines with cellular concrete and capping the ends. Once the tanks are constructed, the stockpiled soil would be used to partially backfill around the tanks and reconstruct the embankment. A new access road from Leland Drive would also be constructed. The new road would provide access to the tank roofs via an upper perimeter road around the dual tanks and into the basin of the new tanks via a lower road. After construction of this new pipeline is completed, the work to connect the new pipelines to existing pipelines (pipeline tie-ins) would require the excavation of a trench or pit at each connection location: Old Tunnel Road/Windsor Drive and Leland Drive/Meek Place in 2022 and at the southeast side of the reservoir site in 2025.

Proposed reservoir demolition activities would occur over approximately 50 weeks, while construction of the new tanks would occur over approximately 63 weeks. The new water pipeline on the reservoir site would be installed and connected to the existing transmission water pipeline at the southeast side of the project site (7 weeks), and a new storm drain pipeline would be constructed within the reservoir site and connected to the City of Lafayette's existing storm drain system across Leland Drive (5 weeks). Final site restoration (tank backfilling and contouring/landscaping) would occur over approximately 27 weeks.

Construction Schedule. Total construction duration is estimated at approximately 168 weeks (approximately 3+ years), spanning from fall of 2022 to fall of 2025. A summary of construction activities by construction year is presented in **Table 1**.

Table 1: Proposed Construction Activities by Year

Year	Project Component	Activity	Duration[a]
2022	Pipeline in Public Rights-of-Way	Pipeline installation in Windsor Drive, Condit Road, and Leland Drive	13 weeks (65 work days)
2023	Pipeline in Public Rights-of-Way	Pipeline testing and paving	3 weeks (15 work days)
	Demolition of Existing Reservoir	Reservoir demolition	49 weeks (245 work days)
2024	Demolition of Existing Reservoir	Reservoir demolition (final week) and pipeline abandonment	1 week (5 work days)
	Tank Construction	Construction of new tanks (including 4 weeks of valve pit and pit piping/valves)	51 weeks (255 work days)
2025	Tank Construction	3 weeks of valve pit and pit piping/valves, testing and startup	12 weeks (60 work days)
	Pipeline on Reservoir Site	Pipeline installation	7 weeks (35 work days)
	Storm Drain	Storm drain installation	5 weeks (25 work days)
	Site Restoration	Site restoration	27 weeks (135 work days)

NOTE:

[a] Active construction time does not include down time, submittal review, material procurement, and fabrication inspection and approval process.

SOURCE: EBMUD (2017)

Construction Equipment. In order to estimate the Project's construction-related criteria pollutant emissions and associated health risks, EBMUD compiled a list of construction equipment expected to be operated at the reservoir site and along pipeline alignments (off-road equipment), and also estimated haul/delivery (vendor) trucks and worker vehicles that would operate on local roadways (on-road vehicles). Expected durations of off-road equipment use were also estimated by EBMUD and based on the proposed construction schedule (**Table 1**), annual off-road equipment operations and on-road vehicle use by construction year were derived and used to model annual and average daily criteria pollutant emissions. Off-road equipment that is expected to be used on site to construct each Project component is presented in **Table 2.** This table also presents expected duration of equipment use and separates this by construction year.

Table 2: Estimated Construction Equipment and Duration of Use for Project Construction

Equipment Type	Total Number of Hours	Average Hours per Day[a]
2022 – Pipeline Installation in Public Rights-of-Way (13 Weeks)		
Concrete Saw	10	0.15
Tractor/Loader/Backhoe	150	2.31
Excavator	120	1.85
Dewatering Pump	36	0.55
Generator	150	2.31
Air Compressor	100	1.54
2023 – Pipeline Installation in Public Rights-of-Way (3 Weeks) and Reservoir Demolition (49 Weeks)		
Generator	18	0.07
Excavator/Hoe Ram	1,903	7.32
Chain Saw (2)	96	0.37
Pump	153	0.59
Air Compressor	234	0.90
Crusher	678	2.61
Dozer	805	3.10
Pavers	15	0.06
Compactor	20	0.08
Rollers	20	0.08
Tractor/Loader/Backhoe	78	0.30
Sweeper/Scrubber	5	0.02
2024 – Reservoir Demolition (1 Week) and Construction (51 Weeks)		
Excavator	35	0.13
Dozer	35	0.13
Crane/Stress Tower	250	0.96
Pump	370	1.42
Hydroblast	84	0.32
2025 – Tank Construction (12 Weeks), Pipeline Installation on Reservoir Site (7 Weeks), Storm Drain Installation (5 Weeks), Site Restoration (27 Weeks)		
Excavator	96	0.38
Tractor/Loader/Backhoe	123	0.48
Pump	76	0.30
Generator	120	0.47
Air Compressor	80	0.31
Paver	15	0.06
Compactor	20	0.08
Roller	20	0.08
Sweeper/Scrubber	5	0.02

NOTES:

[a] Averaged over 65 days (13 weeks x 5 days per week = 65 workdays) for 2022, 260 days per year (5 days per week x 52 weeks per year = 260 work days) for 2023 and 2024, and 255 days per year 5 days per week x 51 weeks per year = 255 work days) for 2025.

SOURCE*:* EBMUD (2016 and 2017; see **Appendix A** for estimated hours of equipment usage)

In addition to the off-road equipment that would operate at the reservoir site and along pipeline alignments, the Project would also require use of on-road vehicles. Trucks would be used to haul excavated materials or construction debris to landfills or disposal sites as well as deliver construction materials. Personal vehicles or company-owned vehicles (e.g., pickup trucks) would be used by construction workers to commute to work each day. The estimated number of truck trips was estimated by EBMUD for each Project component and trip generation estimates are included in **Appendix A** (Trip Generation Estimates). Construction-related vehicle miles were estimated assuming average round trip distances of 100 miles (50 miles each way) to the closest landfills for haul trucks[2] and 40 miles (20 miles each way) for worker commute trips[3] and materials/supplies delivery trucks[4]. The estimated on-road mileage is summarized in **Table 3**.

Table 3: Estimated Construction Vehicle Trips and On-road Miles

Year	Vehicle Type	Number of Round Trips	Miles per Round Trip[a]	Miles per Year
2022	Commuting Vehicles	1,230	40	49,200
	Vendor Flat Bed Trucks	205	40	8,200
	Heavy Duty Haul Trucks	450	100	45,000
2023	Commuting Vehicles	2,775	40	111,000
	Vendor Flat Bed Trucks	222	40	8,880
	Heavy Duty Haul Trucks	4,690	100	469,000
2024	Commuting Vehicles	4,280	40	171,200
	Vendor Flat Bed Trucks	8,305	40	332,200
	Heavy Duty Haul Trucks	425	100	42,500
2025	Commuting Vehicles	2,360	40	94,400
	Vendor Flat Bed Trucks	1,120	40	44,800
	Heavy Duty Haul Trucks	1,070	100	107,000

NOTE:

[a] Miles per trip are based on the average round trip distance of 100 miles for haul trucks (to closest landfills) and an average round trip of 40 miles for delivery trucks and worker vehicles.

SOURCE: EBMUD (2017) for trip estimates

Project Operation, Maintenance, and Dam Inspections

The existing open cut Leland Reservoir is unstaffed and generates approximately three site visits each month for operations, site maintenance, dam inspections and a yearly inspection with the Division of Safety of Dams (DSOD). Following construction completion of the open cut reservoir replacement with dual concrete tanks, the monthly/yearly dam inspections will no longer be necessary as the facility will be

2 The CalEEMod default for one-way haul trips is 20 miles, but since the Altamont Landfill is approximately 40 miles from Leland Reservoir site and the Potrero Landfill is about 50 miles from the Project site, the default per trip mileage was increased to 50 miles per one-way trip.

3 The CalEEMod default for worker trips (one-way) is 10.8 miles per worker, but the default per trip mileage was increased to 20 miles per one-way trip because the distances from Lafayette to East Bay cities such as Antioch, Livermore, and Brentwood range from 25 to 35 miles.

4 The CalEEMod default for one-way delivery/vendor trips is 7.3 miles, but since materials could be delivered from as close as Concord (9 miles) or as far as the Livermore/Sunol area (30 miles) or other Bay Area locations, the default per trip mileage was increased to 20 miles.

out of DSOD jurisdiction. Site visits would be reduced to approximately two per month for operation and site maintenance inspections.

2.1 Approach

Air Quality

This TM assesses potential criteria pollutant and health impacts that would result from construction and operation of the Project, consistent with guidelines and methodologies from the Bay Area Air Quality Management District (BAAQMD), California Air Resources Board (CARB), California Office of Environmental Health Hazard Assessment (OEHHA), and United States Environmental Protection Agency (USEPA). Consistent with the methods recommended in those guidelines, the health risk screening analysis evaluates the estimated excess lifetime cancer risk, chronic and acute non-cancer hazard indices (HI), and particulate matter ($PM_{2.5}$) concentrations from the Project's short-term construction activities. The cumulative analysis estimates excess lifetime cancer risks and $PM_{2.5}$ concentrations that are attributable to other mobile and stationary sources within the Project vicinity, in addition to impacts from Project-related construction emissions. Maintenance activities associated with the proposed dual tanks would remain essentially the same or less than maintenance activities associated with the existing reservoir. There would be no substantial change in emissions associated with maintenance activities. Therefore, there is no further analysis of operational emissions.

Greenhouse Gas (GHG) Emissions

Gases that trap heat in the atmosphere are referred to as GHGs because they capture heat radiated from the sun as it is reflected back into the atmosphere, much like a greenhouse does. As discussed further below, the accumulation of GHGs contributes to global climate change. GHG emissions and global climate change represent cumulative impacts. GHG emissions cumulatively contribute to the significant adverse environmental impacts of global climate change. No single project could generate enough GHG emissions to noticeably change the global average temperature (BAAQMD, May 2017, p. 2-1); instead, the combination of GHG emissions from past, present, and future projects and activities across the entire planet have contributed and will continue to contribute to global climate change and associated environmental impacts. Therefore, the GHG emissions impact analysis is a cumulative impact analysis only, and this cumulative analysis does not rely on a list-based approach but rather on adopted regional and statewide guidelines described below and consistent with California Environmental Quality Act (CEQA) Guidelines Section 15130(b)(1)(B).

3 Environmental Setting

3.1 Environmental Setting - Air Quality

The following sections describe the existing environmental conditions regarding air quality and the potential effects the Project may have on the site and its surrounding area.

3.1.1 Climate and Meteorology

The Project area is located within the San Francisco Bay Area Air Basin (SFBAAB). The SFBAAB has moderate climate for much of the year, although storms generally affect the region from November through April.

Temperatures in the Lafayette area range from summer highs in the mid-80s (degrees Fahrenheit) and winter lows in the upper-30s. The rapid modification of coastal marine air as it moves inland results in temperatures that are about 15 degrees Fahrenheit warmer in the Lafayette area than west of the coastal hills on summer afternoons and about 10 degrees Fahrenheit 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 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 Lafayette 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, emissions generated in the project vicinity (e.g. from vehicles on SR 24) 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 8 miles per hour (mph), there is usually little potential for localized stagnation of air pollutants. Daytime ventilation is thus normally robust in the project area. However, about one-third of the time winds at night are less than 2 to 3 mph. 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).

3.1.2 Ambient Air Quality

Criteria Air Pollutants

As required by the 1970 federal Clean Air Act (CAA), the United States Environmental Protection Agency (USEPA) initially identified six criteria air pollutants that are pervasive in urban environments and for which state and federal health-based ambient air quality standards have been established. The USEPA calls these pollutants "criteria air pollutants" because the agency has regulated them by developing specific public-health-based and welfare-based criteria as the basis for setting permissible levels. The six criteria air pollutants originally identified by the USEPA are ozone, carbon monoxide (CO), particulate matter (PM), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), and lead. Since that time, subsets of particulate matter have been identified for which permissible levels have been established. These include particulate matter of 10 microns in diameter or less (PM_{10}) and particulate matter of 2.5 microns in diameter or less ($PM_{2.5}$). In accordance with the California Clean Air Act (CCAA) and federal CAA, air pollutant standards are identified for the six criteria air pollutants: ozone, CO, PM, NO_2, SO_2, and lead.

The BAAQMD is the regional agency with jurisdiction for regulating air quality within the nine-county SFBAAB. The region's air quality monitoring network provides information on ambient concentrations of criteria air pollutants at various locations in the San Francisco Bay Area. **Table 4** presents a five-year (2011-2015) summary of the highest annual criteria air pollutant concentrations, collected at the closest air quality monitoring station operated and maintained by the BAAQMD in Concord, approximately 4.4 miles northeast of the Project site. **Table 4** also compares measured pollutant concentrations with the most stringent applicable ambient air quality standards (state or federal). Concentrations shown in bold indicate an exceedance of a standard.

In general, the SFBAAB experiences low concentrations of most pollutants when compared to federal or state standards. The SFBAAB is designated as either in attainment[5] or unclassified for most criteria pollutants with the exception of ozone, $PM_{2.5}$, and PM_{10}, for which the SFBAAB is designated as non-attainment for either the state or federal standards.

Ozone Precursors. Ozone is a secondary air pollutant produced in the atmosphere through a complex series of photochemical reactions involving reactive organic gases (ROG, also sometimes referred to as volatile organic compounds or VOCs by some regulating agencies) and nitrogen oxides (NOx). The main

[5] "Attainment" means the region is meeting federal and/or state standards for a specified criteria pollutant. "Non-attainment" means the region does not meet federal and/or state standards for a specified criteria pollutant. "Unclassified" means there are not enough data to determine the region's attainment status for a specified criteria air pollutant.

Table 4: Summary of Air Quality Monitoring Data (2011–2015) at BAAQMD Monitoring Stations in Concord

Pollutant	Most Stringent Applicable Standard	Number of Days Standards Were Exceeded and Maximum Concentrations Measured[a]				
		2011	2012	2013	2014	2015
Ozone						
- Days 1-Hour Standard Exceeded		2	0	0	1	0
- Maximum 1-Hour Concentration (ppm)	>0.09 ppm[b]	**0.099**	0.093[c]	0.074	**0.095**	0.088
- Days 8-Hour Standard Exceeded		2	2	0	2	2
- Maximum 8-Hour Concentration (ppm)	>0.07 ppm[d,e]	**0.078**	**0.085**	0.062	**0.080**	**0.073**
Carbon Monoxide (CO)						
- Days 1-Hour Standard Exceeded		0	0	0	0	0
- Maximum 1-Hour Concentration (ppm)	>20 ppm[b]	1.6	1.2	1.2	1.4	1.4
- Days 8-Hour Standard Exceeded		0	0	0	0	0
- Maximum 8-Hour Concentration (ppm)	>9 ppm[b, d]	1.2	0.8	1.0	1.1	1.4
Suspended Particulates (PM_{10})						
- Days 24-Hour Standard Exceeded		1	0	1	0	0
- Maximum 24-Hour Concentration (μg/m^3)	>50 μg/m^3 [b]	**59**	35	**51**	43	24
Suspended Particulates ($PM_{2.5}$)						
- Days 24-Hour Standard Exceeded		2	0	1	0	0
- Maximum 24-Hour Concentration (μg/m^3)	>35 μg/m^3 [d]	**47.5**	32.2	**36.2**	30.6	31.0
- Annual Average (μg/m^3)	>12 μg/m^3 [b,d]	7.8	6.5	7.6	6.6	8.8
Nitrogen Dioxide (NO_2)						
- Days 1-Hour Standard Exceeded		0	0	0	0	0
- Maximum 1-Hour Concentration (ppm)	>0.10 ppm[d]	0.09	0.04	0.04	0.05	0.03

NOTES:

Bold values are in excess of applicable standard.

BAAQMD = Bay Area Air Quality Management District; ppm = parts per million; PM_{10} = particulate matter of 10 microns in diameter or less; $PM_{2.5}$ = particulate matter of 2.5 microns in diameter or less; μg/m^3 = micrograms per cubic meter

All values from BAAQMD Concord air quality monitoring station on Treat Boulevard (approximately 1.6 miles from Project site).

[a] Number of days exceeded is for all days in a given year, except for particulate matter of 10 microns in diameter or less. PM_{10} was monitored every six days prior to 2013 and has been monitored every 12 days effective January 2013. Therefore, the number of days exceeded is out of approximately 60 annual samples for 2011 and 2012 and out of approximately 30 annual samples afterward. $PM_{2.5}$ is monitored continuously (hourly, 365 days per year).

[b] State standard, not to be exceeded.

[c] In 2012, the attainment designation for one-hour ozone was 0.1 ppm for state and 0.095 ppm for federal. The attainment designation can change depending on the three most recent years of monitoring data.

[d] Federal standard, not to be exceeded.

[e] In October 2015, the USEPA implemented a new 8-hour ozone standard of 70 parts per billion (equivalent to 0.070 ppm), which is the same as the California standard.

SOURCE: BAAQMD (2011–2015)

sources of ROG and NOx, often referred to as ozone precursors, are combustion processes (including motor vehicle engines) and the evaporation of solvents, paints, and fuels. In the Bay Area, automobiles are the single largest source of ozone precursors. Ozone is referred to as 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.

Table 4 shows that, according to published data, the most stringent applicable standards for ozone (state 1-hour standard of 0.090 parts per million [ppm] and the state/federal 8-hour standard of 0.070 ppm) were exceeded in Concord on 1 to 2 days per year in four of the five years between 2011 and 2015. The SFBAAB is listed as non-attainment for ozone.

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 accelerations. Exposure to high concentrations of CO reduces the oxygen-carrying capacity of the blood and can cause headaches, nausea, dizziness, and fatigue; impair central nervous system function; and induce angina (chest pain) in persons with serious heart disease. Very high levels of CO can be fatal. As shown in **Table 4**, the most stringent applicable standards for CO (state 1-hour standard of 20 ppm and the state/federal 8-hour standard of 9 ppm) were not exceeded between 2011 and 2015.

Particulate Matter (PM_{10} and $PM_{2.5}$). Particulate matter (PM) is a class of air pollutants that consists of heterogeneous solid and liquid airborne particles from man-made and natural sources. Particulate matter is measured in two size ranges: PM_{10} for particles 10 microns in diameter or less, and $PM_{2.5}$ for particles 2.5 microns in diameter or less.[6] In the Bay Area, motor vehicles generate about one-half of the air basin's 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 particulates. One component of these particulate emissions is fine particulates, $PM_{2.5}$, which are small enough to be inhaled into the deepest parts of the human lung and can cause adverse health effects. Between 2011 and 2015, **Table 4** shows that an exceedance of the state PM_{10} standard occurred on one monitored occasion in 2011 and 2013 in Concord. It is estimated that the state's 24-hour PM_{10} standard of 50 micrograms per cubic meter ($\mu g/m^3$) was exceeded on up to six days each in 2011 and 2013.[7] The state's 24-hour $PM_{2.5}$ standard was exceeded on two days in 2011 and one day in 2013.[8] The federal and state annual average $PM_{2.5}$ standard was not exceeded between 2011 and 2015.

Nitrogen Dioxide. NO_2 is a reddish-brown gas that is a byproduct of combustion processes. Automobiles and industrial operations are the main sources of NO_2. Aside from its contribution to ozone formation, NO_2 can increase the risk of acute and chronic respiratory disease and reduce visibility. NO_2 may be visible as a coloring component of the air on high pollution days, especially in conjunction with high ozone levels. Currently, the Project area (Contra Costa County) is designated as an attainment area for both state and federal standards.

The USEPA has also established requirements for a new monitoring network to measure NO_2 concentrations near major roadways in urban areas with a population of 500,000 or more. Sixteen new near-roadway monitoring sites were required in California, three of which are in the Bay Area. These monitors are located in Livermore (Patterson Pass), Oakland (Laney College Freeway), and San Jose (San

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6 PM_{10} is often called "coarse" particulate matter. $PM_{2.5}$ is often called "fine" particulate matter.

7 PM_{10} concentrations were sampled every sixth day prior to 2013; therefore, actual days over the standard can be estimated to be six times the numbers listed in the table.

8 $PM_{2.5}$ concentrations are continuously monitored.

Jose Freeway). The Oakland station commenced operation in February 2014, the San Jose station commenced operation in September 2014, and the Livermore station commenced operation in April 2015. The new monitoring data may result in a need to change area designations in the future. The CARB will revise the area designation recommendations, as appropriate, once sufficient new monitoring data become available.

Sulfur Dioxide. SO_2 is a colorless, acidic gas with a strong odor. It is produced by the combustion of sulfur-containing fuels such as oil, coal, and diesel. SO_2 has the potential to damage materials and can cause health effects at high concentrations. SO_2 can irritate lung tissue and increase the risk of acute and chronic respiratory disease. As indicated by the BAAQMD's long-term air monitoring, pollutant trends suggest that the SFBAAB currently meets and will continue to meet the state standard for SO_2 for the foreseeable future.

The USEPA has designated the SFBAAB as an attainment area for SO_2. On June 2, 2010, the USEPA strengthened the primary NAAQS for SO_2. The USEPA revised the primary SO_2 standard by establishing a new 1-hour standard at a level of 75 parts per billion (ppb). USEPA's evaluation of the scientific information and the risks posed by breathing SO_2 indicate that this new 1-hour standard will protect public health by reducing people's exposure to high short-term (5-minutes to 24-hours) concentrations of SO_2 (USEPA, 2010).

Lead. Leaded gasoline (phased out in the United States beginning in 1973), paint (on older houses, cars), smelters (metal refineries), and manufacture of lead storage batteries have been the primary sources of lead released into the atmosphere. Lead has a range of adverse neurotoxic health effects, which put children at special risk. Some lead-containing chemicals cause cancer in animals. Lead levels in the air have decreased substantially since leaded gasoline was eliminated. Ambient lead concentrations are only monitored on an as-warranted, site-specific basis in California.

On October 15, 2008, the USEPA strengthened the national ambient air quality standard for lead by lowering it from 1.5 $\mu g/m^3$ to 0.15 $\mu g/m^3$. The USEPA revised the monitoring requirements for lead in December 2010 (USEPA, 2010a) with a focus on airports and large urban areas, resulting in an increase in 76 monitors nationally. Lead monitoring stations in the Bay Area are located at Palo Alto Airport, Reid-Hillview Airport (San Jose), and San Carlos Airport. Non-airport locations for lead monitoring are in Redwood City and San Jose.

3.1.3 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 residences directly adjacent to the western and eastern reservoir site boundaries. Most existing residences to the west are located off Old Tunnel Road and at the ends of Maryola Court, Mars Court, and Windsor Court. Existing residences to the east of the reservoir site are on the east side of Leland Drive. There is one residence located on the west side of Leland Drive, adjacent to the site's northeast boundary. The Meher Schools are located approximately 800 feet south of the reservoir site.

There are residences located on Windsor Drive, Condit Road, and Leland Drive, adjacent to the off-site pipeline alignment.

3.2 Environmental Setting - GHG Emissions

3.2.1 Overview

The primary GHGs, or climate pollutants, are carbon dioxide (CO_2), black carbon, methane (CH_4), nitrous oxide (N_2O), ozone, and water vapor.

Individual development projects contribute to the cumulative effects of climate change by emitting GHGs during demolition, construction, and operational phases. While primary GHGs occur naturally in the atmosphere, CO_2, CH_4, and N_2O are also emitted from human activities, accelerating the rate at which these compounds occur within the earth's atmosphere. Emissions of CO_2 are largely by-products of fossil fuel combustion, whereas CH_4 results from off-gassing associated with agricultural practices, landfills, and to a lesser extent wastewater treatment. Black carbon has emerged as a major contributor to global climate change, possibly second only to CO_2. Black carbon is produced naturally and by human activities as a result of the incomplete combustion of fossil fuels, biofuels, and biomass (Center for Climate and Energy Solutions, 2010). N_2O is a byproduct of various industrial processes including wastewater treatment. Other GHGs include hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride, and are generated in certain industrial processes. GHGs are typically reported in "carbon dioxide-equivalent" (CO_2e) measures.[9]

There is international scientific consensus that human-caused increases in GHGs contribute to global warming and, thus, climate change. Many impacts resulting from climate change, including sea level rise, increased fires, floods, severe storms, and heat waves, already occur and will only become more severe and costly (IPCC, 2013). Secondary effects of climate change likely include impacts on agriculture, the state's electricity system, and native freshwater fish ecosystems; an increase in the vulnerability of levees such as in the Sacramento-San Joaquin Delta; changes in disease vectors; and changes in habitat and biodiversity (IPCC, 2013; CCCC, 2012).

3.2.2 GHG Emission Estimates and Energy Providers in California

The CARB estimated that in 2010 California produced about 451.60 million gross metric tons of CO_2e (MT CO_2e; CARB, 2013). The CARB found that transportation is the source of 38 percent of the state's GHG emissions, followed by electricity generation (both in-state generation and imported electricity) at 21 percent and industrial sources at 19 percent. Commercial and residential fuel use (primarily for heating) accounted for 10 percent of GHG emissions. The remaining 12 percent of the state's GHG emissions are generated by compost/landfill facilities, agriculture, forestry, and processes involving the use of high global warming potential gases (i.e., ozone depleting substance substitutes, electricity grid SF6 losses, and semiconductor manufacturing).

Energy to most EBMUD facilities (and the City of Lafayette) is provided by the Pacific Gas and Electricity Company (PG&E). Both PG&E and Marin Clean Energy (MCE) provide electric service to the City of Lafayette (including the Leland Reservoir site). MCE's power mix for the City of Lafayette is 50 percent renewable energy, which is derived from solar, wind, bioenergy, geothermal, and small hydroelectric (MCE, 2017). Similarly, about half of the electricity delivered by PG&E is from renewable and GHG-free sources. For example, PG&E's 2016 power mix was as follows: 17 percent natural gas, 24 percent nuclear, 33 percent eligible renewables, 12 percent large hydroelectric, and 14 percent unspecified power (PG&E, 2016).

9 Because of the differential heat absorption potential of various GHGs, GHG emissions are frequently measured in "carbon dioxide-equivalents," which present a weighted average based on each gas's heat absorption (or "global warming") potential.

4 Regulatory Framework

4.1 Air Quality Regulations, Plans, and Policies

4.1.1 Federal Regulations

The 1970 federal CAA (last amended in 1990) requires 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 by the deadlines specified in the CAA. These 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 and are designed to protect those segments of the public most susceptible to respiratory distress, 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 ambient air quality standards before adverse health effects are observed.

The current attainment status for the SFBAAB, with respect to federal standards, is summarized in **Table 5**. In general, the SFBAAB experiences low concentrations of most pollutants when compared to federal standards (i.e., in attainment), except for ozone and particulate matter (PM_{10} and $PM_{2.5}$, respectively). The Bay Area's attainment status for federal standards is classified as "marginal nonattainment" for 8-hour ozone and "nonattainment" for $PM_{2.5}$ (see **Table 5**). In response to the USEPA's designation of the overall basin for the 8-hour federal ozone standard, the BAAQMD, ABAG, and MTC were required to develop an ozone attainment plan to meet this standard. The *1999 Ozone Attainment Plan* was prepared and adopted by these agencies in June 1999, and this plan was updated in 2001. The most recent state ozone plan is the Bay Area *2017 Clean Air Plan.* The *2017 Clean Air Plan* was developed as a multi-pollutant strategy to simultaneously reduce emissions and ambient concentrations of ozone, fine particulate matter, toxic air contaminants, as well as greenhouse gases that contribute to climate change.

4.1.2 State Regulations

California Clean Air Act

While the federal CAA established national ambient air quality standards, individual states retained the option to adopt more stringent standards and to include other pollution sources. The State of California had already established its own air quality standards when federal standards were established, and because of the unique meteorological conditions in California, there is considerable diversity between the state and national ambient air quality standards, as shown in **Table 5**. California ambient standards tend to be at least as protective as national ambient standards and are often more stringent.

In 1988, the State of California passed the CCAA (California Health and Safety Code Sections 39600 et seq.), which, like its federal counterpart, called for the designation of areas as attainment or non-attainment, but based on state ambient air quality standards rather than the federal standards. As indicated in **Table 5**, the SFBAAB is designated as "non-attainment" for state ozone, PM_{10}, and $PM_{2.5}$ standards. The SFBAAB is designated as "attainment" for other pollutants.

Regulation of Toxic Air Contaminants

For toxic air contaminants (TACs), both the USEPA and the CARB recognize that air pollution affects the public's health, especially sensitive groups, and can result in respiratory and cardiovascular effects. Section 41700(a) of the California Health and Safety Code prohibits the discharge, from any source, of quantities of air contaminants or other material that cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or that endanger the comfort, repose, health, or safety of

Table 5: State and Federal Ambient Air Quality Standards and San Francisco Bay Area Air Basin (SFBAAB) Attainment Status

Pollutant	Averaging Time	State (SAAQS[a]) Standard	State (SAAQS[a]) Attainment Status	Federal (NAAQS[b]) Standard	Federal (NAAQS[b]) Attainment Status
Ozone	1 hour	0.09 ppm	**N**	None	n/a
	8 hour	0.070 ppm	**N**	0.070 ppm[c]	**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	0.18 ppm	A	0.100 ppm	U
	Annual	0.030 ppm	n/a	0.053 ppm	A
Sulfur Dioxide (SO_2)	1 hour	0.25 ppm	A	0.075	A
	24 hour	0.04 ppm	A	0.14	A
	Annual	n/a	n/a	0.03 ppm	A
Particulate Matter (PM_{10})	24 hour	50 µg/m^3	**N**	150 µg/m^3	U
	Annual[d]	20 µg/m^3	**N**	n/a	n/a
Fine Particulate Matter ($PM_{2.5}$)	24 hour	n/a	n/a	35 µg/m^3	**N**
	Annual	12 µg/m^3	**N**	12 µg/m^3	U/A [e]
Sulfates	24 hour	25 µg/m^3	A	n/a	n/a
Lead	30 day	1.5 µg/m^3	A	n/a	n/a
	Cal. Quarter	n/a	n/a	1.5 µg/m^3	A
Hydrogen Sulfide	1 hour	0.03 ppm	U	n/a	n/a
Visibility-Reducing Particles	8 hour	See Note f	U	n/a	n/a

NOTES:

A = Attainment; **N** = Non-attainment; U = Unclassified; n/a = not applicable, 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 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 PM_{10} standard is attained when the three-year average of the 99th percentile of monitored concentrations is less than the standard. The 24-hour $PM_{2.5}$ standard is attained when the three-year average of the 98th percentile is less than the standard.

[c] On October 1, 2015, the national 8-hour ozone primary and secondary standards were lowered from 0.075 to 0.070 ppm. An area will meet the standard if the fourth-highest maximum daily 8-hour ozone concentration per year, averaged over three years, is equal to or less than 0.070 ppm. EPA will make recommendations on attainment designations by October 1, 2016, and issue final designations October 1, 2017. Nonattainment areas will have until 2020 to late 2037 to meet the health standard, with attainment dates varying based on the ozone level in the area.

[d] State standard = annual geometric mean·

[e] In December 2012, the USEPA strengthened the annual $PM_{2.5}$ National Ambient Air Quality Standards (NAAQS) from 15.0 to 12.0 micrograms per cubic meter (µg/m^3). In December 2014, the USEPA issued final area designations for the 2012 primary annual $PM_{2.5}$ NAAQS. Areas designated “unclassifiable/attainment” must continue to take steps to prevent their air quality from deteriorating to unhealthy levels. The effective date of this standard was April 15, 2015.

[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 (2017)

any of those persons or the public, or that cause, or have a natural tendency to cause, injury or damage to business or property.

In 2005, 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 changes relevant to the proposed Project are in Section 2485, Airborne Toxic Control Measure to Limit Diesel-Fueled Commercial Motor Vehicle Idling, which limits idling of a vehicle's primary diesel engine for greater than five minutes in any location (with some exceptions) or operation of a diesel-fueled auxiliary power system within 100 feet of residential areas.

Emission Standards for New Off-Road Equipment. Prior to 1994, there were no standards to limit the amount of emissions from off-road equipment. In 1994, the USEPA established emission standards for hydrocarbons, nitrogen oxides, carbon monoxide, and particulate matter to regulate new pieces of off-road equipment. These emission standards came to be known as Tier 1. Since that time, increasingly more stringent Tier 2, Tier 3, and Tier 4 (interim and final) standards were adopted by the USEPA, as well as by the CARB. Each adopted emission standard was phased in over time. New engines built in and after 2015 across all horsepower sizes must meet Tier 4 final emission standards. In other words, new manufactured engines cannot exceed the emissions established for Tier 4 final emissions standards. Out of the estimated 161,420 pieces of construction equipment used statewide in 2014, 59 percent are Tier 2 and above.

Verified Diesel Emission Control Strategies (VDECS). Since these tiered emission standards described in the previous paragraph only apply to new engines and off-road equipment can last several years, verified diesel emission control strategies (VDECS) were developed to help reduce emissions from existing engines. VDECS are designed primarily for the reduction of diesel particulate matter emissions and have been verified by the CARB. There are three levels of VDECS. The most effective VDECS (a device, system, or strategy used to achieve the highest level of pollution control from an existing off-road vehicle) is the Level 3 VDECS. Tier 4 engines are not required to install VDECS since they already meet the emissions standards for lower tiered equipment with installed controls.

In July 2007, the CARB adopted the In-Use Off-Road Diesel Vehicle Regulation to reduce diesel particulate matter and nitrogen oxides emissions from in-use existing off-road diesel vehicles in California. This regulation includes:

- Equipment labeling requirements
- Annual reporting of equipment
- Five-minute (30 seconds within 100 feet of schools) idling limit (applies to off-road and on-road diesel vehicles)
- Restrictions on adding older and dirtier Tier 0 and Tier 1 vehicles to construction fleets.

4.1.3 Local Policies and Standard Specifications

Bay Area Air Quality Management District

The BAAQMD is the regional agency with jurisdiction over the nine-county SFBAAB, which includes San Francisco, Alameda, Contra Costa, Marin, San Mateo, Santa Clara, and Napa Counties and portions of Sonoma and Solano Counties. The BAAQMD is responsible for attaining and maintaining air quality in the SFBAAB within federal and state air quality standards, as established by the federal CAA and the CCAA, respectively. Specifically, the BAAQMD has the responsibility to monitor ambient air pollutant levels throughout the SFBAAB and to develop and implement strategies to attain the applicable federal and state standards. The BAAQMD does not have authority to regulate emissions from motor vehicles.

Air quality plans developed to meet federal requirements are referred to as State Implementation Plans. The CAA and the CCAA require plans to be developed for areas that do not meet air quality standards. The most recent air quality plan, the *2017 Clean Air Plan*, was adopted by the BAAQMD on April 19, 2017 (BAAQMD, 2017). The *2017 Clean Air Plan* updates the *2010 Clean Air Plan,* pursuant to air quality planning requirements defined in the California Health and Safety Code. To fulfill state ozone planning requirements, the *2017 Clean Air Plan* control strategy is to include all feasible measures to reduce emissions of ozone precursors – reactive organic gases (ROG) and nitrogen oxides (NOx) – and reduce transport of ozone and its precursors to neighboring air basins. The *2017 Clean Air Plan* describes a multi-pollutant strategy to simultaneously reduce emissions and ambient concentrations of ozone, fine particulate matter, toxic air contaminants, as well as greenhouse gases that contribute to climate change.

The *2017 Clean Air Plan*'s control strategy includes 85 control measures that apply to stationary sources, transportation sources, energy production, buildings, agriculture, natural and working lands, waste management, water, and super-GHGs. The key priorities of the control strategy are to: (1) reduce emissions of criteria air pollutants and toxic air contaminants from all key sources; (2) reduce emissions of super-GHG pollutants such as methane; (3) decrease demand for fossil fuels by increasing efficiency and reducing demand; and (4) decarbonize our energy system. The *2017 Clean Air Plan* represents the most current applicable approved air quality plan for the SFBAAB. Consistency with the *2017 Clean Air Plan* is the basis for determining whether the Project would conflict with or obstruct implementation of air quality plans.

In June 2010, BAAQMD adopted CEQA significance thresholds and updated the previous CEQA Guidelines. These 2010 thresholds include quantitative CEQA significance thresholds for emissions of criteria pollutants, ozone precursors, and TACs during project construction and operations. The thresholds are designed to establish the level at which the BAAQMD believed air pollution emissions would cause significant environmental impacts under CEQA. These thresholds were challenged in court, and in view of the Supreme Court's opinion, the BAAQMD has initiated an update of the 2010 CEQA Guidelines to reflect new or revised requirements in the state CEQA Guidelines, recent court decisions, improved analytical methodologies, and new mitigation strategies. The BAAQMD issued an interim update (dated May 2017). This update includes thresholds of significance consistent with those adopted in 2010, but does not address outdated references, links, analytical methodologies, or other technical information. It should be noted in an opinion issued on December 17, 2015, the California Supreme Court held that CEQA does not generally require an analysis of the impacts of locating development in areas subject to environmental hazards unless the project would exacerbate existing environmental hazards. The Supreme Court also held that public agencies remain free to conduct this analysis regardless of whether it is required by CEQA. The BAAQMD has advised local agencies that the thresholds are not mandatory and agencies should apply them only after determining that they reflect an appropriate measure of a project's impacts.

EBMUD Standard Construction Specifications

EBMUD's Standard Construction Specification 01 35 44 (Environmental Requirements) includes practices and procedures for minimizing air quality impacts and GHG emissions, including dust control and monitoring, emissions control, and use of BAAQMD-compliant architectural coatings, as described below.

Submittal of Dust Control and Monitoring Plan. EBMUD Construction Specification 01 35 44, Part 1, Section 1.3, Subsection E requires that the contractor submit a Dust Control and Monitoring Plan detailing the means and methods for controlling and monitoring dust generated by demolition and other work on the site for the Engineer's acceptance prior to any work at the jobsite. The specification requires that the plan shall:

- Comply with all applicable regulations including but not limited to the BAAQMD visible emissions regulation[10] and Public Nuisance Rule.[11]
- Include items such as mitigation measures to control fugitive dust emissions generated by construction activities.
- Outline best management practices for preventing dust emissions, provide guidelines for training of employees, and procedures to be used during operations and maintenance activities.
- Include measures for the control of paint overspray generated during the painting of exterior surfaces.
- Detail the equipment and methods used to monitor compliance with the plan.

Dust Control. EBMUD Construction Specification 01 35 44, Part 3, Section 3.3, Subsection B requires the Contractor to implement all necessary dust control measures, including but not limited to the following:

- All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered minimum two times per day or as directed by the Engineer.
- Water and/or coarse rock all dust-generating construction areas as directed by Engineer to reduce the potential for airborne dust from leaving the site.
- Water and/or cover soil stockpiles daily.
- Cover all haul trucks entering/leaving the site and trim their loads as necessary.
- Using wet power vacuum street sweepers (dry power sweeping is prohibited) to:
  - Sweep all paved access road, parking areas and staging areas at the construction site daily or as often as necessary.
  - Sweep public roads adjacent to the site at least twice daily or as often as necessary.
- All trucks and equipment, including their tires, shall be washed off prior to leaving the site.
- Gravel or apply non-toxic soil stabilizers on all unpaved access roads, parking areas and staging areas at construction sites.
- Site accesses to a distance of 100 feet from the paved road shall be treated with 12-inches of compacted coarse rock.
- Sandbags or other erosion control measures shall be installed to prevent silt runoff to public roadways from sites with a slope greater than one percent.
- All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible.
- Building pads shall be laid as soon as possible after grading unless seeding or soil binders are used.
- Vegetative ground cover (e.g., fast-germinating native grass seed) shall be planted in disturbed areas as soon as possible and watered appropriately until vegetation is established.

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[10] BAAQMD Regulation 6, Particulate Matter and Visible Emissions, limits the quantity of particulate matter in the atmosphere through the establishment of limitations on emission rates, concentration, visible emissions and opacity.

[11] BAAQMD Regulation 1-301, Public Nuisance, limits air contaminants which cause a public nuisance to any considerable number of persons or the public.

- Wind breaks (e.g., fences) shall be installed on the windward sides(s) of actively disturbed areas of construction. Wind breaks should have a maximum 50 percent air porosity.
- The simultaneous occurrence of excavation, grading, and ground disturbing construction activities on the same area at any one time shall be limited. Activities shall be phased to reduce the amount of disturbed surfaces at any one time.
- All excavation, grading, and/or demolition activities shall be suspended when average wind speeds exceed 20 mph.
- All vehicle speeds shall be limited to fifteen (15) mph or less on the construction site and any adjacent unpaved roads.

Dust Monitoring During Demolition and Construction. EBMUD Construction Specification 01 35 44, Part 3, Section 3.3, Subsection C requires the Contractor shall provide air monitoring per the Dust Control and Monitoring Plan along the perimeter of the job site. A minimum of 4 stations, one on each side of the EBMUD property, shall be established, capable of continuous measurement of total particulate concentration when any dust generating activity is occurring. Dust monitoring shall include:

- Contractor shall not emit from any source for a period or periods aggregating more than three minutes in any hour, a visible emission which is as dark as or darker than No. 1 on the Ringelmann Chart, or of such opacity as to obscure an observer's view to an equivalent or greater degree.
- Contractor shall not emit from any source for a period or periods aggregating more than three minutes in an hour an emission equal to or greater than 20% opacity as perceived by an opacity sensing device, where such device is required by Air Quality Management District regulations.
- All environmental and personal air sampling equipment shall be in conformance with the Association of Industrial Hygiene and National Institute of Safety and Health (NIOSH) standards.
- All analysis shall be completed by a California Department of Health Services certified laboratory for the specific parameters of interest.
    - The Contractor shall provide to the Engineer, within 72 hours of sampling all test results.

Dust Control System Compliance. EBMUD Construction Specification 01 35 44, Part 3, Section 3.3, Subsection D requires the dust control system to comply with the Dust Control and Monitoring Plan and any applicable laws and regulations.

Air Quality and Emissions Control. EBMUD Construction Specification 01 35 44, Part 3, Section 3.4, Subsection A requires implementation of the following control measures:

- The Contractor shall ensure that line power is used instead of diesel generators at all construction sites where line power is available.
- The Contractor shall ensure that for operation of any stationary, compression- ignition engines as part of construction, 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.
- Fixed temporary sources of air emissions (such as portable pumps, compressors, generators, etc.) shall be electrically powered unless the Contractor submits documentation and receives approval from the Engineer that the use of such equipment is not practical, feasible, or available. All portable engines and equipment units used as part of construction shall be properly registered with the California Air Resources Board or otherwise permitted by the appropriate local air district, as required.

- Contractor shall implement standard air emissions controls such as:
  - Minimize the use of diesel generators where possible.
  - Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes as required by the California Airborne Toxics Control Measure (ATCM) Title 13, Section 2485 of California Code of Regulations. Clear signage shall be provided for construction workers at all access points.
  - Minimize the idling time of diesel powered construction equipment to five minutes.
  - Follow applicable regulations for fuel, fuel additives, and emission standards for stationary, diesel-fueled engines.
  - Locate generators at least 100 feet away from adjacent homes and ball fields.
  - Perform regular low-emission tune-ups on all construction equipment, particularly haul trucks and earthwork equipment.
- Contractor shall implement the following measures to reduce greenhouse gas emissions from fuel combustion:
  - On road and off-road vehicle tire pressures shall be maintained to manufacturer specifications. Tires shall be checked and re-inflated at regular intervals.
  - Construction equipment engines shall be maintained to manufacturer's specifications. All equipment shall be checked by a certified mechanic and determined to be running in proper condition prior to operation.
  - All construction equipment, diesel trucks, and generators shall be equipped with Best Available Control Technology for emission reductions of Nitrogen Oxides (NOx) and Particulate Matter (PM).
  - Demolition debris shall be recycled for reuse to the extent feasible. See the Construction and Demolition Waste Disposal Plan paragraphs above for requirements on wood treated with preservatives.

Architectural Coatings. EBMUD Construction Specification 01 35 44, Part 3, Section 3.4, Subsection B requires that architectural coatings shall be used in compliance with appropriate Volatile Organic Compound limits as established in the Bay Area Air Quality Management District's Regulation 8, Rule 3, and any amendments thereto.

4.2 GHG Regulations, Plans, and Policies

4.2.1 Federal Regulations

Mandatory Greenhouse Gas Reporting

Title 40 Code of Federal Regulations Part 98, Mandatory Greenhouse Gas Reporting, establishes mandatory GHG reporting requirements for certain industrial facilities that directly emit operational GHGs.[12] The purpose of the mandated GHG Reporting Program is to provide accurate and timely GHG

[12] Title 40, Chapter 1, Subchapter C, Part 98, Subparts A and II. Available online at http://www.ecfr.gov/cgi-bin/retrieveECFR?gp=&SID=c784a291ba489991c58a3321c8ff8fcf&mc=true&n=pt40.23.98&r=PART&ty=HTML#se40.23.98_12. This reporting requirement applies to facilities industrial facilities (e.g., manufacturing, petroleum refineries, petroleum/natural gas systems, etc.) but also includes electricity generation and industrial wastewater facilities as well as municipal solid waste landfills. Accessed on September 9, 2017.

data to inform the public, policy makers, and other interested parties regarding emissions from specific industries, emissions from individual facilities, factors that influence GHG emission rates, and actions that could be taken at facilities to reduce emissions. These mandatory GHG reporting requirements would not apply to this Project's water facilities.

4.2.2 State Regulations

Executive Orders S-3-05 and B-30-15

Executive Order (EO) S-3-05 sets forth a series of target dates by which statewide emissions of GHGs need to be progressively reduced, as follows: by 2010, reduce GHG emissions to 2000 levels (approximately 457 million MT CO_2e); by 2020, reduce emissions to 1990 levels (estimated at 427 million MT CO_2e); and by 2050, reduce emissions to 80 percent below 1990 levels (approximately 85 million MT CO_2e). As discussed in Section 4.9.1, California produced about 452 million MT CO_2e in 2010, thereby meeting the 2010 target date to reduce GHG emissions to 2000 levels.

EO B-30-15 set an additional, interim statewide GHG reduction target of 40 percent below 1990 levels to be achieved by 2030. The purpose of this interim target is to ensure California meets its target of reducing GHG emissions to 80 percent below 1990 levels by 2050 (Governor's Office, 2015). EO B-30-15 also requires all state agencies with jurisdiction over sources of GHG emissions to implement measures within their statutory authority to achieve reductions of GHG emissions to meet the 2030 and 2050 GHG emissions reductions targets.

Assembly Bill 32

In 2006, the California legislature passed Assembly Bill (AB) No. 32 (California Health and Safety Code Division 25.5, Sections 38500, et seq.), also known as the California Global Warming Solutions Act. AB 32 requires the CARB to design and implement emission limits, regulations, and other measures, such that feasible and cost-effective statewide GHG emissions are reduced to 1990 levels by 2020.

California Climate Change Scoping Plan. Pursuant to AB 32, the CARB adopted the *Climate Change Scoping Plan* (Scoping Plan) in December 2008 outlining measures to meet the 2020 GHG reduction limits. In order to meet the goals of AB 32, California must reduce its GHG emissions by 30 percent below projected 2020 business-as-usual emissions levels (approximately 15 percent below 2008 levels). The Scoping Plan estimates a reduction of 174 million MT CO_2e from transportation, energy, agriculture, forestry, and other high global warming sectors (CARB, 2010).

The Scoping Plan anticipates that actions by local governments will result in reduced GHG emissions because local governments have the primary authority to plan, zone, approve, and permit development to accommodate population growth and the changing needs of their jurisdictions (CARB, 2008). The Scoping Plan also relies on the requirements of Senate Bill (SB) 375 (discussed below) to align local land use and transportation planning to achieve GHG reduction.

The Scoping Plan must be updated every five years to evaluate AB 32 policies and ensure that California is on track to achieve the 2020 GHG reduction goal. In 2014, the CARB released the *First Update to the Climate Change Scoping Plan* (First Update), which builds upon the initial scoping plan with new strategies and recommendations. The First Update identifies opportunities to leverage existing and new funds to further drive GHG emission reductions through strategic planning and targeted low carbon investments. The First Update defines the CARB's climate change priorities for the next five years and sets the groundwork to reach long-term goals set forth in EO S-3-05. The First Update highlights California's progress toward meeting the near-term 2020 GHG emission reduction goals in the initial scoping plan. It also evaluates how to align the state's longer-term GHG reduction strategies with other state policy priorities for water, waste, natural resources, clean energy, transportation, and land use (CARB, 2014).

As identified in the First Update, California is on track to meeting the goals of AB 32. The First Update also addresses the State of California's longer-term GHG goals within a post-2020 element. The post-2020 element provides a high-level view of a long-term strategy for meeting the 2050 GHG goals, including a recommendation for the State to adopt a mid-term target. According to the First Update, local government reduction targets should chart a reduction trajectory that is consistent with, or exceeds, the trajectory created by statewide goals. According to the First Update, reducing emissions to 80 percent below 1990 levels will require a fundamental shift to efficient, clean energy in every sector of the economy. Progressing toward California's 2050 climate targets will require significant acceleration of GHG reduction rates. Emissions from 2020 to 2050 will have to decline several times faster than the rate that was needed to reach the 2020 emissions limit.

Senate Bill 375

The Scoping Plan also relies on the requirements of SB 375 (Chapter 728, Statutes of 2008), also known as the Sustainable Communities and Climate Protection Act of 2008, to reduce carbon emissions from land use decisions. SB 375 requires regional transportation plans developed by each of the state's 18 metropolitan planning organizations (MPOs) to incorporate a "Sustainable Communities Strategy" in each regional transportation plan that will then achieve GHG emission reduction targets set by the CARB. For the Bay Area, the per-capita GHG emission reduction target is a 7 percent reduction by 2020 and a 15 percent reduction from 2005 levels by 2035 (CARB, 2011). *Plan Bay Area*, the Metropolitan Transportation Commission's regional transportation plan, adopted in July 2013, is the region's first plan subject to SB 375 requirements (ABAG and MTC, 2013).

Senate Bills 1078, 107, X1-2, and 350 and Executive Orders S-14-08 and S-21-09

California established aggressive renewable portfolio standards under SB 1078 (Chapter 516, Statutes of 2002) and SB 107 (Chapter 464, Statutes of 2006), which require retail sellers of electricity to provide at least 20 percent of their electricity supply from renewable sources by 2010. EO S-14-08 (November 2008) expanded the state's renewable portfolio standard from 20 to 33 percent of electricity from renewable sources by 2020. In September 2009, then Governor Schwarzenegger continued California's commitment to the renewable portfolio standard by signing EO S-21-09, which directed the CARB to enact regulations to help California meet the renewable portfolio standard goal of 33 percent renewable energy by 2020 (CPUC, 2015).

In April 2011, Governor Brown signed SB X1-2 (Chapter 1, Statutes of 2011) codifying the GHG reduction goal of 33 percent by 2020 for energy suppliers which preempts the CARB's 33 percent renewable sources electricity standard and applies to all electricity suppliers (not just retail sellers) in the state, including publicly owned utilities, investor-owned utilities, electricity service providers, and community choice aggregators. Under SB X1-2, all of these entities must adopt the new renewable portfolio standard goals of 20 percent of retail sales from renewable sources by the end of 2013, 25 percent by the end of 2016, and 33 percent by the end of 2020 (CPUC, 2015). Eligible renewable sources include geothermal, ocean wave, solar photovoltaic, and wind, but exclude large hydroelectric (30 megawatts [MW] or more).

Senate Bill 32 and Assembly Bill 197

In August 2016, the California state legislature passed SB 32 which establishes a new target for GHG emissions reductions in the state. SB 32 requires the CARB to ensure that statewide GHG emissions are reduced to 40 percent below the 1990 level by the year 2030 and would augment AB 32 (described above). The Legislature paired SB 32 with AB 197, which directs the CARB to prioritize disadvantaged communities in its climate change regulations and to evaluate the cost-effectiveness of the measures it considers. SB 32 and AB 197 have been enacted (Chapters 249 and 250, Statutes of 2016 (chaptered September 8, 2016) and became effective on January 1, 2017.

California Green Building Standards Code

The 2013 California Green Building Standards Code, as specified in Title 24, Part 11 of the California Code of Regulations, specifies building standards to improve public health, safety, and general welfare by enhancing the design and construction of buildings through the use of building concepts having a positive environmental impact and encouraging sustainable construction practices in five categories: planning and design, energy efficiency, water efficiency and conservation, material conservation and resource efficiency, and environmental quality. The provisions of this code apply to the planning, design, operation, construction, replacement, use and occupancy, location, maintenance, removal, and demolition of every building or structure or any appurtenances connected or attached to such building structures throughout California.

4.9.2.3 Local Plans

BAAQMD

CEQA Guidelines. The BAAQMD CEQA Air Quality Guidelines also assist lead agencies in complying with the requirements of CEQA regarding potentially adverse impacts on air quality. The BAAQMD advises lead agencies to consider adopting a GHG reduction strategy capable of meeting AB 32 goals and then reviewing projects for compliance with the GHG reduction strategy as a CEQA threshold of significance which is consistent with the approach to analyzing GHG emissions described in CEQA Guidelines Section 15183.5.

Bay Area Air Quality Management District Climate Protection Program. On June 1, 2005 the BAAQMD Board of Directors adopted a resolution establishing a Climate Protection Program and acknowledging the link between climate protection and programs to reduce air pollution in the Bay Area. A central element of the BAAQMD's Climate Protection Program is the integration of climate protection activities into existing BAAQMD programs.

2017 Clean Air Plan. The BAAQMD is responsible for attaining and maintaining federal and state air quality standards in the SFBAAB, as established by the federal CAA and the CCAA, respectively. The CAA and the CCAA require plans to be developed for areas that do not meet air quality standards, generally. The most recent air quality plan, the *Bay Area 2017 Clean Air Plan*, includes a goal of reducing GHG emission to 1990 levels by 2020, 40 percent below 1990 levels by 2035, and 80 percent below 1990 levels by 2050.

In addition, the BAAQMD established a climate protection program to reduce pollutants that contribute to global climate change and affect air quality in the SFBAAB; the program includes GHG reduction measures that promote energy efficiency, reduce vehicle miles traveled, and develop alternative energy sources (BAAQMD, 2017).

EBMUD

EBMUD Climate Mitigation Action Plan. In 2008, EBMUD adopted a climate change objective in EBMUD's Strategic Plan focusing on using resources (economic, environmental, and human) in a responsible manner that meets current needs without compromising the ability to meet future needs. In response to the climate change objective, EBMUD prepared the *EBMUD 2014 Climate Change Monitoring and Response Plan*. EBMUD also prepared an Action Plan that provides guidance to inform EBMUD of decisions regarding water supply, water quality, and infrastructure planning. EBMUD's goal is to reduce GHG emissions by 50 percent by 2040 (as compared to baseline GHG emissions in year 2000). In 2013, GHG emissions generated by EBMUD were 31,244 $MTCO_2e$ which was 31 percent below 2000 GHG emission levels. EBMUD tracks GHG emissions per the California Climate Action Registry protocols (EBMUD, 2014).

EBMUD Standard Construction Specifications. EBMUD's Standard Construction Specification 01 35 44 (Environmental Requirements) includes practices and procedures for minimizing GHG emissions from fuel combustion and they are listed above in Section 4.1.3, *Local Policies and Standard Specifications*.

City of Lafayette

The City of Lafayette has not prepared a qualified Climate Action Plan and there are no other city regulations or policies relating to the reduction of GHGs (e.g., reducing energy use, reducing use of single-occupant automobiles, encouraging alternative modes of transportation) that are applicable to the Project.

5 Impact Analysis

5.1 Methodology for Analysis

Construction-related Criteria Air Pollutant Emissions

This air quality impact analysis considers construction-related impacts associated with the proposed Project. Construction equipment, trucks, worker vehicles, and ground-disturbing activities associated with the proposed Project would generate emissions of criteria air pollutants and precursors. Construction-related emissions are evaluated consistent with methodologies outlined in the 2017 BAAQMD CEQA Guidelines for assessing and mitigating air quality impacts (BAAQMD, 2017) including quantification of the Project's construction-related exhaust emissions and comparison to the daily criteria pollutant emissions significance thresholds in order to determine the significance of a Project's impact on regional air quality. The Project's off-road, construction-related emissions were estimated using the equipment mix and operating durations provided by EBMUD, presented in **Table 2**. The CalEEMod emissions estimator model (Version 2016.3.2) was used to estimate off-road equipment emissions. However, because of the characteristics of the Project's on-road construction-related vehicular traffic (different from construction of a typical residential or commercial development project), the Project's on-road, construction-related worker, haul, and vendor truck emissions were more accurately modeled using vehicle miles estimated by EBMUD (see **Table 3**) and EMFAC2014 emission factors.[13] Model results are discussed below under Impact AIR-1.

A screening-level health risk analysis was conducted to determine cancer and non-cancer risks from Project-related construction activities at the closest sensitive receptor and modeling results are discussed under Impact AIR-2. The EPA AERSCREEN air dispersion model was used to evaluate concentrations of DPM and $PM_{2.5}$ from diesel exhaust. AERSCREEN is a single source Gaussian plume model which provides a maximum one-hour ground-level pollution concentration estimate.

Consistent with the BAAQMD CEQA Guidelines, this analysis assumes potential health risk and hazard impacts could occur at sensitive receptors located within 1,000 feet of emission sources. Thus, human health risks and hazards associated with Project construction are calculated at the Maximally-Exposed Individual (MEI) within the 1,000-foot zone of influence of the Project site. This analysis evaluates risk and hazard impacts on the MEI due to the proposed Project's construction-related TAC emissions, primarily as DPM in combination with other existing major sources of DPM, such as freeways. Emissions from other projects within 1,000 feet of the Project site, which could be under construction at the same time as the proposed Project, are considered in the cumulative impact analysis (see Impact AIR-5).

Construction-related GHG Emissions

The BAAQMD CEQA Guidelines do not include significance thresholds for construction-related GHG emissions. However, the BAAQMD recommends that construction-related GHG emissions be quantified and disclosed. The CalEEMod emissions estimator model (Version 2016.3.2) was used to estimate GHG emissions from off-road equipment emissions, while the Project's GHG emissions from on-road, construction-related worker, haul, and vendor truck emissions were estimated using estimated vehicle

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[13] CalEEMod outputs are included in **Appendix B**.

miles presented in **Table 3** and EMFAC2014 emission factors. Model results are discussed below under Impact GHG-1.

Operational Emissions

The BAAQMD CEQA Guidelines also provide significance thresholds for criteria pollutant and GHG emissions associated with Project operations. Project facilities would not include any new air pollutant emission sources and therefore, the potential for the Project to generate operational emissions increases would be limited to mobile sources (i.e., service vehicles) associated with maintenance activities. Since no substantial changes in operations and maintenance activities would occur at the reservoir site, there would be no increase in existing operational criteria pollutant emissions, health risks, and GHG emissions. Therefore, no further analysis of operational emissions is included below.

5.2 Thresholds of Significance

Consistent with Appendix G of the *CEQA Guidelines*, an impact on air quality and greenhouse gas emissions would be considered significant if the Project would:

1. Violate any air quality standard or contribute substantially to an existing or projected air quality violation;
2. Expose sensitive receptors to substantial pollutant concentrations;
3. Conflict with or obstruct implementation of the applicable air quality plan;
4. Create objectionable odors affecting a substantial number of people;
5. Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors);
6. Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment; or
7. Conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases.

The BAAQMD (2017) recommends the following thresholds for construction-related and operational criteria pollutant emissions which have been used in the air quality and greenhouse gas emissions analysis to determine whether the proposed Project's air pollutant emissions would significantly affect the SFBAAB's regional air quality (both at a project level and cumulatively):

- 54 pounds/day NO_X and ROG
- 82 pounds/day PM_{10}
- 54 pounds/day $PM_{2.5}$

In addition to establishing the above significance thresholds for criteria pollutant emissions, BAAQMD (2017) also recommends the following quantitative thresholds to determine the significance of construction-related and operational emissions of toxic air contaminants from individual project and cumulative sources on cancer and non-cancer health risks and have been applied in the air quality and greenhouse gas emissions analysis to construction-related criteria air pollutant emissions only since there would be no change in operational emissions associated with Project implementation:

- Increased cancer risk of >10.0 in a million for individual projects and >100 in a million (from all local sources) for cumulative sources.
- Increased non-cancer risk of >1.0 Hazard Index (Chronic or Acute) for individual projects and >10.0 Hazard Index (from all local sources) for cumulative sources.

- Ambient $PM_{2.5}$ increase: >0.3 μg/m^3 annual average for individual projects and >0.8 μg/m^3 annual average (from all local sources) for cumulative sources.

5.3 Air Quality Impacts and Mitigation Measures

Criteria Air Pollutants

Impact AIR-1: Violate any air quality standard or contribute substantially to an existing or projected air quality violation? (Criterion 1)

Project pipeline construction would involve cutting the pavement, excavating the trench, removing/ stockpiling the soils, installing the pipeline, backfilling the trench, and repaving. Project reservoir construction would entail site grading/preparation for equipment and truck access into the reservoir area, demolition of the existing reservoir, construction of the replacement dual tanks, installation of a storm drain, and restoration of the Project site (including landscaping). Emissions from the Project's construction equipment and vehicles would be generated from multiple sources, including heavy mobile equipment and delivery/haul trucks, and worker vehicles.

Average daily emissions by construction year that would be associated with construction of each Project element are presented in **Table 6**. Emissions from on-road vehicle and off-road equipment are calculated using different emission models (as described above under *Methodology for Analysis*) and, thus, are presented separately. Construction-related criteria pollutant emissions from off-road equipment were calculated for the Project using the BAAQMD-recommended CalEEMod model (CalEEMod Version 2016.3.2). On-road vehicle emissions were calculated using EMFAC2014 emission factors. CalEEMod outputs and EMFAC emissions estimates are included as **Appendix B.** As indicated in **Table 6**, construction of proposed pipelines, storm drains, and the replacement reservoir would not exceed BAAQMD significance thresholds for criteria pollutants, and therefore, the Project's construction-related criteria air pollutant emissions would have a less-than-significant impact on air quality.

Whether or not a project's emissions exceed the BAAQMD significance thresholds, the BAAQMD recommends that all projects implement the *Basic Construction Mitigation Measures*, and these are typically included as mitigation measures. A number of EBMUD standard practices and procedures, applicable to all EBMUD projects, have been incorporated into the Project, including Standard Construction Specification 01 35 44, Environmental Requirements. Sections 1.3E, Dust Control and Monitoring Plan, 3.3B, Dust Control, and 3.4A, Air Quality and Emissions Control, of Standard Construction Specification 01 35 44 require BAAQMD-recommended measures addressing dust and emissions controls. Therefore, no additional mitigation is required to include BAAQMD-recommended measures.

Because Sections 1.3E, Dust Control and Monitoring Plan, 3.3B, Dust Control, and 3.4A, Air Quality and Emissions Control, of EBMUD's Standard Construction Specification 01 35 44, Environmental Requirements, have been incorporated into the Project and include specified dust control BMPs to minimize short-term construction-related emissions, the Project construction impacts related to construction-related criteria air pollutant emissions would be less than significant.

Significance Determination before Mitigation

Less than Significant.

Mitigation Measures

No mitigation measures are required.

Table 6: Project Construction-related Criteria Pollutant Emissions

Construction Activities by Year	Criteria Pollutants (pounds per day) ROG	CO	NO_X	PM_{10}	$PM_{2.5}$
2022					
Pipeline in Public Rights-of-Way (Installation)					
- Off-road Equipment	0.54	6.51	4.44	0.23	0.22
- On-road Vehicles	0.21	1.74	5.46	0.29	0.13
Total (2022)	***0.75***	***8.25***	***10.90***	***0.52***	***0.35***
2023					
Pipeline in Public Rights-of-Way (paving) and Reservoir Demolition					
- Off-road Equipment	1.55	15.00	13.19	0.62	0.58
- On-road Vehicles	0.32	2.28	5.93	0.50	0.19
Total (2023)	***1.87***	***17.28***	***19.12***	***1.12***	***0.77***
2024					
Tank Construction					
- Off-road Equipment	0.25	1.93	2.46	0.11	0.10
- On-road Vehicles	0.18	1.55	3.71	0.51	0.22
Total (2024)	***0.43***	***3.48***	***6.17***	***0.62***	***0.32***
2025					
Tank Construction (piping/valves, testing), Pipeline on Reservoir Site, Storm Drain Installation, and Site Restoration					
- Off-road Equipment	0.10	1.56	0.89	0.04	0.04
- On-road Vehicles	0.09	0.84	1.65	0.18	0.08
Total (2025)	***0.19***	***2.54***	***2.55***	***<0.28***	***<0.18***
Significance Thresholds (pounds per day)	54	- [a]	54	82	54

NOTES: Based on pipeline progression rate of 80 feet per day.

[a] There is no daily emissions threshold for CO. If localized carbon monoxide estimated emissions exceed 550 pounds/day, more detailed analysis is required. Therefore, emissions below this threshold indicate that CO emissions would be less than significant.

SOURCE: CalEEMod and EMFAC (Appendix B), Orion Environmental Associates.

Toxic Air Contaminants

Impact AIR-2: Expose sensitive receptors to substantial pollutant concentrations? (Criterion 2)

Project construction would utilize diesel-powered equipment such as excavators, dozers, loaders, backhoes, and cranes. Operation of such equipment would generate emissions of TACs, including DPM and $PM_{2.5}$.

Given the project's construction duration and proximity of sensitive receptors, there is the potential for the Project's construction-related DPM emissions to exceed the BAAQMD's risk and hazard significance thresholds of 10 excess cancer cases in a million, a HI of 1 for chronic and acute non-cancer risks, and an annual $PM_{2.5}$ concentration of 0.3 micrograms per cubic meter ($\mu g/m^3$). Therefore, a screening-level individual cancer analysis was conducted to determine the cancer and non-cancer health risks from Project-related construction activities at the closest sensitive receptor (see *Methodology for Analysis* discussion above for a description of the methodology for this analysis). The excess individual cancer risk factor for DPM exposure is approximately 300 in a million per 1 $\mu g/m^3$ of lifetime exposure. More recent research has determined that young children are substantially more sensitive to DPM exposure risk. If exposure occurs in the first several years of life, an age sensitivity factor (ASF) of 10 should be applied. For toddlers though mid-teens, the ASF is 3. The DPM exposure risk from construction exhaust thus depends upon the age of the receptor population. However, even with the application of ASFs, the exposure risk at residences for the highest risk group (babies) would 4.94 in a million. Thus, the maximum individual cancer risk would be well below the 10 in a million significance threshold for all age groups.

Pipeline construction would progress along pipeline alignments at a rate of about 80 feet per day (approximately two weeks of exposure at any given receptor), while reservoir demolition/construction would occur at one location for over two years. The only areas where equipment would operate for any length of time at one location would be the reservoir site. Therefore, the MEI for this analysis is the group of residences located closest to and downwind of the reservoir site, which are residences located along the east side of Leland Drive and adjacent to the reservoir site.

Estimated increases in cancer risk, non-cancer chronic and acute hazards, and $PM_{2.5}$ concentrations are broken down by Project component in **Tables 7, 8,** and **9**, respectively. As indicated in these tables, Project-related construction activities would result in a maximum excess cancer risk of 4.94 in a million (for infants and pregnant women in their last trimester), chronic non-cancer risk of 0.024 HI, acute non-cancer risk of 0.136 HI, and $PM_{2.5}$ concentration of 0.115 $\mu g/m^3$.

As shown in **Tables 7** through **9**, the Project's construction-related DPM emissions would be well below BAAQMD project-level thresholds of significance for cancer and non-cancer risks as well as $PM_{2.5}$ concentrations, and therefore, the Project's health risks from DPM would be less than significant.

Operation of Project facilities would not be a source of TACs or $PM_{2.5}$ emissions because there would be no substantial changes in operations and maintenance activities at the reservoir site. Therefore, there would be no operational risk and hazard impacts associated with operation of the Project.

Significance Determination before Mitigation

Less than significant.

Mitigation Measures

No mitigation measures are required.

Table 7: Project Construction-related Cancer Health Risks by Component

	Excess Cancer Risk (cancer cases per one million population)			
Age Group	**Reservoir[a]**	**Pipeline[b]**	**Storm Drain[b]**	**Total**
Infant (0-2 years) and Pregnant Women (last trimester)[c]	4.659	0.187	0.094	4.94
Child (2-14 years)[c]	1.398	0.056	0.028	1.482
Adult	0.466	0.019	0.009	0.494
Significance Threshold				10

NOTES:

[a] Assumes exposure to entire 3¼ years of construction (2022-2025).

[b] Assumes exposure for 12.5 days at an individual location along the pipeline alignment assuming construction would progress at a rate of 80 feet per day.

[c] If exposure occurs in the first several years of life, an age sensitivity factor (ASF) of 10 is applied to account for higher sensitivity of infants than adults and children. For toddlers though mid-teens, the ASF is 3 to account for higher sensitivity of children than adults.

SOURCE: AERSCREEN outputs (Appendix C), Orion Environmental Associates.

Table 8: Project Construction-related Non-cancer Health Risks by Component

Risk	Non-Cancer Risk (hazard index or HI)			
	Reservoir	Pipeline	Storm Drain	Total
Non-Cancer Chronic Hazard	0.022	0.001	0.001	0.024
Non-Cancer Acute Hazard	0.126	0.005	0.005	0.136
Significance Threshold				1
SOURCE: AERSCREEN outputs (Appendix C), Orion Environmental Associates.				

Table 9: Project Construction-related $PM_{2.5}$ Concentration by Component

Risk	Average Annual $PM_{2.5}$ Concentration (µg/m^3)			
	Reservoir	Pipeline	Storm Drain	Total
$PM_{2.5}$ Concentration	0.109	0.004	0.002	0.115
Significance Threshold				0.3 µg/m^3
SOURCE: AERSCREEN outputs (Appendix C), Orion Environmental Associates.				

Consistency with Clean Air Plan

Impact AIR-3: Conflict with or obstruct implementation of the applicable air quality plan? (Criterion 3)

The most recently adopted air quality plan in the SFBAAB is the BAAQMD's *2017 Clean Air Plan* whose primary goals are to protect public health and protect the climate. The *2017 Clean Air Plan* includes a wide range of control measures, which consist of actions to reduce combustion-related activities, decrease fossil fuel combustion, improve energy efficiency, and decrease emissions of potent GHGs. Numerous measures address reduction of several pollutants: ozone precursors, particulate matter, air toxics, and/or GHGs. Other measures focus on a single type of pollutant, super GHGs such as methane and black carbon, or harmful fine particles that affect public health.

As indicated in Impacts AIR-1 (**Table 6**), AIR-2 (**Tables 7**, **8**, and **9**), and GHG-1 (**Table 11**), the Project's construction-related criteria pollutant, TAC, and GHG emissions would not exceed threshold levels (consistent with BAAQMD CEQA Guidelines), indicating that Project-related emissions would not have a significant impact on regional air quality or climate change, and would not pose significant health risks to the public. Heavy-duty vehicles used by EBMUD and its contractors for Project construction would comply with applicable diesel emission standards for heavy-duty on-road and off-road engines. Therefore, the Project would not conflict with the *2017 Clean Air Plan's* measures requiring use of cleaner diesel-fueled engines. In addition, a number of EBMUD standard practices and procedures applicable to all EBMUD projects have been incorporated into the Project, including Standard Construction Specification 01 35 44, Environmental Requirements (listed above). Sections 1.3E, Dust Control and Monitoring Plan, 3.3B, Dust Control, and 3.4A, Air Quality and Emissions Control, of Standard Construction Specification 01 35 44, Environmental Requirements, require BAAQMD-recommended measures addressing dust and emissions controls. Incorporation of these dust and air quality emission controls, which are consistent with BAAQMD-recommended *Basic Construction Mitigation Measures*, would further reduce the Project's construction-related criteria pollutant emissions.

For these reasons, the Project would not hinder the Plan's ability to meet its primary goals to reduce emissions and harmful pollutants, safeguard public health, and reduce GHG emissions. Therefore, the Project would not conflict with or obstruct implementation of the *2017 Clean Air Plan.*

Significance Determination before Mitigation

Less than significant.

Mitigation Measures

No mitigation measures are required.

Odors

Impact AIR-4: Create objectionable odors affecting a substantial number of people? (Criterion 4)

During construction, diesel exhaust from construction equipment would generate some odors at various locations within the vicinities of the Project reservoir site and pipeline alignment. Residential uses are located as close as 80 feet west (generally upwind) and 400 feet east (generally downwind) from construction work areas at the reservoir site. Although diesel exhaust odors would be generated in the reservoir site vicinity over the 2+ year construction duration, such setbacks in combination with prevailing wind conditions would help minimize the potential for nuisance odors at the closest receptors even though perceptible diesel odors could occur. However, such construction-related nuisance odors would be temporary, varying from day to day with the level of construction activity and meteorological conditions (i.e., dispersion by winds, etc.), and would cease after Project construction is complete. In addition, the Project would involve commonly used construction techniques and materials, which are not particularly odorous. Thus, construction activities at the reservoir site are are not expected to create objectionable odors affecting a substantial number of people, and this impact would be less than significant.

Existing residences are located much closer (as close as 40 feet) to the Project pipeline alignment and these residences, particularly those located downwind of the pipeline alignment, would be subject to perceptible diesel exhaust odors. Despite their proximity, each receptor would be subject to nuisance diesel odors for less than two weeks (10 work days). Given this short duration, construction activities along the pipeline alignment are not be expected to create objectionable odors affecting a substantial number of people, and this impact would be less than significant.

A number of EBMUD standard practices and procedures, applicable to all EBMUD projects, have been incorporated into the Project, including Standard Construction Specification 01 35 44, Environmental Requirements. Section 3.4A, Air Quality and Emissions Control, of Standard Construction Specification 01 35 44 limits idling time of diesel engines and minimize use of diesel generators. Such limits would help to further minimize these temporary construction-related nuisance odor effects.

Odors would not be emitted during operation of the proposed replacement reservoir or pipeline, just as no odors are associated with operation of the existing reservoir and pipelines.

Significance Determination before Mitigation

Less than significant.

Mitigation Measures

No mitigation measures are required.

Cumulative Impacts

Impact AIR-5: Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors)? (Criterion 5)

Cumulative Criteria Air Pollutant Emissions. By definition, regional air pollution is largely a cumulative impact. Emissions from past, present, and future projects contribute to the region's adverse air quality on a cumulative basis. No single project is sufficient in size to, by itself, result in non-attainment of air quality standards. Instead, a project's individual emissions are considered to contribute to existing cumulative air quality impacts (BAAQMD, 2017). The Project-level thresholds for criteria air pollutants are based on levels that would result in a cumulatively considerable net increase in criteria air pollutants if they are exceeded. Projects that would result in criteria pollutant emissions below these significance thresholds would result in a less than cumulatively considerable increase in criteria air pollutants. As shown in **Table 6**, the Project's construction-related emissions would not exceed the BAAQMD's construction-related criteria air pollutant significance thresholds (see Impact AIR-1 above). Therefore, because the Project's emissions (Impact AIR-1) would not exceed the project-level thresholds for criteria air pollutants, the proposed Project would not result in a cumulatively considerable contribution to regional air quality impacts, a less-than-significant cumulative impact.

Cumulative Health Risks. BAAQMD CEQA Guidelines require a determination of cumulative health risk impacts. Therefore, in addition to Project construction, possible local stationary or vehicular source emissions must be added to the concentration to determine the cumulative total. Specifically, the CEQA Guidelines require that existing stationary and mobile emissions sources within 1,000 feet of the Project area also be considered. Any potential cumulative health risk would, therefore, derive from Project activities plus any existing identified risk sources within the Project vicinity.

The BAAQMD has developed a Google Earth application that maps the locations of all stationary sources in the region that the BAAQMD permits. For each source, the application lists the name of the source and the conservative screening level cancer risk and $PM_{2.5}$ concentration values. According to BAAQMD records (BAAQMD, 2012), there are no permitted stationary sources within 1,000 feet of the Project site. One mobile source, SR 24, that carries a volume over 10,000 average daily traffic (ADT) and is located approximately 1,000 feet from the Project's MEI, which was included in the cumulative analysis. There is also one proposed six-lot subdivision at the end of Hoedel Court, which is located 1,000 feet west of the Project site. Although construction is estimated to occur prior to 2022, DPM emissions associated with construction of that project would contribute to cumulative health risks for residences located in the Project vicinity. Therefore, health risks associated with these sources have been included to determine the cumulative health risks. **Table 10** presents cumulative health risks (cancer risk, annual average $PM_{2.5}$ emissions, and non-cancer (chronic and acute) hazards) associated with these sources.

As indicated in Table 10, the cumulative or combined health risks from exposure of sensitive receptors in the Project vicinity to existing and proposed sources within 1,000 feet of the MEI would not exceed the BAAQMD's cumulative health risk significance thresholds. Therefore, cumulative health risks would be less than significant and the Project's contribution to cumulative health risks would be less than cumulatively considerable.

Project facilities would not be a source of TACs or $PM_{2.5}$ emissions because there are no emissions sources (i.e., diesel-fueled equipment), and therefore, operation of the Project would not contribute to cumulative risk and hazard impacts.

Table 10: Cumulative Cancer and Non-Cancer Risks and $PM_{2.5}$ Concentrations

Source	Cancer Risk (cases in one million)	Average Annual $PM_{2.5}$ Concentration ($\mu g/m^3$)	Chronic Hazard (HI)	Acute Hazard (HI)
SR 24[a]	9.70	0.092	0.009	0.011
Proposed Project (worst-case)[b]	4.94	0.115	0.024	0.136
Hoedel Subdivision (Construction)[c]	13.30	0.310	0.056	0.361
Cumulative Risk (Maximum)	27.94	0.517	0.198	0.508
Significance Threshold	100	0.8	1	1

NOTES:

[a] Health risks at 1,000 feet south of SR 24, which approximately coincides with MEI location.

[b] Total Project emissions, which includes emissions associated with construction of the pipelines, reservoir, and storm drain.

[c] The CalEEMod defaults for the Hoedel project assume all six homes would be built simultaneously and completed in 10 months, but it is likely that construction would occur over a longer period of time. Therefore, construction-related emissions associated with this project should be considered very conservative and are likely overestimated.

SOURCES: BAAQMD, 2015 for SR 24; Tables, 7, 8, and 9 (above) for Proposed Project; CalEEMod for Hoedel Subdivision.

Significance Determination before Mitigation

Less than significant.

Mitigation Measures

No mitigation measures are required.

5.4 GHG Emissions Impacts and Mitigation Measures

Impact GHG-1: Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment or conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases? (Criterion 6)

Construction-related GHG emissions would include direct GHG emissions from operation of construction equipment and increases in vehicle trips over the Project's 3+ years of construction. Construction-related GHG emissions associated with mobile sources were estimated using CalEEMod, EMFAC2014 emission factors, a Project-specific construction equipment list, and on-road haul/delivery truck and worker vehicle volume estimates provided by EBMUD. **Table 11** summarizes the Project's annual and total construction-related GHG emissions from off-road equipment and on-road trucks.

Table 11: Project Construction-related Greenhouse Gas Emissions

	GHG Emissions (MT CO_2e per year)		
Year	Off-Road Equipment	On-Road Vehicles	Total
2022	31	96	126
2023	327	777	1,103
2024	53	507	560
2025	28	242	270

NOTE: Due to rounding conventions, the numbers in the first two columns may not add up to totals in the right column.

SOURCE: CalEEMod for off-road equipment (outputs in Appendix B) and EMFAC2014 emissions factors for on-road vehicles, Orion Environmental Associates.

Neither the state nor BAAQMD has adopted a methodology or quantitative threshold, such as those that exist for criteria pollutants, which can be applied to a construction project to evaluate the significance of an individual project's construction-related contribution to GHG emissions. However, when the Project's construction-related annualized GHG emissions are compared to the BAAQMD's operational threshold for stationary sources of 10,000 MT CO_2e per year, the Project's annual and total construction-related GHG emissions shown in **Table 11** would remain well below BAAQMD's threshold and would be less than significant.

Although BAAQMD's CEQA Guidelines do not specify thresholds of significance for construction-related GHG emissions, they do encourage incorporation of best management practices (BMPs) to reduce GHG emissions during construction, where feasible and applicable. Consistent with these BMPs, EBMUD proposes to use excavated material as backfill where feasible, thereby minimizing GHG emissions associated with construction haul trucks and solid waste disposal.

Additionally, a number of EBMUD standard practices and procedures, applicable to all EBMUD projects, have been incorporated into the Project, including Standard Construction Specification 01 35 44, Environmental Requirements. Section 3.4A, Air Quality and Emissions Control, of Standard Construction Specification 01 35 44, requires construction crews to use alternative-fueled construction equipment and to recycle or reuse construction waste or demolition materials to the extent feasible.

Because Section 3.4A, Air Quality and Emissions Control, of EBMUD's Standard Construction Specification 01 35 44, Environmental Requirements, has been incorporated into the Project and includes specified air emission control BMPs to minimize short-term construction diesel exhaust emissions, and includes GHG emission controls which would reduce GHG emissions from fuel combustion, the Project construction impacts related to GHG emissions would be less than significant.

Following completion of Project pipelines, operational and maintenance practices for the Leland Reservoir would not change substantially. Therefore, direct GHG emissions associated with this maintenance traffic would be similar to existing levels, and operational GHG emissions would be less than significant.

Indirect operational GHG emissions are typically associated with emissions by electricity providers for line power and the source of line power that would be used by Project facilities is provided by PG&E. PG&E derives almost half of its power from eligible renewables and large hydroelectric, which would help minimize the potential for Project-related indirect GHG emissions.

Significance Determination before Mitigation

Less than significant.

Mitigation Measures

No mitigation measures are required.

Impact GHG-2: Conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases? (Criterion 7)

Construction of Project facilities would result in operation of diesel vehicles and equipment that would directly generate GHG emissions and the vehicles and equipment would be subject to actions outlined in the California Climate Change Scoping Plan. Actions pertinent to Project facilities relate to emission controls that will be imposed in the future, including future implementation of additional controls (Phase 2) to reduce GHG emissions in new heavy-duty vehicles beyond 2018, continued implementation of diesel controls to reduce black carbon emissions from heavy-duty on-road engines as well as off-road engines, and reducing emissions of smog-forming pollutants by about 90 percent below 2010 levels by 2032 to meet the NAAQS for ozone. Heavy-duty vehicles used by EBMUD and its contractors would comply with applicable emission standards. As indicated in Table 6, the project's construction-related ROG and NOx emissions (smog-forming pollutants or ozone precursors) would not exceed BAAQMD-recommended CEQA threshold levels. These thresholds are intended to ensure that the SFBAAB would meet NAAQS standards. Therefore, the Project's construction-related GHG emissions would not conflict with any plans, policies, or regulations adopted for the purpose of reducing GHG emissions (i.e., Scoping Plan actions, *2017 Clean Air Plan,* and the BAAQMD-recommended CEQA significance thresholds). Diesel trucks and off-road equipment operated by EBMUD and its contractors would comply with the latest vehicle emission standards established by CARB pursuant to the Scoping Plan.

According to EBMUD's Climate Mitigation Action Plan (2014), the majority of EBMUD's total operational GHG emissions are indirect GHG emissions associated with the use of electrical energy. However, 22 percent of EBMUD's total GHG emissions are direct GHG emissions associated with fleet operations (vehicles and portable equipment). Following completion of Project facilities, operational and maintenance practices for the reservoir and pipelines would remain the same, which would include periodic maintenance. Because GHG emissions associated with this maintenance traffic would be similar to existing levels, there would be no substantial increase in direct GHG emissions due to the Project. EBMUD's heavy-duty maintenance vehicles would comply with the latest vehicle emission standards established by CARB pursuant to the Scoping Plan. Therefore, the Project's direct operational GHG emissions would not conflict with Scoping Plan actions, *2017 Clean Air Plan,* or the BAAQMD-recommended CEQA significance thresholds.

With respect to indirect operational GHG emissions associated with electrical energy use, EBMUD's *2014 Climate Change Monitoring and Response Plan* outlines how GHG emissions reductions are accomplished through implementation of energy efficiency practices, use of low-carbon energy sources, reductions in non-CO_2 emissions reductions (including black carbon), and carbon sequestration. EBMUD evaluates each project for water and energy conservation opportunities as well as the potential to create renewable energy. Energy efficiency measures implemented by EBMUD that pertain to the Project include the following:

- Minimizing GHG emissions as a goal in planning new projects;
- Reducing water use at District facilities through equipment upgrades and metering; and
- Reviewing the District's master equipment specifications to ensure energy efficient systems are appropriately procured.

Implementation of such measures would help to minimize the Project's indirect GHG emissions associated with energy use. Since EBMUD's *2014 Climate Change Monitoring and Response Plan* goal is to reduce GHG emissions by 50 percent by 2040 and energy efficiency measures would be implemented as part of the Project per the Response Plan, the Project's indirect operational GHG emissions would not conflict with Scoping Plan actions, *2017 Clean Air Plan,* or the BAAQMD-recommended CEQA significance thresholds.

Significance Determination before Mitigation

Less than significant.

Mitigation Measures

No mitigation measures are required.

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Appendix A

Trip Generation and Equipment Operation Estimates

Leland Reservoir Replacement and Pipeline Installation at 80 LF/Day Production Rate - Truck Trip Estimate

Construction Phase	Approx. Duration (weeks)	Trips per Day: Haul Trucks (per day)	Trips per Day: Materials Trucks (per day)	Trips per Day: Worker Vehicles (per day)	Daily One-Way Trips: Trucks[2]	Daily One-Way Trips: Workers[2]	Daily One-Way Trips: Total[2] [Trucks + Workers]	Max Hourly One-Way Trips[3, 4]	
Pipeline Installation - Windsor Drive, Condit Road, and Leland Drive									
Pipeline Installation Mobilization	2	0	4	2	8	4	**12**	2	Trucks
								2	Vehicles
Pipeline Connection 1 - Windsor Drive/Old Tunnel Road	1	3	3	24	12	48	**60**	2	Trucks
								24	Vehicles
Pipeline Connection 2 - Leland Drive/Meek Place	1	3	3	24	12	48	**60**	2	Trucks
								24	Vehicles
Pipeline Installation (2,700 LF at 80 LF/Day Production Rate) - Windsor Drive, Condit Road, and Leland Drive	7	12	3	24	30	48	**78**	4	Trucks
								24	Vehicles
Pipeline Testing - Flushing, Pressure Testing, and Chlorination	4	0	3	13	6	26	**32**	1	Trucks
								13	Vehicles
Pipeline Paving - Windsor Drive, Condit Road, and Leland Drive (2,700 LF)	1	10	0	13	20	26	**46**	3	Trucks
								13	Vehicles
Demolition									
Reservoir Replacement Mobilization	2	0	4	2	8	4	**12**	2	Trucks
								2	Vehicles
Site Work-Tree Removal	2	0	2	2	4	4	**8**	1	Trucks
								2	Vehicles
Drain Reservoir	4	0	1	2	2	4	**6**	1	Trucks
								2	Vehicles
Removal and Crush Concrete Roof Panels and Structure	6	13	1	15	28	30	**58**	4	Trucks
								15	Vehicles
Remove and Crush Concrete Girders	3	3	1	15	8	30	**38**	2	Trucks
								15	Vehicles
Remove and Crush Concrete Columns and Footings	3	2	1	15	6	30	**36**	1	Trucks
								15	Vehicles
Remove and Crush Concrete Lining	6	5	1	15	12	30	**42**	2	Trucks
								15	Vehicles
Open Cut Excavation and Soil Hauling	24	35	0	10	70	20	**90**	10	Trucks
								10	Vehicles
Tank Construction and Onsite Water Pipeline and Stormdrain Installation									
Reservoir Concrete Foundation	8	0	53	23	106	46	**152**	16	Trucks
								23	Vehicles
Reservoir Concrete Walls/Columns	11	0	13	18	26	36	**62**	4	Trucks
								18	Vehicles
Reservoir Prestress Wrapping/Shotcrete	8	0	8	8	16	16	**32**	3	Trucks
								8	Vehicles
Reservoir Concrete Roof Slab	20	0	50	18	100	36	**136**	15	Trucks
								18	Vehicles
Valve Pit and Pit Piping/Valves	7	10	6	8	32	16	**48**	5	Trucks
								8	Vehicles
Reservoir Field Testing and Startup	9	0	1	8	2	16	**18**	1	Trucks
								8	Vehicles

Leland Reservoir Replacement and Pipeline Installation at 80 LF/Day Production Rate - Truck Trip Estimate

Construction Phase	Approx. Duration (weeks)	Trips per Day			Daily One-Way Trips			Max Hourly One-Way Trips[3, 4]	
		Haul Trucks (per day)	Materials Trucks (per day)	Worker Vehicles (per day)	Trucks[2]	Workers[2]	Total[2] [Trucks + Workers]		
Pipeline Connection 3 - Within Leland Reservoir Property Boundary	1	3	3	24	12	48	**60**	2	Trucks
								24	Vehicles
Pipeline Installation (580 LF at 80 LF/Day Production Rate) - Pipeline within Leland Reservoir property boundary in unpaved area (cross-country)	2	12	3	24	30	48	**78**	4	Trucks
								24	Vehicles
Pipeline Installation (370 LF at 80 LF/Day Production Rate - Pipeline within Leland Reservoir property boundary in new access road (to be paved)	1	12	3	24	30	48	**78**	4	Trucks
								24	Vehicles
Pipeline Testing - Flushing, Pressure Testing, and Chlorination	2	0	3	13	6	26	**32**	1	Trucks
								13	Vehicles
Pipeline Paving - New access road paving within Leland Reservoir property boundary	1	6	0	13	12	26	**38**	2	Trucks
								13	Vehicles
Stormdrain Connection - Patty Way/Leland Drive	1	2	3	24	10	48	**58**	1	Trucks
								24	Vehicles
Stormdrain Installation - Leland Reservoir Property	3	10	3	24	26	48	**74**	4	Trucks
								24	Vehicles
Paving - Across Patty Way and Leland Drive Connection Area	1	9	0	13	18	26	**44**	3	Trucks
								13	Vehicles
Site Restoration									
Tank Backfill	13	4	1	4	10	8	**18**	2	Trucks
								4	Vehicles
Contouring/Landscaping	8	4	20	8	48	16	**64**	7	Trucks
								8	Vehicles
Complete Civil Work	4	4	0	4	8	8	**16**	2	Trucks
								4	Vehicles
Demobilization	2	4	0	4	8	8	**16**	2	Trucks
								4	Vehicles
Total Duration (weeks)	**168**								
							Max Hourly One Way Trips =	**16**	**Trucks**
								24	**Vehicles**

Assumptions:
Haul trucks for soil disposal and transporting excavated soil material onsite for temporary soil stockpiling and partially backfilling around new tanks.
Material trucks for building material, piping, paving, and equipment delivery.
Haul trucks average 16 cubic yards; Concrete trucks average 10 cubic yards

Excavation is approximately 108,000 CY with off haul of approximately 66,000 CY.
Backfill is approximately 42,000 CY, which can be temporarily stockpiled onsite

Notes:
1. Work schedule: 8-hour workday, typical construction hours M -F between 7:00 am to 7:00 pm
2. Daily One-Way Vehicle Trips Account for Trucks/Vehicles ***going to and leaving the project site on a daily basis*** *.*
3. Max hourly one-way truck trips is estimated by averaging the number of trucks ***going to and leaving*** *the job site on a daily basis over a 7-hour period.*
4. Max hourly one-way vehicle trips is estimated by assuming all workers are arriving and leaving the job site during a.m. and p.m. peak hours.
5. Contractor could typically install 80 to 200 lineal feet (LF), 100 LF on average, of 36-inch transmission pipeline per workday in paved areas.
6. One paving crew could typically pave 700 LF of trench with 6" AC paving per day.

Leland Reservoir Replacement - Major Equipment Hour Estimate **12/21/2016**

Construction Phase	Duration (Weeks)	Duration (Days)	Major Equipment	Estimated Hrs/Wk	Estimated Hrs/Day	Total Equipment Hours
Mobilization	2					
Mobilization						
		6	Generator		3	18
		6	Excavator		3	18
Demolition						
Site Work-Tree Removal	2					
		8	Chain Saws (2)		12	96
		8	Wood Chipper		6	48
		8	Backhoe		6	48
Drain Reservoir	4					
			Portable Pump	30	6	120
Remove and Crush Concrete Roof Panels and Stucture	6					
			Excavator (2)	40	12	240
			Hoe Ram	20	4	120
			Air Compressor	13	3	78
			Concrete Crusher	35	7	210
Remove and Crush Concrete Girders	3					
			Excavator (2)	40	12	120
			Hoe Ram	20	4	60
			Air Compressor	13	3	39
			Concrete Crusher	35	7	105
Remove and Crush Concrete Columns and Footings	3					
			Excavator (2)	40	12	120
			Hoe Ram	20	4	60
			Air Compressor	13	3	39
			Concrete Crusher	35	7	105

Leland Reservoir Replacement - Major Equipment Hour Estimate

12/21/2016

Construction Phase	Duration (Weeks)	Duration (Days)	Major Equipment	Estimated Hrs/Wk	Estimated Hrs/Day	Total Equipment Hours
Remove and Crush Concrete Lining	6					
			Excavator (2)	40	12	240
			Hoe Ram	20	4	120
			Air Compressor	13	3	78
			Concrete Crusher	35	7	210
Open Cut Excavation and Soil Hauling	24					
			Excavator	35	7	840
			Bulldozer	35	7	840
Tank Construction						
Reservoir Concrete Foundation	8	4				
			Crane		6	24
			Concrete Pump		8	120
Reservoir Concrete Walls/Columns	11	15				
			Crane		6	90
			Concrete Pump		8	120
Reservoir Prestress Wrapping/Shotcrete	8					
		6	Hydroblasting Machine		6	84
		14	Pre-Stressing Tower		8	112
		12	Concrete Pump		7	84
Reservoir Concrete Roof Slab	20	4				
			Crane		6	24
			Concrete Pump		8	32
Valve Pit and Pit Piping/Valves	7	3				
			Backhoe		3	21
			Concrete Pump		8	24

Leland Reservoir Replacement - Major Equipment Hour Estimate

12/21/2016

Construction Phase	Duration (Weeks)	Duration (Days)	Major Equipment	Estimated Hrs/Wk	Estimated Hrs/Day	Total Equipment Hours
Field Testing and Startup	9		None			
Site Restoration						
Tank Backfill	13					
			Bulldozer	35	7	455
			Backhoe	35	7	455
			Compactor	35	7	455
Contouring/Landscaping	8					
			Backhoe	20	4	160
Complete Civil Work	4					
			Asphalt Paver	8	2	32
			Scraper	8	2	32
			Roller	8	2	32
			Bulldozer	16	4	64
Demobilization	2					
			Backhoe	8	2	16
Estimated Construction Duration (weeks)	**140**					

Leland Reservoir Open Cut - 18.3-MG; Future Tanks - Dual 8.0-MG Tanks;

Open Cut Demo Excavation (Soil + demo material) ~ 108,000 CY, Offhaul ~ 66,000 CY

Onsite Temp Soil Storage/Backfill Around New Tanks ~ 42,000 CY

Leland Reservoir Replacement 36-inch Pipeline Installation - Major Equipment Hour Estimate Phase 1

Pipeline Installation Phase 1 - Pipeline Installation in Windsor Drive, Condit Road, and Leland Drive

36-inch Pipeline Installation Equipment Hour Use Estimate (80 LF/Day)

Construction Phase and Major Equipment	Estimated Equipment Use Duration		
	Average Hours/Day	Days	Total Hours
Demolition			
Concrete/Industrial Saws	2	5	10
Tractors/Loaders/Backhoes x2	12	5	60
Pipeline Installation			
Excavators	8	15	120
Tractors/Loaders/Backhoes	6	15	90
Dewatering Pump (Per Pipeline Connection to Existing Distribution System - 2 Connections)	18	2	36
Generator	6	25	150
Air Compressors	4	25	100
Paving			
Cement/Mortar Mixers Pumps	6	5	30
Pavers	3	5	15
Compactor	4	5	20
Rollers	4	5	20
Tractors/Loaders/Backhoes	6	5	30
Sweepers/Scrubbers	1	5	5

Leland Reservoir Replacement 36-inch Pipeline Installation - Major Equipment Hour Estimate Phase 2

Pipeline Installation Phase 2 - Pipeline Installation within Leland Reservoir Property Boundary

36-inch Pipeline Installation Equipment Hour Use Estimate (80 LF/Day)

Construction Phase and Major Equipment	Estimated Equipment Use Duration		
	Average Hours/Day	Days	Total Hours
Demolition*			
Concrete/Industrial Saws	0	0	0
Tractors/Loaders/Backhoes x2	0	0	0
Pipeline Installation			
Excavators	8	6	48
Tractors/Loaders/Backhoes	6	6	36
Dewatering Pump (Pipeline Connection to Existing Distribution System)	18	2	36
Generator	6	10	60
Air Compressors	4	10	40
Paving			
Cement/Mortar Mixers Pumps	6	3	18
Pavers	3	3	9
Compactor	4	3	12
Rollers	4	3	12
Tractors/Loaders/Backhoes	6	3	18
Sweepers/Scrubbers	1	3	3

*Demolition work for pipeline installation phase 2 will be completed during the existing reservoir demolition phase

2022 Summary			Pipeline (Phase 1)			
			Year	Equipment Type	Total Hrs	Ave. Hrs/Day
Equipment Type	**Total Hrs**	**Ave. Hrs/Day**	2022	Concrete Saw	10	0.15
Concrete Saw	10	0.15	2022	Tractor/Loader/Backho	60	0.92
Tractor/Loader/Backhoe	150	2.31	2022	Excavator	120	1.85
Excavator	120	1.85	2022	Tractor/Loader/Backho	90	1.38
Pump	36	0.55	2022	Dewatering Pump	36	0.55
Generator	150	2.31	2022	Generator	150	2.31
Air Compressor	100	1.54	2022	Air Compresor	100	1.54

Color Key	
	2022
	2023
	2024
	2025

2023 Summary		
Equipment Type	Total Hrs	Ave. Hrs/Day
Generator	18	0.07
Excavator/Hoe Ram	1903	7.32
Chain Saw	96	0.37
Pump	153	0.59
Air Compressor	234	0.90
Crusher	678	2.61
Dozer/Excavator	805	3.10
Pavers	15	0.06
Compactor/Chipper	20	0.08
Rollers	20	0.08
Tractor/Loader/Backhoe	78	0.30
Sweeper/Scrubber	5	0.02

Reservoir Demolition			
Year	Equipment Type	Total Hrs	Ave. Hrs/Day
2023	Generator	18	0.07
	Excavator	18	0.07
2023	Chain Saw (2)	96	0.37
	Wood Chipper	48	0.18
	Backhoe	48	0.18
2023	Portable Pump	123	0.47
2023	Excavator	240	0.92
	Hoe Ram	120	0.46
	Air Compressor	78	0.30
	Crusher	210	0.81
2023	Excavator	120	0.46
	Hoe Ram	60	0.23
	Air Compressor	39	0.15
	Crusher	105	0.40
2023	Excavator	120	0.46
	Hoe Ram	60	0.23
	Air Compressor	39	0.15
	Crusher	105	0.40
2023	Excavator	240	0.92
	Hoe Ram	120	0.46
	Air Compressor	78	0.30
	Crusher	210	0.81
2023	Excavator	805	3.10
	Dozer	805	3.10

Pipeline Construction					
Year	Phase	Equipment Type	Days	Total Hrs	Ave. Hrs/Day
2023	Paving	Pumps	5	30	0.12
		Pavers	5	15	0.06
		Compactor	5	20	0.08
		Rollers	5	20	0.08
		Tractor/Loader/Backh	5	30	0.12
		Sweeper/Scrubber	5	5	0.02

Color Key	
	2022
	2023
	2024
	2025

2024 Summary

Equipment Type	Total Hrs	Ave. Hrs/Day
Excavator	35	0.13
Dozer	35	0.13
Crane and Stress Tower	250	0.96
Pump	370	1.42
Hydroblast (pressure washer)	84	0.32

Color Key	
	2022
	2023
	2024
	2025

Reservoir Construction

Year	Phase	Equipment Type	Total Hrs	Hrs/Yr
2024	Reservoir Concrete Foundation			
		Crane	24	0.09
		Pump	120	0.46
2024	Res Concrete Walls/Columns			
		Crane	90	0.35
		Pump	120	0.46
2024	Reservoir Prestress Wrapping/Shotcrete			
		Hydroblast	84	0.32
		Stress Tower	112	0.43
		Pump	84	0.32
2024	Reservoir Concrete Roof Slab			
		Crane	24	0.09
		Pump	32	0.12
2024	Valve Pit and Pit Piping Valves			
		Backhoe	12	0.05
		Concrete Pump	14	0.05

Reservoir Demolition

Year	Equipment Type	Total Hrs	Hrs/Yr
2024	Excavator	35	0.13
	Dozer	35	0.13

2025

Summary

Equipment Type	Total Hrs	Ave. Hrs/Day
Excavator	96	0.38
Tractor/Loader/Backhoe	123	0.48
Pump	76	0.30
Generator	120	0.47
Air Compressor	80	0.31
Paver	15	0.06
Compactor	20	0.08
Roller	20	0.08
Sweeper/Scrubber	5	0.02

Color Key	
	2022
	2023
	2024
	2025

Reservoir Construction

Year	Equipment Type	Total Hrs	Ave. Hrs/Day
2025	Valve Pit and Pit Piping Valves		
	Backhoe	9	0.04
	Concrete Pump	10	0.04

Pipeline (Phase 2)

Year	Equipment Type	Total Hrs	Ave. Hrs/Day
2025	Excavator	48	0.19
	Tractor/Loader/Backhoe	36	0.14
	Dewatering Pump	36	0.14
	Generator	60	0.24
	Air Compressor	40	0.16
2025	Pumps	18	0.07
	Pavers	9	0.04
	Compactor	12	0.05
	Rollers	12	0.05
	Tractor/Loader/Backhoe	18	0.07
	Sweeper/Scrubber	3	0.01

Storm Drain

Year	Equipment Type	Total Hrs	Ave. Hrs/Day
2025	Concrete Saw	1	0.00
	Tractor/Loader/Backhoe	12	0.05
2025	Excavator	48	0.19
	Tractor/Loader/Backhoe	36	0.14
	Dewatering Pump	0	0.00
	Generator	60	0.24
	Air Compressor	40	0.16
2025	Pumps	12	0.05
	Pavers	6	0.02
	Compactor	8	0.03
	Rollers	8	0.03
	Tractor/Loader/Backhoe	12	0.05
	Sweeper/Scrubber	2	0.01

Reservoir Construction

Phase	Construction Year	Equipment Type	Duration (Weeks)	Total hours	Average Hours/Day[1]	Weeks/Year	
Mobilization							
Mobilization	2023		2				
		Generator		18	0.07		
		Excavator		18	0.07		
Demolition							
Demolition and Pipe Abandonment	2023		2				
		Concrete Pump		3	0.01		
		Chain Saw (2)		96	0.37		
		Wood Chipper		48	0.18		
		Backhoe		48	0.18		
Drain Reservoir	2023		4		0.00		
		Portable Pump		120	0.46		
Remove Roof and Crush	2023		6				
		Excavator		240	0.92		
		Hoe Ram		120	0.46		
		Air Compressor		78	0.30		
		Crusher		210	0.81		
Remove Girders and Crush	2023		3				
		Excavator		120	0.46		
		Hoe Ram		60	0.23		
		Air Compressor		39	0.15		
		Crusher		105	0.40		
Remove/Crush Footings	2023		3				
		Excavator		120	0.46		
		Hoe Ram		60	0.23		
		Air Compressor		39	0.15		
		Crusher		105	0.40		
Remove and Crush Lining	2023		6				
		Excavator		240	0.92		
		Hoe Ram		120	0.46		
		Air Compressor		78	0.30		
		Crusher		210	0.81		
Open Cut Excavation and Soil Hauling	2023		23				
		Excavator		805	3.10		
		Dozer		805	3.10	49	+3 for pipeline = 52 Weeks
Open Cut Excavation and Soil Hauling	2024		1				
		Excavator		35	0.13		
		Dozer		35	0.13		
Tank Construction							
Reservoir Concrete Foundation	2024		8				
		Crane		24	0.09		
		Concrete Pump		120	0.46		
Res Concrete Walls/Columns	2024		11				
		Crane		90	0.35		
		Concrete Pump		120	0.46		
Reservoir Prestress Wrapping/Shotcrete	2024		8				
		Hydroblast		84	0.32		
		Stress Tower		112	0.43		
		Concrete Pump		84	0.32		
Reservoir Concrete Roof Slab	2024		20				
		Crane		24	0.09		
		Pump		32	0.12		
Valve Pit and Pit Piping/Valves	2024		4				
		Backhoe		12	0.05		
		Pump		14	0.05	52	
Valve Pit and Pit Piping/Valves	2025		3				
		Backhoe		9	0.03		
		Pump		10	0.04		
Reservoir Field Testing and Startup	2025		9				
		None					
Site Restoration							
Tank Backfill	2025		13				
		Dozer		455	1.75		
		Backhoe		455	1.75		
		Compactor		455	1.75		
Contouring/Landscaping	2025		8				
		Backhoe		160	0.62		
Complete Civil Work	2025		4				
		Paver		32	0.12		
		Scraper		32	0.12		
		Roller		32	0.12		
		Dozer		64	0.25		
Demobilization	2025		2				
		Backhoe		16	0.06	39	+6+6 for pipeline & storm drain=51 Weeks

NOTES:

[1] Average hours per day are derived from the total hours of equipment operation averaged over the construction duration (5 days/week x 52 weeks = 260 work days. However, average hours per day in 2025 are derived from total hours of equipment operation averaged over the construction duration of 51 weeks (255 work days).

SOURCE:EBMUD, *Leland Reservoir Replacement - Major Equipment Hour Estimate,* December 21, 2016.

Equipment Type	Combined Total Hours
Generator	18
Excavator	773
Chain Saw	96
Wood Chipper	48
TTB	48
Pump	123
Air Compressor	234
Crusher	363

Color Key	
	2022
	2023
	2024
	2025

Pipeline Construction

Phase 1	Construction Year	Equipment Type	Total hours	Average Hours/Day[1]	Weeks/Year
Demolition	2022	Concrete Saw	10	0.15	
		Tractor/Loader/Backhoe	60	0.92	
Installation	2022	Excavator	120	1.85	
		Tractor/Loader/Backhoe	90	1.38	
		Dewatering Pump	36	0.55	
		Generator	150	2.31	
		Air Compressor	100	1.54	13
Paving	2023	Pumps	30	0.46	
		Pavers	15	0.23	
		Compactor	20	0.31	
		Rollers	20	0.31	
		Tractor/Loader/Backhoe	30	0.46	
		Sweeper/Scrubber	5	0.08	3
Phase 2	**Construction Year**	**Equipment Type**	**Total hours**	**Average Hours/Day[2]**	
Demolition	2025	Concrete Saw	0	0	
		Tractor/Loader/Backhoe	0	0	
Installation	2025	Excavator	48	0.185	
		Tractor/Loader/Backhoe	36	0.138	
		Dewatering Pump	36	0.138	
		Generator	60	0.231	
		Air Compressor	40	0.154	
Paving	2025	Pumps	18	0.069	
		Pavers	9	0.035	
		Compactor	12	0.046	
		Rollers	12	0.046	
		Tractor/Loader/Backhoe	18	0.069	
		Sweeper/Scrubber	3	0.012	6

NOTES:

[1] Average hours per day are derived from the total hours of equipment operation averaged over the construction duration (20 work days/month x 3.25 months (13 weeks) = 65 work days.

[2] Average hours per day are derived from the total hours of equipment operation averaged over the construction duration (5 days/week x 52 weeks = 260 work days.

SOURCE: EBMUD, *Leland Reservoir Replacement 36-inch Pipeline Installation - Major Equipment Hour Estimate Phase 1*, April 10, 2017.
EBMUD, *Leland Reservoir Replacement 36-inch Pipeline Installation - Major Equipment Hour Estimate Phase 2,* April 10, 2017.

Color Key	
	2022
	2023
	2024
	2025

Stormdrain Construction

Phase	Construction Year	Equipment Type	Total Hours	Average Hours/Day[1]	Weeks/Year
Demolition	2025	concrete saw	1	0.004	
		Tractor/Loader/Backhoe x2	12	0.046	
Installation	2025	Excavator	48	0.185	
		Tractor/Loader/Backhoe	36	0.138	
		Dewatering Pump			
		Generator	60	0.231	
		Air Comperssor	40	0.154	
Paving	2025	Pumps	12	0.046	
		Pavers	6	0.023	
		Compactor	8	0.031	
		Rollers	8	0.031	
		Tractor/Loader/Backhoe	12	0.046	
		Sweeper/Scrubber	2	0.008	
			245		6

NOTES:

[1] Average hours per day are derived from the total hours of equipment operation averaged over the construction duration (5 days/week x 52 weeks = 260 work days.

SOURCE: EBMUD, *Leland Reservoir Replacement 36-inch Pipeline Installation - Major Equipment Hour Estimate Phase 1,* April 10, 2017.

Color Key	
	2022
	2023
	2024
	2025

Appendix B

CalEEMod (Off-Road Equipment) and EMFAC (On-Road Vehicles) Outputs for Criteria Pollutant Emissions

2022 Leland

San Francisco Bay Area Air Basin, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
User Defined Industrial	1.00	User Defined Unit	1.00	0.00	0

1.2 Other Project Characteristics

Urbanization Urban **Wind Speed (m/s)** 2.2 **Precipitation Freq (Days)** 64

Climate Zone 4

Utility Company Pacific Gas & Electric Company

CO2 Intensity (lb/MWhr) 641.35 **CH4 Intensity (lb/MWhr)** 0.029 **N2O Intensity (lb/MWhr)** 0.006

1.3 User Entered Comments & Non-Default Data

Construction Phase - 2022 equipment

Off-road Equipment - 2022

Table Name	Column Name	Default Value	New Value
tblAreaCoating	Area_EF_Parking	250	0
tblConstructionPhase	NumDays	2.00	65.00
tblLandUse	LotAcreage	0.00	1.00
tblOffRoadEquipment	HorsePower	84.00	13.00
tblOffRoadEquipment	LoadFactor	0.73	1.00

tblOffRoadEquipment	LoadFactor	0.37	1.00
tblOffRoadEquipment	LoadFactor	0.38	1.00
tblOffRoadEquipment	LoadFactor	0.74	1.00
tblOffRoadEquipment	LoadFactor	0.74	1.00
tblOffRoadEquipment	LoadFactor	0.48	1.00
tblOffRoadEquipment	OffRoadEquipmentType		Excavators
tblOffRoadEquipment	OffRoadEquipmentType		Pumps
tblOffRoadEquipment	OffRoadEquipmentType		Generator Sets
tblOffRoadEquipment	OffRoadEquipmentType		Air Compressors
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	UsageHours	6.00	1.00
tblOffRoadEquipment	UsageHours	7.00	2.31
tblProjectCharacteristics	OperationalYear	2018	2019

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2022	0.5401	4.4431	6.5075	0.0108	0.8349	0.2312	1.0661	0.4356	0.2213	0.6569	0.0000	1,033.4506	1,033.4506	0.1992	0.0000	1,038.4308
Maximum	**0.5401**	**4.4431**	**6.5075**	**0.0108**	**0.8349**	**0.2312**	**1.0661**	**0.4356**	**0.2213**	**0.6569**	**0.0000**	**1,033.4506**	**1,033.4506**	**0.1992**	**0.0000**	**1,038.4308**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2022	0.5401	4.4431	6.5075	0.0108	0.8349	0.2312	1.0661	0.4356	0.2213	0.6569	0.0000	1,033.4506	1,033.4506	0.1992	0.0000	1,038.4308
Maximum	**0.5401**	**4.4431**	**6.5075**	**0.0108**	**0.8349**	**0.2312**	**1.0661**	**0.4356**	**0.2213**	**0.6569**	**0.0000**	**1,033.4506**	**1,033.4506**	**0.1992**	**0.0000**	**1,038.4308**

2022 Leland - San Francisco Bay Area Air Basin, Summer

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Grading	Grading	1/2/2022	4/1/2022	5	65	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
	Air Compressors	1	1.50	78	1.00
	Concrete/Industrial Saws	1	0.20	81	1.00
	Excavators	1	1.90	158	1.00

2022 Leland - San Francisco Bay Area Air Basin, Summer

	Generator Sets	1	2.30	84	1.00
	Pumps	1	0.60	84	1.00
	Tractors/Loaders/Backhoes	1	2.30	97	1.00
Grading	Concrete/Industrial Saws	1	0.15	81	1.00
Grading	Rubber Tired Dozers	0	1.00	247	0.40
Grading	Tractors/Loaders/Backhoes	1	2.31	97	1.00
Grading	Excavators	1	1.85	158	1.00
Grading	Pumps	1	0.55	13	1.00
Grading	Generator Sets	1	2.31	84	1.00
Grading	Air Compressors	1	1.54	78	1.00

2022 Leland

San Francisco Bay Area Air Basin, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
User Defined Industrial	1.00	User Defined Unit	1.00	0.00	0

1.2 Other Project Characteristics

Urbanization Urban **Wind Speed (m/s)** 2.2 **Precipitation Freq (Days)** 64

Climate Zone 4

Utility Company Pacific Gas & Electric Company

CO2 Intensity (lb/MWhr) 641.35 **CH4 Intensity (lb/MWhr)** 0.029 **N2O Intensity (lb/MWhr)** 0.006

1.3 User Entered Comments & Non-Default Data

Construction Phase - 2022 equipment

Off-road Equipment - 2022

Table Name	Column Name	Default Value	New Value
tblAreaCoating	Area_EF_Parking	250	0
tblConstructionPhase	NumDays	2.00	65.00
tblLandUse	LotAcreage	0.00	1.00
tblOffRoadEquipment	HorsePower	84.00	13.00
tblOffRoadEquipment	LoadFactor	0.73	1.00

2022 Leland - San Francisco Bay Area Air Basin, Annual

tblOffRoadEquipment	LoadFactor	0.37	1.00
tblOffRoadEquipment	LoadFactor	0.38	1.00
tblOffRoadEquipment	LoadFactor	0.74	1.00
tblOffRoadEquipment	LoadFactor	0.74	1.00
tblOffRoadEquipment	LoadFactor	0.48	1.00
tblOffRoadEquipment	OffRoadEquipmentType		Excavators
tblOffRoadEquipment	OffRoadEquipmentType		Pumps
tblOffRoadEquipment	OffRoadEquipmentType		Generator Sets
tblOffRoadEquipment	OffRoadEquipmentType		Air Compressors
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	UsageHours	6.00	1.00
tblOffRoadEquipment	UsageHours	7.00	2.31
tblProjectCharacteristics	OperationalYear	2018	2019

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2022	0.0175	0.1445	0.2108	3.5000e-004	0.0270	7.5100e-003	0.0346	0.0141	7.1900e-003	0.0213	0.0000	30.3118	30.3118	5.8700e-003	0.0000	30.4586
Maximum	**0.0175**	**0.1445**	**0.2108**	**3.5000e-004**	**0.0270**	**7.5100e-003**	**0.0346**	**0.0141**	**7.1900e-003**	**0.0213**	**0.0000**	**30.3118**	**30.3118**	**5.8700e-003**	**0.0000**	**30.4586**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2022	0.0175	0.1445	0.2108	3.5000e-004	0.0270	7.5100e-003	0.0346	0.0141	7.1900e-003	0.0213	0.0000	30.3118	30.3118	5.8700e-003	0.0000	30.4586
Maximum	**0.0175**	**0.1445**	**0.2108**	**3.5000e-004**	**0.0270**	**7.5100e-003**	**0.0346**	**0.0141**	**7.1900e-003**	**0.0213**	**0.0000**	**30.3118**	**30.3118**	**5.8700e-003**	**0.0000**	**30.4586**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
19	12-20-2021	3-19-2022	0.1372	0.1372
20	3-20-2022	6-19-2022	0.0232	0.0232
		Highest	0.1372	0.1372

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Grading	Grading	1/2/2022	4/1/2022	5	65	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
	Air Compressors	1	1.50	78	1.00
	Concrete/Industrial Saws	1	0.20	81	1.00
	Excavators	1	1.90	158	1.00
	Generator Sets	1	2.30	84	1.00
	Pumps	1	0.60	84	1.00
	Tractors/Loaders/Backhoes	1	2.30	97	1.00
Grading	Concrete/Industrial Saws	1	0.15	81	1.00
Grading	Rubber Tired Dozers	0	1.00	247	0.40
Grading	Tractors/Loaders/Backhoes	1	2.31	97	1.00
Grading	Excavators	1	1.85	158	1.00
Grading	Pumps	1	0.55	13	1.00
Grading	Generator Sets	1	2.31	84	1.00
Grading	Air Compressors	1	1.54	78	1.00

Year 2023 Leland

San Francisco Bay Area Air Basin, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
User Defined Industrial	1.00	User Defined Unit	1.00	0.00	0

1.2 Other Project Characteristics

Urbanization Urban **Wind Speed (m/s)** 2.2 **Precipitation Freq (Days)** 64

Climate Zone 4

Utility Company Pacific Gas & Electric Company

CO2 Intensity (lb/MWhr) 641.35 **CH4 Intensity (lb/MWhr)** 0.029 **N2O Intensity (lb/MWhr)** 0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Year 2023

Construction Phase - 2023

Off-road Equipment - user defined fleet

Trips and VMT -

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	2.00	260.00
tblLandUse	LotAcreage	0.00	1.00

Year 2023 Leland - San Francisco Bay Area Air Basin, Summer

tblOffRoadEquipment	LoadFactor	0.40	1.00
tblOffRoadEquipment	LoadFactor	0.37	1.00
tblOffRoadEquipment	LoadFactor	0.48	1.00
tblOffRoadEquipment	LoadFactor	0.73	1.00
tblOffRoadEquipment	LoadFactor	0.78	1.00
tblOffRoadEquipment	LoadFactor	0.38	1.00
tblOffRoadEquipment	LoadFactor	0.74	1.00
tblOffRoadEquipment	LoadFactor	0.42	1.00
tblOffRoadEquipment	LoadFactor	0.43	1.00
tblOffRoadEquipment	LoadFactor	0.74	1.00
tblOffRoadEquipment	LoadFactor	0.38	1.00
tblOffRoadEquipment	LoadFactor	0.46	1.00
tblOffRoadEquipment	UsageHours	6.00	3.10
tblOffRoadEquipment	UsageHours	7.00	0.30
tblProjectCharacteristics	OperationalYear	2018	2023

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2023	1.5461	13.1858	15.0005	0.0286	2.5800	0.6249	3.2049	1.3481	0.5838	1.9319	0.0000	2,768.1199	2,768.1199	0.7004	0.0000	2,785.6293
Maximum	**1.5461**	**13.1858**	**15.0005**	**0.0286**	**2.5800**	**0.6249**	**3.2049**	**1.3481**	**0.5838**	**1.9319**	**0.0000**	**2,768.1199**	**2,768.1199**	**0.7004**	**0.0000**	**2,785.6293**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2023	1.5461	13.1858	15.0005	0.0286	2.5800	0.6249	3.2049	1.3481	0.5838	1.9319	0.0000	2,768.1199	2,768.1199	0.7004	0.0000	2,785.6293
Maximum	**1.5461**	**13.1858**	**15.0005**	**0.0286**	**2.5800**	**0.6249**	**3.2049**	**1.3481**	**0.5838**	**1.9319**	**0.0000**	**2,768.1199**	**2,768.1199**	**0.7004**	**0.0000**	**2,785.6293**

Year 2023 Leland - San Francisco Bay Area Air Basin, Summer

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Grading	Air Compressors	1	0.90	78	1.00
Grading	Concrete/Industrial Saws	1	0.40	81	1.00
Grading	Crushing/Proc. Equipment	1	2.60	85	1.00
Grading	Excavators	1	7.30	158	1.00
Grading	Generator Sets	1	0.10	84	1.00
Grading	Pavers	1	0.10	130	1.00
Grading	Plate Compactors	1	0.10	8	1.00
Grading	Pumps	1	0.60	84	1.00
Grading	Rollers	1	0.10	80	1.00
Grading	Rubber Tired Dozers	1	3.10	247	1.00
Grading	Sweepers/Scrubbers	1	0.20	64	1.00
Grading	Tractors/Loaders/Backhoes	1	0.30	97	1.00

Year 2023 Leland

San Francisco Bay Area Air Basin, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
User Defined Industrial	1.00	User Defined Unit	1.00	0.00	0

1.2 Other Project Characteristics

Urbanization Urban **Wind Speed (m/s)** 2.2 **Precipitation Freq (Days)** 64

Climate Zone 4 **Operational Year** 2023

Utility Company Pacific Gas & Electric Company

CO2 Intensity (lb/MWhr) 641.35 **CH4 Intensity (lb/MWhr)** 0.029 **N2O Intensity (lb/MWhr)** 0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Year 2023

Construction Phase - 2023

Off-road Equipment - user defined fleet

Trips and VMT -

Table Name	Column Name	Default Value	New Value
tblAreaCoating	Area_EF_Parking	250	0
tblConstructionPhase	NumDays	2.00	260.00

Year 2023 Leland - San Francisco Bay Area Air Basin, Annual

tblLandUse	LotAcreage	0.00	1.00
tblOffRoadEquipment	LoadFactor	0.40	1.00
tblOffRoadEquipment	LoadFactor	0.37	1.00
tblOffRoadEquipment	LoadFactor	0.48	1.00
tblOffRoadEquipment	LoadFactor	0.73	1.00
tblOffRoadEquipment	LoadFactor	0.78	1.00
tblOffRoadEquipment	LoadFactor	0.38	1.00
tblOffRoadEquipment	LoadFactor	0.74	1.00
tblOffRoadEquipment	LoadFactor	0.42	1.00
tblOffRoadEquipment	LoadFactor	0.43	1.00
tblOffRoadEquipment	LoadFactor	0.74	1.00
tblOffRoadEquipment	LoadFactor	0.38	1.00
tblOffRoadEquipment	LoadFactor	0.46	1.00
tblOffRoadEquipment	UsageHours	6.00	3.10
tblOffRoadEquipment	UsageHours	7.00	0.30
tblProjectCharacteristics	OperationalYear	2018	2023

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2023	0.2005	1.7149	1.9426	3.7000e-003	0.3342	0.0812	0.4154	0.1750	0.0759	0.2509	0.0000	324.6343	324.6343	0.0826	0.0000	326.6983
Maximum	**0.2005**	**1.7149**	**1.9426**	**3.7000e-003**	**0.3342**	**0.0812**	**0.4154**	**0.1750**	**0.0759**	**0.2509**	**0.0000**	**324.6343**	**324.6343**	**0.0826**	**0.0000**	**326.6983**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2023	0.2005	1.7149	1.9426	3.7000e-003	0.3342	0.0812	0.4154	0.1750	0.0759	0.2509	0.0000	324.6339	324.6339	0.0826	0.0000	326.6980
Maximum	**0.2005**	**1.7149**	**1.9426**	**3.7000e-003**	**0.3342**	**0.0812**	**0.4154**	**0.1750**	**0.0759**	**0.2509**	**0.0000**	**324.6339**	**324.6339**	**0.0826**	**0.0000**	**326.6980**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
23	**12-20-2022**	**3-19-2023**	0.4056	0.4056
24	**3-20-2023**	**6-19-2023**	0.4841	0.4841
25	**6-20-2023**	**9-19-2023**	0.4840	0.4840
26	**9-20-2023**	**9-30-2023**	0.0579	0.0579
		Highest	0.4841	0.4841

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Grading	Grading	1/2/2023	12/29/2023	5	260	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Grading	Air Compressors	1	0.90	78	1.00
Grading	Concrete/Industrial Saws	1	0.40	81	1.00
Grading	Crushing/Proc. Equipment	1	2.60	85	1.00
Grading	Excavators	1	7.30	158	1.00
Grading	Generator Sets	1	0.10	84	1.00
Grading	Pavers	1	0.10	130	1.00
Grading	Plate Compactors	1	0.10	8	1.00
Grading	Pumps	1	0.60	84	1.00
Grading	Rollers	1	0.10	80	1.00
Grading	Rubber Tired Dozers	1	3.10	247	1.00
Grading	Sweepers/Scrubbers	1	0.20	64	1.00
Grading	Tractors/Loaders/Backhoes	1	0.30	97	1.00

Leland 2024

San Francisco Bay Area Air Basin, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
User Defined Industrial	1.00	User Defined Unit	1.00	0.00	0

1.2 Other Project Characteristics

Urbanization Urban **Wind Speed (m/s)** 2.2 **Precipitation Freq (Days)** 64

Climate Zone 4 **Operational Year** 2024

Utility Company Pacific Gas & Electric Company

CO2 Intensity (lb/MWhr) 641.35 **CH4 Intensity (lb/MWhr)** 0.029 **N2O Intensity (lb/MWhr)** 0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - 2024

Construction Phase - 260 day year

Off-road Equipment - 2024 offroad

Trips and VMT - offroad only

Off-road Equipment - off road

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	2.00	260.00

tblLandUse	LotAcreage	0.00	1.00
tblOffRoadEquipment	LoadFactor	0.40	1.00
tblOffRoadEquipment	LoadFactor	0.38	1.00
tblOffRoadEquipment	LoadFactor	0.29	1.00
tblOffRoadEquipment	LoadFactor	0.74	1.00
tblOffRoadEquipment	LoadFactor	0.30	1.00
tblOffRoadEquipment	OffRoadEquipmentType		Excavators
tblOffRoadEquipment	OffRoadEquipmentType		Cranes
tblOffRoadEquipment	OffRoadEquipmentType		Pumps
tblOffRoadEquipment	OffRoadEquipmentType		Pressure Washers
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	UsageHours	6.00	0.13
tblProjectCharacteristics	OperationalYear	2018	2024
tblTripsAndVMT	WorkerTripNumber	8.00	0.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2024	0.2522	2.4576	1.9255	4.6100e-003	0.0378	0.1061	0.1439	0.0194	0.1000	0.1195	0.0000	440.8758	440.8758	0.0997	0.0000	443.3670
Maximum	**0.2522**	**2.4576**	**1.9255**	**4.6100e-003**	**0.0378**	**0.1061**	**0.1439**	**0.0194**	**0.1000**	**0.1195**	**0.0000**	**440.8758**	**440.8758**	**0.0997**	**0.0000**	**443.3670**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2024	0.2522	0.2896	1.9255	4.6100e-003	0.0378	0.1061	0.1439	0.0194	0.1000	0.1195	0.0000	440.8758	440.8758	0.0997	0.0000	443.3670
Maximum	**0.2522**	**0.2896**	**1.9255**	**4.6100e-003**	**0.0378**	**0.1061**	**0.1439**	**0.0194**	**0.1000**	**0.1195**	**0.0000**	**440.8758**	**440.8758**	**0.0997**	**0.0000**	**443.3670**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Grading	Grading	1/1/2024	12/27/2024	5	260	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0.75

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Grading	Tractors/Loaders/Backhoes	0	7.00	97	0.37
Grading	Graders	0	6.00	187	0.41
Grading	Rubber Tired Dozers	1	0.13	247	1.00
Grading	Excavators	1	0.13	158	1.00
Grading	Cranes	1	0.96	231	1.00
Grading	Pumps	1	1.42	84	1.00
Grading	Pressure Washers	1	0.32	13	1.00

3.2 Grading - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0378	0.0000	0.0378	0.0194	0.0000	0.0194			0.0000			0.0000
Off-Road	0.2522	2.4576	1.9255	4.6100e-003		0.1061	0.1061		0.1000	0.1000		440.8758	440.8758	0.0997		443.3670
Total	**0.2522**	**2.4576**	**1.9255**	**4.6100e-003**	**0.0378**	**0.1061**	**0.1439**	**0.0194**	**0.1000**	**0.1195**		**440.8758**	**440.8758**	**0.0997**		**443.3670**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0378	0.0000	0.0378	0.0194	0.0000	0.0194			0.0000			0.0000
Off-Road	0.2522	0.2896	1.9255	4.6100e-003		0.1061	0.1061		0.1000	0.1000	0.0000	440.8758	440.8758	0.0997		443.3670
Total	**0.2522**	**0.2896**	**1.9255**	**4.6100e-003**	**0.0378**	**0.1061**	**0.1439**	**0.0194**	**0.1000**	**0.1195**	**0.0000**	**440.8758**	**440.8758**	**0.0997**		**443.3670**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

Leland 2024

San Francisco Bay Area Air Basin, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
User Defined Industrial	1.00	User Defined Unit	1.00	0.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	64
Climate Zone	4			**Operational Year**	2024
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - 2024

Construction Phase - 260 day year

Off-road Equipment - 2024 offroad

Trips and VMT - offroad only

Off-road Equipment - off road

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	2.00	260.00
tblLandUse	LotAcreage	0.00	1.00
tblOffRoadEquipment	LoadFactor	0.40	1.00
tblOffRoadEquipment	LoadFactor	0.38	1.00
tblOffRoadEquipment	LoadFactor	0.29	1.00
tblOffRoadEquipment	LoadFactor	0.74	1.00
tblOffRoadEquipment	LoadFactor	0.30	1.00
tblOffRoadEquipment	OffRoadEquipmentType		Excavators
tblOffRoadEquipment	OffRoadEquipmentType		Cranes
tblOffRoadEquipment	OffRoadEquipmentType		Pumps
tblOffRoadEquipment	OffRoadEquipmentType		Pressure Washers
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	UsageHours	6.00	0.13
tblProjectCharacteristics	OperationalYear	2018	2024
tblTripsAndVMT	WorkerTripNumber	8.00	0.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2024	0.0328	0.3195	0.2503	6.0000e-004	4.9100e-003	0.0138	0.0187	2.5300e-003	0.0130	0.0155	0.0000	51.9943	51.9943	0.0118	0.0000	52.2881
Maximum	**0.0328**	**0.3195**	**0.2503**	**6.0000e-004**	**4.9100e-003**	**0.0138**	**0.0187**	**2.5300e-003**	**0.0130**	**0.0155**	**0.0000**	**51.9943**	**51.9943**	**0.0118**	**0.0000**	**52.2881**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2024	0.0328	0.0376	0.2503	6.0000e-004	4.9100e-003	0.0138	0.0187	2.5300e-003	0.0130	0.0155	0.0000	51.9942	51.9942	0.0118	0.0000	52.2880
Maximum	**0.0328**	**0.0376**	**0.2503**	**6.0000e-004**	**4.9100e-003**	**0.0138**	**0.0187**	**2.5300e-003**	**0.0130**	**0.0155**	**0.0000**	**51.9942**	**51.9942**	**0.0118**	**0.0000**	**52.2880**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Grading	Grading	1/1/2024	12/27/2024	5	260	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0.75

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Grading	Tractors/Loaders/Backhoes	0	7.00	97	0.37
Grading	Graders	0	6.00	187	0.41
Grading	Rubber Tired Dozers	1	0.13	247	1.00
Grading	Excavators	1	0.13	158	1.00
Grading	Cranes	1	0.96	231	1.00
Grading	Pumps	1	1.42	84	1.00
Grading	Pressure Washers	1	0.32	13	1.00

3.2 Grading - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					4.9100e-003	0.0000	4.9100e-003	2.5300e-003	0.0000	2.5300e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0328	0.3195	0.2503	6.0000e-004		0.0138	0.0138		0.0130	0.0130	0.0000	51.9943	51.9943	0.0118	0.0000	52.2881
Total	**0.0328**	**0.3195**	**0.2503**	**6.0000e-004**	**4.9100e-003**	**0.0138**	**0.0187**	**2.5300e-003**	**0.0130**	**0.0155**	**0.0000**	**51.9943**	**51.9943**	**0.0118**	**0.0000**	**52.2881**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					4.9100e-003	0.0000	4.9100e-003	2.5300e-003	0.0000	2.5300e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0328	0.0376	0.2503	6.0000e-004		0.0138	0.0138		0.0130	0.0130	0.0000	51.9942	51.9942	0.0118	0.0000	52.2880
Total	**0.0328**	**0.0376**	**0.2503**	**6.0000e-004**	**4.9100e-003**	**0.0138**	**0.0187**	**2.5300e-003**	**0.0130**	**0.0155**	**0.0000**	**51.9942**	**51.9942**	**0.0118**	**0.0000**	**52.2880**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Leland 2025

San Francisco Bay Area Air Basin, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
User Defined Industrial	1.00	User Defined Unit	1.00	0.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	64
Climate Zone	4			**Operational Year**	2025
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Offroad equipment 2025

Construction Phase - 260 work days

Off-road Equipment - offroad equipment

Trips and VMT - 2025

Off-road Equipment - off-road equipment

Leland 2025 - San Francisco Bay Area Air Basin, Summer

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	2.00	260.00
tblGrading	AcresOfGrading	0.00	0.75
tblLandUse	LotAcreage	0.00	1.00
tblOffRoadEquipment	LoadFactor	0.37	1.00
tblOffRoadEquipment	LoadFactor	0.38	1.00
tblOffRoadEquipment	LoadFactor	0.74	1.00
tblOffRoadEquipment	LoadFactor	0.74	1.00
tblOffRoadEquipment	LoadFactor	0.48	1.00
tblOffRoadEquipment	LoadFactor	0.42	1.00
tblOffRoadEquipment	LoadFactor	0.43	1.00
tblOffRoadEquipment	LoadFactor	0.38	1.00
tblOffRoadEquipment	LoadFactor	0.46	1.00
tblOffRoadEquipment	OffRoadEquipmentType		Excavators
tblOffRoadEquipment	OffRoadEquipmentType		Pumps
tblOffRoadEquipment	OffRoadEquipmentType		Generator Sets
tblOffRoadEquipment	OffRoadEquipmentType		Air Compressors
tblOffRoadEquipment	OffRoadEquipmentType		Pavers
tblOffRoadEquipment	OffRoadEquipmentType		Plate Compactors
tblOffRoadEquipment	OffRoadEquipmentType		Rollers
tblOffRoadEquipment	OffRoadEquipmentType		Sweepers/Scrubbers
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	UsageHours	7.00	0.48
tblProjectCharacteristics	OperationalYear	2018	2025

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2025	0.1049	0.8857	1.5581	2.5100e-003	3.0600e-003	0.0384	0.0415	3.3000e-004	0.0368	0.0371	0.0000	239.8061	239.8061	0.0461	0.0000	240.9594
Maximum	**0.1049**	**0.8857**	**1.5581**	**2.5100e-003**	**3.0600e-003**	**0.0384**	**0.0415**	**3.3000e-004**	**0.0368**	**0.0371**	**0.0000**	**239.8061**	**239.8061**	**0.0461**	**0.0000**	**240.9594**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2025	0.1049	0.3692	1.5581	2.5100e-003	3.0600e-003	0.0384	0.0415	3.3000e-004	0.0368	0.0371	0.0000	239.8061	239.8061	0.0461	0.0000	240.9594
Maximum	**0.1049**	**0.3692**	**1.5581**	**2.5100e-003**	**3.0600e-003**	**0.0384**	**0.0415**	**3.3000e-004**	**0.0368**	**0.0371**	**0.0000**	**239.8061**	**239.8061**	**0.0461**	**0.0000**	**240.9594**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	58.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Grading	Grading	1/1/2025	12/30/2025	5	260	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0.75

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
	Excavators	1	0.40	158	1.00
Grading	Graders	0	6.00	187	0.41
Grading	Rubber Tired Dozers	0	6.00	247	0.40
Grading	Tractors/Loaders/Backhoes	1	0.48	97	1.00
Grading	Excavators	1	0.38	158	1.00
Grading	Pumps	1	0.30	84	1.00
Grading	Generator Sets	1	0.47	84	1.00
Grading	Air Compressors	1	0.31	78	1.00
Grading	Pavers	1	0.06	130	1.00
Grading	Plate Compactors	1	0.08	8	1.00
Grading	Rollers	1	0.08	80	1.00
Grading	Sweepers/Scrubbers	1	0.02	64	1.00

Leland 2025

San Francisco Bay Area Air Basin, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
User Defined Industrial	1.00	User Defined Unit	1.00	0.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	64
Climate Zone	4			**Operational Year**	2025
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Offroad equipment 2025

Construction Phase - 260 work days

Off-road Equipment - offroad equipment

Trips and VMT - 2025

Off-road Equipment - off-road equipment

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	2.00	260.00
tblGrading	AcresOfGrading	0.00	0.75
tblLandUse	LotAcreage	0.00	1.00
tblOffRoadEquipment	LoadFactor	0.37	1.00
tblOffRoadEquipment	LoadFactor	0.38	1.00
tblOffRoadEquipment	LoadFactor	0.74	1.00
tblOffRoadEquipment	LoadFactor	0.74	1.00
tblOffRoadEquipment	LoadFactor	0.48	1.00
tblOffRoadEquipment	LoadFactor	0.42	1.00
tblOffRoadEquipment	LoadFactor	0.43	1.00
tblOffRoadEquipment	LoadFactor	0.38	1.00
tblOffRoadEquipment	LoadFactor	0.46	1.00
tblOffRoadEquipment	OffRoadEquipmentType		Excavators
tblOffRoadEquipment	OffRoadEquipmentType		Pumps
tblOffRoadEquipment	OffRoadEquipmentType		Generator Sets
tblOffRoadEquipment	OffRoadEquipmentType		Air Compressors
tblOffRoadEquipment	OffRoadEquipmentType		Pavers
tblOffRoadEquipment	OffRoadEquipmentType		Plate Compactors
tblOffRoadEquipment	OffRoadEquipmentType		Rollers
tblOffRoadEquipment	OffRoadEquipmentType		Sweepers/Scrubbers
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Grading

tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	UsageHours	7.00	0.48
tblProjectCharacteristics	OperationalYear	2018	2025

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2025	0.0136	0.1151	0.2026	3.3000e-004	4.0000e-004	4.9900e-003	5.3900e-003	4.0000e-005	4.7800e-003	4.8300e-003	0.0000	28.2813	28.2813	5.4400e-003	0.0000	28.4173
Maximum	**0.0136**	**0.1151**	**0.2026**	**3.3000e-004**	**4.0000e-004**	**4.9900e-003**	**5.3900e-003**	**4.0000e-005**	**4.7800e-003**	**4.8300e-003**	**0.0000**	**28.2813**	**28.2813**	**5.4400e-003**	**0.0000**	**28.4173**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	58.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
31	12-19-2024	3-18-2025	0.0272	0.0130
32	3-19-2025	6-18-2025	0.0325	0.0156
33	6-19-2025	9-18-2025	0.0325	0.0156
34	9-19-2025	9-30-2025	0.0042	0.0020
		Highest	0.0325	0.0156

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Grading	Grading	1/1/2025	12/30/2025	5	260	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0.75

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
	Excavators	1	0.40	158	1.00
Grading	Graders	0	6.00	187	0.41
Grading	Rubber Tired Dozers	0	6.00	247	0.40
Grading	Tractors/Loaders/Backhoes	1	0.48	97	1.00
Grading	Excavators	1	0.38	158	1.00
Grading	Pumps	1	0.30	84	1.00
Grading	Generator Sets	1	0.47	84	1.00
Grading	Air Compressors	1	0.31	78	1.00
Grading	Pavers	1	0.06	130	1.00
Grading	Plate Compactors	1	0.08	8	1.00
Grading	Rollers	1	0.08	80	1.00
Grading	Sweepers/Scrubbers	1	0.02	64	1.00

Truck Trip Estimates

Year		Daily Round Trips x # of Weeks		
		Worker	Vendor	Haul
2022	Pipeline Installation Mobilization	4	8	0
	Pipeline Connection 1 (Windsor Dr/Old Tunnel Rd)	24	3	3
	Pipeline Connection 2 (Leland Dr/Meek Pl)	24	3	3
	Pipeline Installation (2,700 LF at 80 LF/day production rate)	168	21	84
	Pipeline Testing (2 of 4 wks)	26	6	0
		246	**41**	**90**
2023	Pipeline Testing (2 of 4 wks)	26	6	0
	Pipeline Paving	13	4	10
	Demo/Reservoir Replacement Mobilization	4	8	0
	Demo/Site Work-Tree Removal	4	4	0
	Demo/Drain Reservoir	8	4	0
	Demo/Remove & Crush Concrete Roof Panels/Structure	90	6	78
	Demo/Remove & Crush Concrete Girders	45	3	9
	Demo/Remove & Crush Concrete Columns & Footings	45	3	6
	Demo/Remove & Crush Concrete Lining	90	6	30
	Demo/Open Cut Excavation & Soil Hauling (23 of 24 wks)	230	0	805
		555	**44**	**938**
2024	Demo/Open Cut Excavation & Soil Hauling (1 of 24 wks)	10	0	35
	Tank Const/Reservoir Concrete Foundation	184	424	0
	Tank Const/Reservoir Concrete Walls/Columns	198	143	0
	Tank Const/Reservoir Prestress Wrapping/Shotcrete	64	64	0
	Tank Const/Reservoir Concrete Roof Slab	360	1,000	0
	Tank Const/Vale Pit and Pit Piping/Valves (5 of 7 wks)	40	30	50
		856	**1,661**	**85**
2025	Tank Const/Valve Pit and Pit Piping/Valves (5 of 7 wks)	16	12	20
	Tank Const/Reservoir Field Testing & Startup	72	9	0
2025	Pipeline Connection 3 (Within Leland Reservoir Propery)	24	3	3
	Pipeline Installation (580 LF at 80 LF/day production rate)	48	6	24
	Pipeline Installation (370 LF at 80 LF/day production rate)	24	3	12
	Pipeline Testing	26	6	0
	Pipeline Paving	13	0	6
	Stormdrain Connection (Patty Wy/Leland Dr)	24	3	2
	Stormdrain Installation (Leland Reservoir Property)	72	9	30
	Paving (Across Patty Wy & Leland Dr Connection Area)	13	0	9
	Site Restoration/Tank Backfill	52	13	52
	Site Restoration/Contouring & Landscaping	64	160	32
	Site Restoration/Complete Civil Work	16	0	16
	Site Restoration/Demobilization	8	0	8
		472	**224**	**214**

Worker	Vendor	Haul
2,129	1,970	1,327

Total
5,426

Year		Totals from Left	Total Annual Daily Round Trips
2022	Worker	246	**1,230**
	Vendor	41	**205**
	Haul	90	**450**
2023	Worker	555	**2,775**
	Vendor	44	**222**
	Haul	938	**4,690**
2024	Worker	856	**4,280**
	Vendor	1,661	**8,305**
	Haul	85	**425**
2025	Worker	472	**2,360**
	Vendor	224	**1,120**
	Haul	214	**1,070**

Worker	Vendor Trucks	Haul Trucks
2,129	1,970	1,327

Total
5,426

EMFAC2014 (v1.0.7) Emission Rates and Criteria Pollutant Calculations for On-Road Vehicles

Region Type: Air Basin LDA 2022
Region: San Francisco Bay Area
Calendar Year: 2022
Season: Annual
Vehicle Classification: EMFAC2011 Categories
Units: miles/day for VMT, trips/day for Trips, g/mile for RUNEX, PMBW and PMTW, g/trip for STREX, HTSK and RUNLS, g/vehicle/day for IDLEX, RESTL and DIURN
Data from EMFAC2014

Region	CalYr	VehClass	MdlYr	Speed	Fuel	ROG_RUNEX	ROG_IDLEX	ROG_STREX	ROG_RUNLOSS	ROG_RESTLOSS	ROG_DIURN
San Francisco Bay Area		**LDA**	Aggregated	Aggregated	GAS	0.010427956	0	0.0836376	0.23326967	0.183937427	0.201762695
San Francisco Bay Area	**2022**	**T6 instate s**	Aggregated	Aggregated	DSL	0.047575917	0.019731146	0	0	0	0
San Francisco Bay Area		**T7 single cc**	Aggregated	Aggregated	DSL	0.099733928	0.668427023	0	0	0	0
San Francisco Bay Area		**LDA**	Aggregated	Aggregated	GAS	0.009532372	0	0.073670872	0.223897993	0.172460402	0.18769666
San Francisco Bay Area	**2023**	**T6 instate c**	Aggregated	Aggregated	DSL	0.041168086	0.015928125	0	0	0	0
San Francisco Bay Area		**T7 Single**	Aggregated	Aggregated	DSL	0.065916761	0.403631212	0	0	0	0
San Francisco Bay Area		**LDA**	Aggregated	Aggregated	GAS	0.008716539	0	0.06516352	0.215826073	0.162332506	0.175455665
San Francisco Bay Area	**2024**	**T6 instate s**	Aggregated	Aggregated	DSL	0.041783313	0.015799526	0	0	0	0
San Francisco Bay Area		**T7 Single**	Aggregated	Aggregated	DSL	0.066538962	0.403631212	0	0	0	0
San Francisco Bay Area		**LDA**	Aggregated	Aggregated	GAS	0.008066487	0	0.058342605	0.210148237	0.154317165	0.166048078
San Francisco Bay Area	**2025**	**T6 instate c**	Aggregated	Aggregated	DSL	0.041836921	0.015894742	0	0	0	0
San Francisco Bay Area		**T7 single cc**	Aggregated	Aggregated	DSL	0.06576063	0.405103395	0	0	0	0

CO_RUNEX	CO_IDLEX	CO_STREX	NOx_RUNEX	NOx_IDLEX	NOx_STREX	PM10_RUNEX	PM10_IDLEX	PM10_STREX	PM10_PMTW	PM10_PMBW
0.572204	0	1.341228491	0.051150026	0	0.080319555	0.001738503	0	0.002393336	0.008000002	0.036750011
0.227504	0.151424	0	1.293926563	2.149112	0	0.004193645	0.00023556	0	0.012000003	0.130340037
0.437444	2.632193	0	3.249259727	23.10424	0	0.014617406	0.010205559	0	0.03600001	0.061740018
0.54049	0	1.224725475	0.047138223	0	0.071122081	0.001735655	0	0.002394705	0.008000002	0.036750011
0.215792	0.119449	0	1.06353387	1.758117	0	0.002982553	0.000175707	0	0.012000003	0.130340037
0.389223	1.492143	0	1.331971045	12.31095	0	0.0042746	0.001188356	0	0.03600001	0.061740018
0.510192	0	1.123941493	0.043563377	0	0.063424318	0.001735165	0	0.00240027	0.008000002	0.036750011
0.219934	0.118127	0	1.079415964	1.721241	0	0.002941382	0.000132354	0	0.012000003	0.130340037
0.392897	1.492143	0	1.335324692	12.31095	0	0.004331879	0.001188356	0	0.03600001	0.061740018
0.482841	0	1.041097027	0.040616771	0	0.057001042	0.001739068	0	0.002417503	0.008000002	0.036750011
0.219531	0.119106	0	1.078263345	1.748329	0	0.003026742	0.000163408	0	0.012000003	0.130340037
0.385159	1.499159	0	1.298828537	12.42264	0	0.004640555	0.001461622	0	0.03600001	0.061740018

PM2_5_RU	PM2_5_IDI	PM2_5_STREX	PM2_5_PMTW	PM2_5_PN	CO2_RUNEX	CO2_IDLEX	CO2_STREX
0.001599	0	0.002200681	0.002000001	0.01575	262.727487	0	60.23396449
0.004012	0.000225	0	0.003000001	0.05586	1191.860848	654.4811856	0
0.013985	0.009764	0	0.009000003	0.02646	1601.473919	4714.599055	0
0.001596	0	0.002201902	0.002000001	0.01575	254.7164653	0	58.55570797
0.002854	0.000168	0	0.003000001	0.05586	1178.651493	640.2765186	0
0.00409	0.001137	0	0.009000003	0.02646	1565.313711	4868.210458	0
0.001595	0	0.00220696	0.002000001	0.01575	246.8323842	0	56.86864269
0.002814	0.000127	0	0.003000001	0.05586	1178.567774	640.3392301	0
0.004144	0.001137	0	0.009000003	0.02646	1558.648136	4848.382818	0
0.001599	0	0.002222805	0.002000001	0.01575	238.9974832	0	55.18270329
0.002896	0.000156	0	0.003000001	0.05586	1172.305381	637.7036717	0
0.00444	0.001398	0	0.009000003	0.02646	1533.935169	4733.255519	0

EMFAC2014 (v1.0.7) Emission Rates and Criteria Pollutant Calculations for On-Road Vehicles (Continued)

Grams/Year (RT=Round Trips)

Year	Veh Type	Trips/Veh/Day	Project RT	Miles/RT	ROG	CO	NOx	PM10	PM2.5	CO2	Total Vehicle Miles Traveled
2022	LDA	1	1,230	40	1377	29802	2615	2290	955	13000280	49,200
2022	Med	1	205	40	394	1897	11051	1202	516	9907428	8,200
2022	Hvy	8	450	100	4526	19833	147516	5057	2226	72331523	45,000
2023	LDA	1	2,775	40	2883	63393	5430	5167	2154	28436020	111,000
2023	Med	1	222	40	369	1943	9834	1291	548	10608567	8,880
2023	Hvy	8	4,690	100	31152	183420	631912	47846	18549	736986119	469,000
2024	LDA	1	4,280	40	4141	92155	7730	7969	3321	42501102	171,200
2024	Med	1	8,305	40	14012	74043	372877	48264	20489	396838232	332,200
2024	Hvy	8	425	100	2849	16777	57405	4338	1683	66500116	42,500
2025	LDA	1	2,360	40	2151	48037	3969	4394	1832	22691594	94,400
2025	Med	1	1,120	40	1892	9968	50264	6513	2767	53233509	44,800
2025	Hvy	8	1,070	100	7091	41413	140636	10955	4269	164764136	107,000

Pounds/Year

Year	Veh Type	Trips/Veh/Day	Project RT	Miles/RT	ROG	CO	NOx	PM10	PM2.5	CO2	
2022	LDA	1	1,230	40	3.03	65.56	5.75	5.04	2.10	28601	
2022	Med	1	205	40	0.87	4.17	24.31	2.64	1.13	21796	13 weeks
2022	Hvy	8	450	100	9.96	43.63	324.54	11.12	4.90	159129	
2023	LDA	1	2,775	40	6.34	139.46	11.95	11.37	4.74	62559	
2023	Med	1	222	40	0.81	4.27	21.64	2.84	1.21	23339	52 weeks
2023	Hvy	8	4,690	100	68.53	403.52	1390.21	105.26	40.81	1621369	
2024	LDA	1	4,280	40	9.11	202.74	17.00	17.53	7.31	93502	
2024	Med	1	8,305	40	30.83	162.89	820.33	106.18	45.08	873044	52 weeks
2024	Hvy	8	425	100	6.27	36.91	126.29	9.54	3.70	146300	
2025	LDA	1	2,360	40	4.73	105.68	8.73	9.67	4.03	49922	
2025	Med	1	1,120	40	4.16	21.93	110.58	14.33	6.09	117114	
2025	Hvy	8	1,070	100	15.60	91.11	309.40	24.10	9.39	362481	

Pounds/day

											Total Emissions by Year (All Veh Types)				
Year	Veh Type	Trips/Veh/Day	Project RT	Miles/RT	ROG	CO	Nox	PM10	PM2.5	CO2	ROG	CO	NOx	PM10	PM2.5
2022	LDA	1	1,230	40	0.05	1.01	0.09	0.08	0.03	440.01	**0.21**	**1.74**	**5.46**	**0.29**	**0.13**
	Med	1	205	40	0.01	0.06	0.37	0.04	0.02	335.33					
	Hvy	8	450	100	0.15	0.67	4.99	0.17	0.08	2448.14					
2023	LDA	1	2,775	40	0.02	0.54	0.05	0.04	0.02	240.61	**0.29**	**2.10**	**5.48**	**0.46**	**0.18**
	Med	1	222	40	0.00	0.02	0.08	0.01	0.00	89.76					
	Hvy	8	4,690	100	0.26	1.55	5.35	0.40	0.16	6236.04					
2024	LDA	1	4,280	40	0.04	0.78	0.07	0.07	0.03	359.62	**0.18**	**1.55**	**3.71**	**0.51**	**0.22**
	Med	1	8,305	40	0.12	0.63	3.16	0.41	0.17	3357.86					
	Hvy	8	425	100	0.02	0.14	0.49	0.04	0.01	562.69					
2025	LDA	1	2,360	40	0.02	0.41	0.03	0.04	0.02	195.77	**0.10**	**0.86**	**1.68**	**0.19**	**0.08**
	Med	1	1,120	40	0.02	0.09	0.43	0.06	0.02	459.27					
	Hvy	8	1,070	100	0.06	0.36	1.21	0.09	0.04	1421.49					

Tons/Year

											Annual CO2/CO2e (in Metric Tons)		
Year	Veh Type	Trips/Veh/Day	Project RT	Miles/RT	ROG	CO	NOx	PM10	PM2.5	CO2	MTCO2/yr	MTCO2e/yr	Total CO2e/yr
2022	LDA	1	1,230	40	0.00	0.03	0.00	0.00	0.00	14.30	12.97	13.62	
2022	Med	1	205	40	0.00	0.00	0.01	0.00	0.00	10.90	9.89	9.90	**95.8**
2022	Hvy	8	450	100	0.00	0.02	0.16	0.01	0.00	79.56	72.18	72.25	
2023	LDA	1	2,775	40	0.00	0.07	0.01	0.01	0.00	31.28	28.38	29.80	
2023	Med	1	222	40	0.00	0.00	0.01	0.00	0.00	11.67	10.59	10.60	**776.6**
2023	Hvy	8	4,690	100	0.03	0.20	0.70	0.05	0.02	810.68	735.44	736.18	
2024	LDA	1	4,280	40	0.00	0.10	0.01	0.01	0.00	46.75	42.41	44.53	
2024	Med	1	8,305	40	0.02	0.08	0.41	0.05	0.02	436.52	396.01	396.40	**507.4**
2024	Hvy	8	425	100	0.00	0.02	0.06	0.00	0.00	73.15	66.36	66.43	
2025	LDA	1	2,360	40	0.00	0.05	0.00	0.00	0.00	24.96	22.64	23.78	
2025	Med	1	1,120	40	0.00	0.01	0.06	0.01	0.00	58.56	53.12	53.18	**241.5**
2025	Hvy	8	1,070	100	0.01	0.05	0.15	0.01	0.00	181.24	164.42	164.58	

Appendix C

CalEEMod and AERSCREEN Model Outputs for Health Risk Screening

Leland Reservoir All Yrs

San Francisco Bay Area Air Basin, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
User Defined Industrial	1.00	User Defined Unit	1.00	0.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	64
Climate Zone	4				
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Reservoir

Construction Phase - 1 day per year

Off-road Equipment - per project engineer

Off-road Equipment - per project info

Off-road Equipment - per project info

Construction Off-road Equipment Mitigation - DPF filters

Off-road Equipment - 2023

Leland Reservoir All Yrs - San Francisco Bay Area Air Basin, Annual

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	40	0
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 2
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstructionPhase	NumDays	100.00	1.00
tblConstructionPhase	NumDays	100.00	1.00
tblConstructionPhase	NumDays	100.00	1.00
tblConstructionPhase	PhaseEndDate	5/15/2017	5/15/2023
tblConstructionPhase	PhaseEndDate	5/16/2017	5/16/2024
tblConstructionPhase	PhaseEndDate	5/17/2017	5/19/2025
tblConstructionPhase	PhaseStartDate	5/15/2017	5/15/2023

Leland Reservoir All Yrs - San Francisco Bay Area Air Basin, Annual

tblConstructionPhase	PhaseStartDate	5/16/2017	5/16/2024
tblConstructionPhase	PhaseStartDate	5/17/2017	5/17/2025
tblLandUse	LotAcreage	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentType		Excavators
tblOffRoadEquipment	OffRoadEquipmentType		Pumps
tblOffRoadEquipment	OffRoadEquipmentType		Air Compressors
tblOffRoadEquipment	OffRoadEquipmentType		Crushing/Proc. Equipment
tblOffRoadEquipment	OffRoadEquipmentType		Rubber Tired Dozers
tblOffRoadEquipment	OffRoadEquipmentType		Concrete/Industrial Saws
tblOffRoadEquipment	OffRoadEquipmentType		Pumps
tblOffRoadEquipment	OffRoadEquipmentType		Pavers
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	10.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	10.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	10.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	20.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00

tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	50.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	50.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	PhaseName		Construction 2024
tblOffRoadEquipment	PhaseName		Construction 2024
tblOffRoadEquipment	PhaseName		Construction 2025
tblOffRoadEquipment	PhaseName		Construction 2025
tblOffRoadEquipment	PhaseName		Construction 2025
tblOffRoadEquipment	PhaseName		Construction 2025
tblOffRoadEquipment	PhaseName		Building Construction 2023
tblOffRoadEquipment	PhaseName		Building Construction 2023
tblOffRoadEquipment	PhaseName		Building Construction 2023
tblOffRoadEquipment	PhaseName		Building Construction 2023
tblOffRoadEquipment	PhaseName		Building Construction 2023
tblOffRoadEquipment	PhaseName		Building Construction 2023
tblOffRoadEquipment	PhaseName		Construction 2025
tblOffRoadEquipment	PhaseName		Construction 2025
tblOffRoadEquipment	UsageHours	8.00	18.00
tblOffRoadEquipment	UsageHours	6.00	24.00
tblOffRoadEquipment	UsageHours	6.00	16.00
tblOffRoadEquipment	UsageHours	6.00	13.00
tblProjectCharacteristics	OperationalYear	2018	2019

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2023	0.0794	0.7072	0.7706	1.4200e-003	0.0000	0.0335	0.0335	0.0000	0.0314	0.0314	0.0000	124.3312	124.3312	0.0325	0.0000	125.1445
2024	0.0103	0.0940	0.1018	2.1000e-004	0.0000	4.1300e-003	4.1300e-003	0.0000	4.0200e-003	4.0200e-003	0.0000	17.8315	17.8315	2.2100e-003	0.0000	17.8867
2025	0.0300	0.2995	0.2201	4.7000e-004	0.0000	0.0129	0.0129	0.0000	0.0119	0.0119	0.0000	41.2433	41.2433	0.0129	0.0000	41.5659
Maximum	**0.0794**	**0.7072**	**0.7706**	**1.4200e-003**	**0.0000**	**0.0335**	**0.0335**	**0.0000**	**0.0314**	**0.0314**	**0.0000**	**124.3312**	**124.3312**	**0.0325**	**0.0000**	**125.1445**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2023	0.0794	0.6656	0.7706	1.4200e-003	0.0000	7.7500e-003	7.7500e-003	0.0000	7.4300e-003	7.4300e-003	0.0000	124.3310	124.3310	0.0325	0.0000	125.1444
2024	0.0103	0.0940	0.1018	2.1000e-004	0.0000	2.4900e-003	2.4900e-003	0.0000	2.5000e-003	2.5000e-003	0.0000	17.8314	17.8314	2.2100e-003	0.0000	17.8867
2025	0.0300	0.2962	0.2201	4.7000e-004	0.0000	2.2400e-003	2.2400e-003	0.0000	2.0800e-003	2.0800e-003	0.0000	41.2433	41.2433	0.0129	0.0000	41.5659
Maximum	**0.0794**	**0.6656**	**0.7706**	**1.4200e-003**	**0.0000**	**7.7500e-003**	**7.7500e-003**	**0.0000**	**7.4300e-003**	**7.4300e-003**	**0.0000**	**124.3310**	**124.3310**	**0.0325**	**0.0000**	**125.1444**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**4.08**	**0.00**	**0.00**	**0.00**	**75.30**	**75.30**	**0.00**	**74.61**	**74.61**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
25	**5-15-2023**	**8-14-2023**	0.5618	0.5322
		Highest	0.5618	0.5322

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**1.0000e-005**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0000**	**2.0000e-005**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**1.0000e-005**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0000**	**2.0000e-005**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Building Construction 2023	Building Construction	5/15/2023	5/15/2023	5	1	
2	Construction 2024	Building Construction	5/16/2024	5/16/2024	5	1	
3	Construction 2025	Building Construction	5/17/2025	5/19/2025	5	1	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

<u>OffRoad Equipment</u>

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
	Cranes	1	96.00	231	0.29
	Cranes	1	360.00	231	0.29
	Crushing/Proc. Equipment	1	411.00	85	0.78
	Excavators	1	1,578.00	158	0.38
	Pumps	1	120.00	84	0.74
	Rubber Tired Dozers	1	840.00	247	0.40
	Tractors/Loaders/Backhoes	1	48.00	97	0.37
Building Construction 2023	Cranes	0	6.00	231	0.29
Building Construction 2023	Forklifts	0	6.00	89	0.20
Building Construction 2023	Generator Sets	1	18.00	84	0.74
Building Construction 2023	Tractors/Loaders/Backhoes	2	24.00	97	0.37
Building Construction 2023	Welders	0	8.00	46	0.45
Construction 2024	Cranes	10	16.00	231	0.29
Construction 2024	Forklifts	0	6.00	89	0.20
Construction 2024	Generator Sets	0	8.00	84	0.74
Construction 2024	Pressure Washers	10	8.40	13	0.30
Construction 2024	Pumps	10	35.60	84	0.74
Construction 2024	Tractors/Loaders/Backhoes	0	6.00	97	0.37

Construction 2024	Welders	0	8.00	46	0.45
Construction 2025	Cranes	0	6.00	231	0.29
Construction 2025	Forklifts	0	6.00	89	0.20
Construction 2025	Generator Sets	0	8.00	84	0.74
Construction 2025	Plate Compactors	20	22.75	8	0.43
Construction 2025	Rollers	1	32.00	80	0.38
Construction 2025	Rubber Tired Dozers	50	10.40	247	0.40
Construction 2025	Scrapers	1	32.00	367	0.48
Construction 2025	Tractors/Loaders/Backhoes	50	13.00	97	0.37
Construction 2025	Welders	0	8.00	46	0.45
Building Construction 2023	Excavators	100	19.60	158	0.38
Building Construction 2023	Pumps	10	12.00	84	0.74
Building Construction 2023	Air Compressors	10	24.00	78	0.48
Building Construction 2023	Crushing/Proc. Equipment	20	20.60	85	0.78
Building Construction 2023	Rubber Tired Dozers	50	16.80	247	0.40
Building Construction 2023	Concrete/Industrial Saws	10	9.60	81	0.73
Construction 2025	Pumps	1	24.00	84	0.74
Construction 2025	Pavers	2	17.00	130	0.42

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Building Construction 2023	2	0.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Construction 2024	3	0.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Construction 2025	5	0.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use DPF for Construction Equipment

3.2 Building Construction 2023 - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0794	0.7072	0.7706	1.4200e-003		0.0335	0.0335		0.0314	0.0314	0.0000	124.3312	124.3312	0.0325	0.0000	125.1445
Total	**0.0794**	**0.7072**	**0.7706**	**1.4200e-003**		**0.0335**	**0.0335**		**0.0314**	**0.0314**	**0.0000**	**124.3312**	**124.3312**	**0.0325**	**0.0000**	**125.1445**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.2 Building Construction 2023 - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0794	0.6656	0.7706	1.4200e-003		7.7500e-003	7.7500e-003		7.4300e-003	7.4300e-003	0.0000	124.3310	124.3310	0.0325	0.0000	125.1444
Total	**0.0794**	**0.6656**	**0.7706**	**1.4200e-003**		**7.7500e-003**	**7.7500e-003**		**7.4300e-003**	**7.4300e-003**	**0.0000**	**124.3310**	**124.3310**	**0.0325**	**0.0000**	**125.1444**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.3 Construction 2024 - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0103	0.0940	0.1018	2.1000e-004		4.1300e-003	4.1300e-003		4.0200e-003	4.0200e-003	0.0000	17.8315	17.8315	2.2100e-003	0.0000	17.8867
Total	**0.0103**	**0.0940**	**0.1018**	**2.1000e-004**		**4.1300e-003**	**4.1300e-003**		**4.0200e-003**	**4.0200e-003**	**0.0000**	**17.8315**	**17.8315**	**2.2100e-003**	**0.0000**	**17.8867**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.3 Construction 2024 - 2024

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0103	0.0940	0.1018	2.1000e-004		2.4900e-003	2.4900e-003		2.5000e-003	2.5000e-003	0.0000	17.8314	17.8314	2.2100e-003	0.0000	17.8867
Total	**0.0103**	**0.0940**	**0.1018**	**2.1000e-004**		**2.4900e-003**	**2.4900e-003**		**2.5000e-003**	**2.5000e-003**	**0.0000**	**17.8314**	**17.8314**	**2.2100e-003**	**0.0000**	**17.8867**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.4 Construction 2025 - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0300	0.2995	0.2201	4.7000e-004		0.0129	0.0129		0.0119	0.0119	0.0000	41.2433	41.2433	0.0129	0.0000	41.5659
Total	**0.0300**	**0.2995**	**0.2201**	**4.7000e-004**		**0.0129**	**0.0129**		**0.0119**	**0.0119**	**0.0000**	**41.2433**	**41.2433**	**0.0129**	**0.0000**	**41.5659**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.4 Construction 2025 - 2025

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0300	0.2962	0.2201	4.7000e-004		2.2400e-003	2.2400e-003		2.0800e-003	2.0800e-003	0.0000	41.2433	41.2433	0.0129	0.0000	41.5659
Total	**0.0300**	**0.2962**	**0.2201**	**4.7000e-004**		**2.2400e-003**	**2.2400e-003**		**2.0800e-003**	**2.0800e-003**	**0.0000**	**41.2433**	**41.2433**	**0.0129**	**0.0000**	**41.5659**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Leland Res Pipeline 1000 feet

San Francisco Bay Area Air Basin, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
User Defined Industrial	1.00	User Defined Unit	1.00	0.00	0

1.2 Other Project Characteristics

Urbanization Urban **Wind Speed (m/s)** 2.2 **Precipitation Freq (Days)** 64

Climate Zone 4

Utility Company Pacific Gas & Electric Company

CO2 Intensity (lb/MWhr) 641.35 **CH4 Intensity (lb/MWhr)** 0.029 **N2O Intensity (lb/MWhr)** 0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Pipeline 80-ft day

Construction Phase - All years

Off-road Equipment - 2022 Pipeline

Off-road Equipment - Yr 2023

Off-road Equipment - Yr 2022

Off-road Equipment - Yr 2025

Table Name	Column Name	Default Value	New Value

tblConstructionPhase	NumDays	100.00	1.00
tblConstructionPhase	NumDays	100.00	1.00
tblConstructionPhase	NumDays	100.00	1.00
tblConstructionPhase	PhaseEndDate	5/17/2017	5/16/2022
tblConstructionPhase	PhaseStartDate	5/18/2017	5/15/2022
tblLandUse	LotAcreage	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentType		Concrete/Industrial Saws
tblOffRoadEquipment	OffRoadEquipmentType		Tractors/Loaders/Backhoes
tblOffRoadEquipment	OffRoadEquipmentType		Excavators
tblOffRoadEquipment	OffRoadEquipmentType		Pumps
tblOffRoadEquipment	OffRoadEquipmentType		Air Compressors
tblOffRoadEquipment	OffRoadEquipmentType		Generator Sets
tblOffRoadEquipment	OffRoadEquipmentType		Sweepers/Scrubbers
tblOffRoadEquipment	OffRoadEquipmentType		Rollers
tblOffRoadEquipment	OffRoadEquipmentType		Plate Compactors
tblOffRoadEquipment	OffRoadEquipmentType		Pumps
tblOffRoadEquipment	OffRoadEquipmentType		Pavers
tblOffRoadEquipment	OffRoadEquipmentType		Excavators
tblOffRoadEquipment	OffRoadEquipmentType		Air Compressors
tblOffRoadEquipment	OffRoadEquipmentType		Pumps
tblOffRoadEquipment	OffRoadEquipmentType		Pavers
tblOffRoadEquipment	OffRoadEquipmentType		Sweepers/Scrubbers
tblOffRoadEquipment	OffRoadEquipmentType		Rollers
tblOffRoadEquipment	OffRoadEquipmentType		Plate Compactors
tblOffRoadEquipment	OffRoadEquipmentType		Concrete/Industrial Saws

Leland Res Pipeline 1000 feet - San Francisco Bay Area Air Basin, Annual

tblOffRoadEquipment	OffRoadEquipmentType		Excavators
tblOffRoadEquipment	OffRoadEquipmentType		Pumps
tblOffRoadEquipment	OffRoadEquipmentType		Air Compressors
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00

tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	PhaseName	2022	Construction 2022
tblOffRoadEquipment	PhaseName	2023	Construction 2023
tblOffRoadEquipment	PhaseName	2025	Building Construction 2025
tblOffRoadEquipment	PhaseName	2022	Construction 2022
tblOffRoadEquipment	PhaseName	2023	Construction 2023
tblOffRoadEquipment	PhaseName	2025	Building Construction 2025
tblOffRoadEquipment	PhaseName	2022	Construction 2022
tblOffRoadEquipment	PhaseName	2023	Construction 2023
tblOffRoadEquipment	PhaseName	2025	Building Construction 2025
tblOffRoadEquipment	PhaseName	2022	Construction 2022
tblOffRoadEquipment	PhaseName	2023	Construction 2023
tblOffRoadEquipment	PhaseName	2025	Building Construction 2025
tblOffRoadEquipment	PhaseName	2022	Construction 2022
tblOffRoadEquipment	PhaseName	2023	Construction 2023
tblOffRoadEquipment	PhaseName	2025	Building Construction 2025
tblOffRoadEquipment	PhaseName		Construction 2023
tblOffRoadEquipment	PhaseName		Construction 2023
tblOffRoadEquipment	PhaseName		Construction 2023
tblOffRoadEquipment	PhaseName		Construction 2023
tblOffRoadEquipment	PhaseName		Construction 2023
tblOffRoadEquipment	PhaseName		Building Construction 2025

tblOffRoadEquipment	PhaseName		Building Construction 2025
tblOffRoadEquipment	PhaseName		Building Construction 2025
tblOffRoadEquipment	PhaseName		Building Construction 2025
tblOffRoadEquipment	PhaseName		Building Construction 2025
tblOffRoadEquipment	PhaseName		Building Construction 2025
tblOffRoadEquipment	PhaseName		Building Construction 2025
tblOffRoadEquipment	PhaseName		Construction 2022
tblOffRoadEquipment	PhaseName		Construction 2022
tblOffRoadEquipment	PhaseName		Construction 2022
tblOffRoadEquipment	PhaseName		Construction 2022
tblOffRoadEquipment	UsageHours	8.00	28.80
tblOffRoadEquipment	UsageHours	8.00	6.00
tblOffRoadEquipment	UsageHours	8.00	3.10
tblOffRoadEquipment	UsageHours	6.00	28.80
tblOffRoadEquipment	UsageHours	6.00	1.60
tblOffRoadEquipment	UsageHours	6.00	3.10
tblOnRoadDust	PhaseName	2022	Construction 2022
tblOnRoadDust	PhaseName	2023	Construction 2023
tblOnRoadDust	PhaseName	2025	Building Construction 2025
tblProjectCharacteristics	OperationalYear	2018	2019
tblTripsAndVMT	PhaseName	2022	Construction 2022
tblTripsAndVMT	PhaseName	2023	Construction 2023
tblTripsAndVMT	PhaseName	2025	Building Construction 2025

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2022	1.7000e-003	0.0147	0.0203	3.0000e-005	0.0000	7.7000e-004	7.7000e-004	0.0000	7.4000e-004	7.4000e-004	0.0000	2.8803	2.8803	4.6000e-004	0.0000	2.8918
2023	7.0000e-005	6.7000e-004	9.0000e-004	0.0000	0.0000	3.0000e-005	3.0000e-005	0.0000	3.0000e-005	3.0000e-005	0.0000	0.1251	0.1251	2.0000e-005	0.0000	0.1257
2025	2.0000e-004	1.6700e-003	2.8100e-003	0.0000	0.0000	7.0000e-005	7.0000e-005	0.0000	7.0000e-005	7.0000e-005	0.0000	0.4026	0.4026	6.0000e-005	0.0000	0.4041
Maximum	**1.7000e-003**	**0.0147**	**0.0203**	**3.0000e-005**	**0.0000**	**7.7000e-004**	**7.7000e-004**	**0.0000**	**7.4000e-004**	**7.4000e-004**	**0.0000**	**2.8803**	**2.8803**	**4.6000e-004**	**0.0000**	**2.8918**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2022	1.7000e-003	0.0147	0.0203	3.0000e-005	0.0000	7.7000e-004	7.7000e-004	0.0000	7.4000e-004	7.4000e-004	0.0000	2.8803	2.8803	4.6000e-004	0.0000	2.8918
2023	7.0000e-005	6.7000e-004	9.0000e-004	0.0000	0.0000	3.0000e-005	3.0000e-005	0.0000	3.0000e-005	3.0000e-005	0.0000	0.1251	0.1251	2.0000e-005	0.0000	0.1257
2025	2.0000e-004	1.6700e-003	2.8100e-003	0.0000	0.0000	7.0000e-005	7.0000e-005	0.0000	7.0000e-005	7.0000e-005	0.0000	0.4026	0.4026	6.0000e-005	0.0000	0.4041
Maximum	**1.7000e-003**	**0.0147**	**0.0203**	**3.0000e-005**	**0.0000**	**7.7000e-004**	**7.7000e-004**	**0.0000**	**7.4000e-004**	**7.4000e-004**	**0.0000**	**2.8803**	**2.8803**	**4.6000e-004**	**0.0000**	**2.8918**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
32	2-18-2025	5-17-2025	0.0013	0.0013
		Highest	0.0013	0.0013

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Construction 2022	Building Construction	5/15/2022	5/16/2022	5	1	
2	Construction 2023	Building Construction	5/15/2023	5/15/2023	5	1	
3	Building Construction 2025	Building Construction	5/15/2025	5/15/2025	5	1	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Construction 2022	Cranes	0	6.00	231	0.29
Construction 2023	Cranes	0	6.00	231	0.29
Building Construction 2025	Cranes	0	6.00	231	0.29
Construction 2022	Concrete/Industrial Saws	1	1.90	81	0.73
Construction 2022	Excavators	1	23.10	158	0.38
Construction 2022	Pumps	1	6.90	84	0.74
Construction 2022	Forklifts	0	6.00	89	0.20
Construction 2023	Forklifts	0	6.00	89	0.20
Building Construction 2025	Forklifts	0	6.00	89	0.20
Construction 2022	Generator Sets	1	28.80	84	0.74
Construction 2023	Generator Sets	0	6.00	84	0.74
Construction 2022	Air Compressors	1	19.20	78	0.48
Building Construction 2025	Generator Sets	1	3.10	84	0.74
Construction 2022	Tractors/Loaders/Backhoes	1	28.80	97	0.37
Construction 2023	Tractors/Loaders/Backhoes	1	1.60	97	0.37
Building Construction 2025	Tractors/Loaders/Backhoes	1	3.10	97	0.37
Construction 2022	Welders	0	8.00	46	0.45
Construction 2023	Welders	0	8.00	46	0.45
Building Construction 2025	Welders	0	8.00	46	0.45
	Concrete/Industrial Saws	1	1.90	81	0.73
	Tractors/Loaders/Backhoes	1	28.80	97	0.37
	Excavators	1	23.10	158	0.38
	Pumps	1	6.90	84	0.74

Leland Res Pipeline 1000 feet - San Francisco Bay Area Air Basin, Annual

	Air Compressors	1	19.20	78	0.48
	Generator Sets	1	28.80	84	0.74
Construction 2023	Sweepers/Scrubbers	1	0.30	64	0.46
Construction 2023	Rollers	1	1.00	80	0.38
Construction 2023	Plate Compactors	1	1.00	8	0.43
Construction 2023	Pumps	1	1.60	84	0.74
Construction 2023	Pavers	1	0.80	130	0.42
Building Construction 2025	Excavators	1	2.50	158	0.38
Building Construction 2025	Air Compressors	1	2.10	78	0.48
Building Construction 2025	Pumps	1	2.80	84	0.74
Building Construction 2025	Pavers	1	0.50	130	0.42
Building Construction 2025	Sweepers/Scrubbers	1	0.20	64	0.46
Building Construction 2025	Rollers	1	0.60	80	0.38
Building Construction 2025	Plate Compactors	1	0.60	8	0.43

Leland Stormdrain

San Francisco Bay Area Air Basin, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
User Defined Industrial	1.00	User Defined Unit	1.00	0.00	0

1.2 Other Project Characteristics

Urbanization Urban **Wind Speed (m/s)** 2.2 **Precipitation Freq (Days)** 64

Climate Zone 4

Utility Company Pacific Gas & Electric Company

CO2 Intensity (lb/MWhr) 641.35 **CH4 Intensity (lb/MWhr)** 0.029 **N2O Intensity (lb/MWhr)** 0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Stormdrain

Construction Phase - 2025

Off-road Equipment - 2025 equipment

Off-road Equipment - 2025

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	100.00	1.00
tblConstructionPhase	PhaseEndDate	5/22/2017	5/20/2025

Leland Stormdrain - San Francisco Bay Area Air Basin, Annual

tblConstructionPhase	PhaseStartDate	5/20/2017	5/20/2025
tblLandUse	LotAcreage	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentType		Pumps
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	PhaseName		Building Construction
tblOffRoadEquipment	PhaseName		Building Construction
tblOffRoadEquipment	PhaseName		Building Construction
tblOffRoadEquipment	PhaseName		Building Construction
tblOffRoadEquipment	PhaseName		Building Construction
tblOffRoadEquipment	PhaseName		Building Construction
tblOffRoadEquipment	PhaseName		Building Construction
tblOffRoadEquipment	PhaseName		Building Construction
tblOffRoadEquipment	UsageHours	8.00	0.10
tblOffRoadEquipment	UsageHours	6.00	2.50
tblProjectCharacteristics	OperationalYear	2018	2019

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2025	1.0000e-004	8.0000e-004	1.4800e-003	0.0000	0.0000	4.0000e-005	4.0000e-005	0.0000	3.0000e-005	3.0000e-005	0.0000	0.2022	0.2022	5.0000e-005	0.0000	0.2033
Maximum	**1.0000e-004**	**8.0000e-004**	**1.4800e-003**	**0.0000**	**0.0000**	**4.0000e-005**	**4.0000e-005**	**0.0000**	**3.0000e-005**	**3.0000e-005**	**0.0000**	**0.2022**	**0.2022**	**5.0000e-005**	**0.0000**	**0.2033**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2025	1.0000e-004	8.0000e-004	1.4800e-003	0.0000	0.0000	4.0000e-005	4.0000e-005	0.0000	3.0000e-005	3.0000e-005	0.0000	0.2022	0.2022	5.0000e-005	0.0000	0.2033
Maximum	**1.0000e-004**	**8.0000e-004**	**1.4800e-003**	**0.0000**	**0.0000**	**4.0000e-005**	**4.0000e-005**	**0.0000**	**3.0000e-005**	**3.0000e-005**	**0.0000**	**0.2022**	**0.2022**	**5.0000e-005**	**0.0000**	**0.2033**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
33	**5-20-2025**	**8-19-2025**	0.0006	0.0006
		Highest	0.0006	0.0006

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Building Construction	Building Construction	5/20/2025	5/20/2025	5	1	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
	Air Compressors	0	20.00	78	0.48
	Concrete/Industrial Saws	0	1.00	81	0.73

	Excavators	0	24.00	158	0.38
	Generator Sets	0	20.00	84	0.74
	Pavers	0	6.00	130	0.42
	Plate Compactors	0	8.00	8	0.43
	Pumps	0	12.00	84	0.74
	Rollers	0	8.00	80	0.38
	Sweepers/Scrubbers	0	2.00	64	0.46
	Tractors/Loaders/Backhoes	0	24.00	97	0.37
Building Construction	Air Compressors	1	2.10	78	0.48
Building Construction	Concrete/Industrial Saws	1	0.10	81	0.73
Building Construction	Cranes	0	6.00	231	0.29
Building Construction	Excavators	1	2.50	158	0.38
Building Construction	Forklifts	0	6.00	89	0.20
Building Construction	Generator Sets	1	0.10	84	0.74
Building Construction	Pavers	1	0.30	130	0.42
Building Construction	Plate Compactors	1	0.40	8	0.43
Building Construction	Rollers	1	0.40	80	0.38
Building Construction	Sweepers/Scrubbers	1	0.10	64	0.46
Building Construction	Tractors/Loaders/Backhoes	1	2.50	97	0.37
Building Construction	Welders	0	8.00	46	0.45
Building Construction	Pumps	1	0.60	84	0.74

AERSCREEN 11126 / AERMOD 1135 05/20/17
14:09:55

TITLE: Leland Reservoir Project - Reservoir Construction

****************************** AREA PARAMETERS ****************************

SOURCE EMISSION RATE: 0.136E-02 g/s 0.108E-01 lb/hr

AREA EMISSION RATE: 0.904E-07 g/(s-m2) 0.718E-06 lb/(hr-m2)
AREA HEIGHT: 4.57 meters 15.00 feet
AREA SOURCE LONG SIDE: 164.59 meters 540.00 feet
AREA SOURCE SHORT SIDE: 91.44 meters 300.00 feet
INITIAL VERTICAL DIMENSION: 3.05 meters 10.00 feet
RURAL OR URBAN: URBAN
POPULATION: 25000

INITIAL PROBE DISTANCE = 5000. meters 16404. feet

********************** BUILDING DOWNWASH PARAMETERS *********************

BUILDING DOWNWASH NOT USED FOR NON-POINT SOURCES

************************* FLOW SECTOR ANALYSIS **************************
25 meter receptor spacing: 1. meters - 5000. meters

MAXIMUM IMPACT RECEPTOR

Zo SECTOR	SURFACE ROUGHNESS	1-HR CONC (ug/m3)	RADIAL (deg)	DIST (m)	TEMPORAL PERIOD
1*	1.000	1.063	5	75.0	WIN

* = worst case diagonal

```
---------------------------------------------------------------------------
********************* MAKEMET METEOROLOGY PARAMETERS ********************
---------------------------------------------------------------------------

MIN/MAX TEMPERATURE:    249.8 / 310.9 (K)

MINIMUM WIND SPEED:      2.0 m/s

ANEMOMETER HEIGHT:     10.000 meters

SURFACE CHARACTERISTICS INPUT: AERMET SEASONAL TABLES

DOMINANT SURFACE PROFILE: Urban
DOMINANT CLIMATE TYPE:    Average Moisture
DOMINANT SEASON:         Winter

ALBEDO:              0.35
BOWEN RATIO:           1.50
ROUGHNESS LENGTH:      1.000 (meters)


     METEOROLOGY CONDITIONS USED TO PREDICT OVERALL MAXIMUM IMPACT
     ------------------------------------------------------------

 YR MO DY JDY HR
 -- -- -- --- --
 10 01 01   1 01

   H0     U*     W*  DT/DZ ZICNV ZIMCH  M-O LEN    Z0  BOWEN ALBEDO  REF WS
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
-18.63  0.174 -9.000  0.020 -999.  167.     21.6 1.000   1.50   0.35    2.00

   HT  REF TA     HT
- - - - - - - - - - -
  10.0   249.8    2.0


     METEOROLOGY CONDITIONS USED TO PREDICT AMBIENT BOUNDARY IMPACT
     -------------------------------------------------------------

 YR MO DY JDY HR
 -- -- -- --- --
 10 01 01   1 01

   H0     U*     W*  DT/DZ ZICNV ZIMCH  M-O LEN    Z0  BOWEN ALBEDO  REF WS
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
-18.63  0.174 -9.000  0.020 -999.  167.     21.6 1.000   1.50   0.35    2.00

   HT  REF TA     HT
```

- - - - - - - - - - -
10.0 249.8 2.0

*********************** AERSCREEN AUTOMATED DISTANCES **********************
OVERALL MAXIMUM CONCENTRATIONS BY DISTANCE

DIST (m)	MAXIMUM 1-HR CONC (ug/m3)	DIST (m)	MAXIMUM 1-HR CONC (ug/m3)
1.00	0.7338	2525.00	0.1274E-01
25.00	0.8670	2550.00	0.1258E-01
50.00	0.9776	2575.00	0.1242E-01
75.00	1.063	2600.00	0.1226E-01
100.00	1.012	2625.00	0.1211E-01
125.00	0.7716	2650.00	0.1196E-01
150.00	0.6102	2675.00	0.1182E-01
175.00	0.4956	2700.00	0.1168E-01
200.00	0.4127	2725.00	0.1154E-01
225.00	0.3507	2750.00	0.1141E-01
250.00	0.3029	2775.00	0.1127E-01
275.00	0.2655	2800.00	0.1115E-01
300.00	0.2354	2825.00	0.1102E-01
325.00	0.2107	2850.00	0.1090E-01
350.00	0.1902	2875.00	0.1078E-01
375.00	0.1729	2900.00	0.1066E-01
400.00	0.1582	2925.00	0.1055E-01
425.00	0.1455	2950.00	0.1044E-01
450.00	0.1344	2975.00	0.1033E-01
475.00	0.1248	3000.00	0.1022E-01
500.00	0.1163	3025.00	0.1012E-01
525.00	0.1087	3050.00	0.1002E-01
550.00	0.1020	3075.00	0.9917E-02
575.00	0.9590E-01	3100.00	0.9820E-02
600.00	0.9045E-01	3125.00	0.9725E-02
625.00	0.8552E-01	3150.00	0.9632E-02
650.00	0.8104E-01	3174.99	0.9541E-02
675.00	0.7694E-01	3199.99	0.9451E-02
700.00	0.7320E-01	3225.00	0.9364E-02
725.00	0.6976E-01	3250.00	0.9279E-02
750.00	0.6658E-01	3275.00	0.9196E-02
775.00	0.6364E-01	3300.00	0.9114E-02
800.00	0.6092E-01	3325.00	0.9034E-02
825.00	0.5840E-01	3350.00	0.8956E-02

850.00	0.5605E-01	3375.00	0.8879E-02
875.00	0.5387E-01	3400.00	0.8804E-02
900.00	0.5182E-01	3425.00	0.8730E-02
925.00	0.4991E-01	3450.00	0.8658E-02
950.01	0.4812E-01	3475.00	0.8587E-02
975.00	0.4644E-01	3500.00	0.8518E-02
1000.00	0.4486E-01	3525.00	0.8450E-02
1025.00	0.4337E-01	3550.00	0.8384E-02
1050.00	0.4196E-01	3575.00	0.8319E-02
1075.00	0.4064E-01	3600.00	0.8255E-02
1100.00	0.3938E-01	3625.00	0.8192E-02
1125.00	0.3819E-01	3650.00	0.8131E-02
1150.00	0.3707E-01	3675.00	0.8071E-02
1175.00	0.3600E-01	3700.00	0.8012E-02
1200.00	0.3497E-01	3725.00	0.7954E-02
1225.00	0.3400E-01	3750.00	0.7897E-02
1250.00	0.3307E-01	3775.00	0.7841E-02
1275.00	0.3219E-01	3800.00	0.7786E-02
1300.00	0.3134E-01	3825.00	0.7733E-02
1325.00	0.3053E-01	3849.99	0.7680E-02
1350.00	0.2975E-01	3875.00	0.7628E-02
1375.00	0.2901E-01	3900.00	0.7577E-02
1400.00	0.2830E-01	3925.00	0.7527E-02
1425.00	0.2762E-01	3950.00	0.7478E-02
1450.00	0.2697E-01	3975.00	0.7430E-02
1475.00	0.2634E-01	4000.00	0.7383E-02
1500.00	0.2574E-01	4025.00	0.7337E-02
1525.00	0.2517E-01	4050.00	0.7291E-02
1550.00	0.2461E-01	4075.00	0.7246E-02
1575.00	0.2408E-01	4100.00	0.7202E-02
1600.00	0.2356E-01	4125.00	0.7159E-02
1625.00	0.2307E-01	4149.99	0.7116E-02
1650.00	0.2259E-01	4175.00	0.7074E-02
1675.00	0.2221E-01	4200.00	0.7033E-02
1700.00	0.2177E-01	4225.00	0.6993E-02
1725.00	0.2134E-01	4250.00	0.6953E-02
1750.00	0.2092E-01	4275.00	0.6914E-02
1775.00	0.2052E-01	4300.00	0.6875E-02
1800.00	0.2013E-01	4325.00	0.6838E-02
1825.00	0.1975E-01	4350.00	0.6800E-02
1850.00	0.1939E-01	4375.00	0.6764E-02
1875.00	0.1904E-01	4400.00	0.6727E-02
1900.00	0.1869E-01	4425.00	0.6692E-02
1925.00	0.1836E-01	4450.00	0.6657E-02
1950.00	0.1804E-01	4475.00	0.6622E-02
1975.00	0.1773E-01	4500.00	0.6589E-02
2000.00	0.1743E-01	4525.00	0.6555E-02
2025.00	0.1714E-01	4550.00	0.6522E-02
2050.00	0.1686E-01	4575.00	0.6490E-02

2075.00	0.1658E-01	4600.00	0.6458E-02
2100.00	0.1631E-01	4625.00	0.6426E-02
2125.00	0.1605E-01	4650.00	0.6395E-02
2150.00	0.1580E-01	4675.00	0.6365E-02
2175.00	0.1556E-01	4700.00	0.6335E-02
2200.00	0.1532E-01	4725.00	0.6305E-02
2225.00	0.1509E-01	4750.00	0.6276E-02
2250.00	0.1486E-01	4775.00	0.6247E-02
2275.00	0.1464E-01	4800.00	0.6218E-02
2300.00	0.1443E-01	4825.00	0.6190E-02
2325.00	0.1422E-01	4850.00	0.6163E-02
2350.00	0.1402E-01	4875.00	0.6135E-02
2375.00	0.1382E-01	4900.00	0.6108E-02
2400.00	0.1363E-01	4925.00	0.6082E-02
2425.00	0.1344E-01	4950.00	0.6056E-02
2450.00	0.1326E-01	4975.00	0.6030E-02
2475.00	0.1309E-01	5000.00	0.6004E-02
2500.00	0.1291E-01		

********************* AERSCREEN MAXIMUM IMPACT SUMMARY *********************

3-hour, 8-hour, and 24-hour scaled
concentrations are equal to the 1-hour concentration as referenced in
SCREENING PROCEDURES FOR ESTIMATING THE AIR QUALITY
IMPACT OF STATIONARY SOURCES, REVISED (Section 4.5.4)
Report number EPA-454/R-92-019
http://www.epa.gov/scram001/guidance_permit.htm
under Screening Guidance

CALCULATION PROCEDURE	MAXIMUM 1-HOUR CONC (ug/m3)	SCALED 3-HOUR CONC (ug/m3)	SCALED 8-HOUR CONC (ug/m3)	SCALED 24-HOUR CONC (ug/m3)	SCALED ANNUAL CONC (ug/m3)
FLAT TERRAIN	1.087	1.087	1.087	1.087	N/A

DISTANCE FROM SOURCE 83.00 meters

IMPACT AT THE AMBIENT BOUNDARY	0.7338	0.7338	0.7338	0.7338	N/A

DISTANCE FROM SOURCE 1.00 meters

AERSCREEN 11126 / AERMOD 1135 05/23/17
12:57:29

TITLE: Leland Reservoir Project - Pipeline Construction

****************************** AREA PARAMETERS ****************************

SOURCE EMISSION RATE: 0.252E-04 g/s 0.200E-03 lb/hr

AREA EMISSION RATE: 0.271E-07 g/(s-m2) 0.215E-06 lb/(hr-m2)
AREA HEIGHT: 4.57 meters 15.00 feet
AREA SOURCE LONG SIDE: 304.80 meters 1000.00 feet
AREA SOURCE SHORT SIDE: 3.05 meters 10.00 feet
INITIAL VERTICAL DIMENSION: 3.05 meters 10.00 feet
RURAL OR URBAN: URBAN
POPULATION: 25000

INITIAL PROBE DISTANCE = 5000. meters 16404. feet

*********************** BUILDING DOWNWASH PARAMETERS **********************

BUILDING DOWNWASH NOT USED FOR NON-POINT SOURCES

************************* FLOW SECTOR ANALYSIS ***************************
25 meter receptor spacing: 1. meters - 5000. meters

MAXIMUM IMPACT RECEPTOR

Zo SECTOR	SURFACE ROUGHNESS	1-HR CONC (ug/m3)	RADIAL (deg)	DIST (m)	TEMPORAL PERIOD
1*	1.000	0.4337E-01	0	125.0	WIN

* = worst case diagonal

```
---------------------------------------------------------------------------
********************* MAKEMET METEOROLOGY PARAMETERS ********************
---------------------------------------------------------------------------

MIN/MAX TEMPERATURE:    249.8 / 310.9 (K)

MINIMUM WIND SPEED:      2.0 m/s

ANEMOMETER HEIGHT:    10.000 meters

SURFACE CHARACTERISTICS INPUT: AERMET SEASONAL TABLES

DOMINANT SURFACE PROFILE: Urban
DOMINANT CLIMATE TYPE:    Average Moisture
DOMINANT SEASON:          Winter

ALBEDO:               0.35
BOWEN RATIO:          1.50
ROUGHNESS LENGTH:     1.000 (meters)


     METEOROLOGY CONDITIONS USED TO PREDICT OVERALL MAXIMUM IMPACT
     ------------------------------------------------------------

 YR MO DY JDY HR
 -- -- -- --- --
 10 01 01   1 01

   H0     U*     W*  DT/DZ ZICNV ZIMCH  M-O LEN    Z0  BOWEN ALBEDO  REF WS
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
-18.63  0.174 -9.000  0.020 -999.  167.     21.6 1.000   1.50   0.35    2.00

   HT  REF TA    HT
- - - - - - - - - - -
 10.0   249.8    2.0


     METEOROLOGY CONDITIONS USED TO PREDICT AMBIENT BOUNDARY IMPACT
     ------------------------------------------------------------

 YR MO DY JDY HR
 -- -- -- --- --
 10 01 01   1 01

   H0     U*     W*  DT/DZ ZICNV ZIMCH  M-O LEN    Z0  BOWEN ALBEDO  REF WS
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
-18.63  0.174 -9.000  0.020 -999.  167.     21.6 1.000   1.50   0.35    2.00

   HT  REF TA    HT
```

- - - - - - - - - - -
10.0 249.8 2.0

*********************** AERSCREEN AUTOMATED DISTANCES **********************
OVERALL MAXIMUM CONCENTRATIONS BY DISTANCE

DIST (m)	MAXIMUM 1-HR CONC (ug/m3)	DIST (m)	MAXIMUM 1-HR CONC (ug/m3)
1.00	0.3315E-01	2525.00	0.2360E-03
25.00	0.3755E-01	2550.00	0.2330E-03
50.00	0.3929E-01	2575.00	0.2300E-03
75.00	0.4083E-01	2600.00	0.2272E-03
100.00	0.4218E-01	2625.00	0.2243E-03
125.00	0.4337E-01	2650.00	0.2216E-03
150.00	0.4321E-01	2675.00	0.2189E-03
175.00	0.1828E-01	2700.00	0.2163E-03
200.00	0.1213E-01	2725.00	0.2137E-03
225.00	0.8600E-02	2750.00	0.2113E-03
250.00	0.7043E-02	2775.00	0.2088E-03
275.00	0.5935E-02	2800.00	0.2064E-03
300.00	0.5108E-02	2825.00	0.2041E-03
325.00	0.4469E-02	2850.00	0.2019E-03
350.00	0.3962E-02	2875.00	0.1997E-03
375.00	0.3549E-02	2900.00	0.1975E-03
400.00	0.3208E-02	2925.00	0.1954E-03
425.00	0.2922E-02	2950.00	0.1933E-03
450.00	0.2678E-02	2975.00	0.1913E-03
475.00	0.2468E-02	3000.00	0.1893E-03
500.00	0.2286E-02	3025.00	0.1874E-03
525.00	0.2126E-02	3050.00	0.1855E-03
550.00	0.1985E-02	3075.00	0.1837E-03
575.00	0.1860E-02	3100.00	0.1819E-03
600.00	0.1748E-02	3125.00	0.1801E-03
625.00	0.1647E-02	3150.00	0.1784E-03
650.00	0.1556E-02	3175.00	0.1767E-03
675.00	0.1474E-02	3200.00	0.1751E-03
700.00	0.1399E-02	3225.00	0.1734E-03
725.00	0.1331E-02	3250.00	0.1719E-03
750.00	0.1268E-02	3275.00	0.1703E-03
775.00	0.1210E-02	3300.00	0.1688E-03
800.00	0.1157E-02	3325.00	0.1673E-03
825.00	0.1107E-02	3350.00	0.1659E-03

850.00	0.1062E-02	3375.00	0.1644E-03
875.00	0.1019E-02	3400.00	0.1631E-03
900.00	0.9793E-03	3425.00	0.1617E-03
925.00	0.9305E-03	3450.00	0.1604E-03
950.00	0.8970E-03	3475.00	0.1590E-03
975.00	0.8655E-03	3500.00	0.1578E-03
1000.00	0.8358E-03	3525.00	0.1565E-03
1025.00	0.8079E-03	3550.00	0.1553E-03
1050.00	0.7816E-03	3575.00	0.1541E-03
1075.00	0.7567E-03	3600.00	0.1529E-03
1100.00	0.7331E-03	3625.00	0.1517E-03
1125.00	0.7108E-03	3650.00	0.1506E-03
1150.00	0.6896E-03	3675.00	0.1495E-03
1175.00	0.6695E-03	3700.00	0.1484E-03
1200.00	0.6504E-03	3725.00	0.1473E-03
1225.00	0.6322E-03	3750.00	0.1463E-03
1250.00	0.6149E-03	3775.00	0.1452E-03
1275.00	0.5984E-03	3800.00	0.1442E-03
1300.00	0.5827E-03	3825.00	0.1432E-03
1325.00	0.5676E-03	3850.00	0.1422E-03
1350.00	0.5532E-03	3875.00	0.1413E-03
1375.00	0.5394E-03	3900.00	0.1403E-03
1400.00	0.5262E-03	3925.00	0.1394E-03
1425.00	0.5136E-03	3950.00	0.1385E-03
1450.00	0.5015E-03	3975.00	0.1376E-03
1475.00	0.4899E-03	4000.00	0.1367E-03
1500.00	0.4787E-03	4025.00	0.1359E-03
1525.00	0.4679E-03	4050.00	0.1350E-03
1550.00	0.4576E-03	4075.00	0.1342E-03
1575.00	0.4477E-03	4100.00	0.1334E-03
1600.00	0.4381E-03	4125.00	0.1326E-03
1625.00	0.4289E-03	4150.00	0.1318E-03
1650.00	0.4200E-03	4175.00	0.1310E-03
1675.00	0.4114E-03	4200.00	0.1303E-03
1700.00	0.4032E-03	4225.00	0.1295E-03
1725.00	0.3952E-03	4250.00	0.1288E-03
1750.00	0.3875E-03	4275.00	0.1281E-03
1775.00	0.3800E-03	4300.00	0.1273E-03
1800.00	0.3728E-03	4325.00	0.1266E-03
1825.00	0.3658E-03	4350.00	0.1259E-03
1850.00	0.3591E-03	4375.00	0.1253E-03
1875.00	0.3526E-03	4400.00	0.1246E-03
1900.00	0.3462E-03	4425.00	0.1239E-03
1924.99	0.3401E-03	4450.00	0.1233E-03
1950.00	0.3342E-03	4475.00	0.1227E-03
1975.00	0.3284E-03	4500.00	0.1220E-03
2000.00	0.3228E-03	4525.00	0.1214E-03
2025.00	0.3174E-03	4550.00	0.1208E-03
2050.00	0.3122E-03	4575.00	0.1202E-03

2075.00	0.3071E-03	4600.00	0.1196E-03
2100.00	0.3021E-03	4625.00	0.1190E-03
2125.00	0.2973E-03	4650.00	0.1185E-03
2150.00	0.2927E-03	4675.00	0.1179E-03
2175.00	0.2881E-03	4700.00	0.1173E-03
2200.00	0.2837E-03	4725.00	0.1168E-03
2225.00	0.2794E-03	4750.00	0.1162E-03
2250.00	0.2752E-03	4775.00	0.1157E-03
2275.00	0.2712E-03	4800.00	0.1152E-03
2300.00	0.2672E-03	4825.00	0.1147E-03
2325.00	0.2634E-03	4850.00	0.1141E-03
2350.00	0.2596E-03	4875.00	0.1136E-03
2375.00	0.2560E-03	4900.00	0.1131E-03
2400.00	0.2525E-03	4925.00	0.1126E-03
2425.00	0.2490E-03	4950.00	0.1122E-03
2450.00	0.2456E-03	4975.00	0.1117E-03
2475.00	0.2424E-03	5000.00	0.1112E-03
2500.00	0.2392E-03		

********************* AERSCREEN MAXIMUM IMPACT SUMMARY ********************

3-hour, 8-hour, and 24-hour scaled
concentrations are equal to the 1-hour concentration as referenced in
SCREENING PROCEDURES FOR ESTIMATING THE AIR QUALITY
IMPACT OF STATIONARY SOURCES, REVISED (Section 4.5.4)
Report number EPA-454/R-92-019
http://www.epa.gov/scram001/guidance_permit.htm
under Screening Guidance

CALCULATION PROCEDURE	MAXIMUM 1-HOUR CONC (ug/m3)	SCALED 3-HOUR CONC (ug/m3)	SCALED 8-HOUR CONC (ug/m3)	SCALED 24-HOUR CONC (ug/m3)	SCALED ANNUAL CONC (ug/m3)
FLAT TERRAIN	0.4368E-01	0.4368E-01	0.4368E-01	0.4368E-01	N/A

DISTANCE FROM SOURCE 132.00 meters

IMPACT AT THE AMBIENT BOUNDARY	0.3315E-01	0.3315E-01	0.3315E-01	0.3315E-01	N/A

DISTANCE FROM SOURCE 1.00 meters

AERSCREEN 11126 / AERMOD 1135 05/24/17
14:34:45

TITLE: Leland Reservoir Project - Storm Drain Construction

****************************** AREA PARAMETERS ****************************

SOURCE EMISSION RATE: 0.126E-05 g/s 0.100E-04 lb/hr

AREA EMISSION RATE: 0.136E-08 g/(s-m2) 0.108E-07 lb/(hr-m2)
AREA HEIGHT: 4.57 meters 15.00 feet
AREA SOURCE LONG SIDE: 304.80 meters 1000.00 feet
AREA SOURCE SHORT SIDE: 3.05 meters 10.00 feet
INITIAL VERTICAL DIMENSION: 3.05 meters 10.00 feet
RURAL OR URBAN: URBAN
POPULATION: 25000

INITIAL PROBE DISTANCE = 5000. meters 16404. feet

*********************** BUILDING DOWNWASH PARAMETERS **********************

BUILDING DOWNWASH NOT USED FOR NON-POINT SOURCES

************************* FLOW SECTOR ANALYSIS ***************************
25 meter receptor spacing: 1. meters - 5000. meters

MAXIMUM IMPACT RECEPTOR

Zo SECTOR	SURFACE ROUGHNESS	1-HR CONC (ug/m3)	RADIAL (deg)	DIST (m)	TEMPORAL PERIOD
1*	1.000	0.2168E-02	0	125.0	WIN

* = worst case diagonal

********************* MAKEMET METEOROLOGY PARAMETERS ********************

MIN/MAX TEMPERATURE: 249.8 / 310.9 (K)

MINIMUM WIND SPEED: 2.0 m/s

ANEMOMETER HEIGHT: 10.000 meters

SURFACE CHARACTERISTICS INPUT: AERMET SEASONAL TABLES

DOMINANT SURFACE PROFILE: Urban
DOMINANT CLIMATE TYPE: Average Moisture
DOMINANT SEASON: Winter

ALBEDO: 0.35
BOWEN RATIO: 1.50
ROUGHNESS LENGTH: 1.000 (meters)

METEOROLOGY CONDITIONS USED TO PREDICT OVERALL MAXIMUM IMPACT

```
 YR MO DY JDY HR
 -- -- -- --- --
 10 01 01   1 01

   H0     U*     W*  DT/DZ ZICNV ZIMCH  M-O LEN    Z0  BOWEN ALBEDO  REF WS
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
-18.63  0.174 -9.000  0.020 -999.  167.     21.6 1.000   1.50   0.35    2.00

   HT  REF TA     HT
- - - - - - - - - - -
  10.0   249.8    2.0
```

METEOROLOGY CONDITIONS USED TO PREDICT AMBIENT BOUNDARY IMPACT

```
 YR MO DY JDY HR
 -- -- -- --- --
 10 01 01   1 01

   H0     U*     W*  DT/DZ ZICNV ZIMCH  M-O LEN    Z0  BOWEN ALBEDO  REF WS
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
-18.63  0.174 -9.000  0.020 -999.  167.     21.6 1.000   1.50   0.35    2.00

   HT  REF TA     HT
```

- - - - - - - - - - -
10.0 249.8 2.0

*********************** AERSCREEN AUTOMATED DISTANCES *********************
OVERALL MAXIMUM CONCENTRATIONS BY DISTANCE

DIST (m)	MAXIMUM 1-HR CONC (ug/m3)	DIST (m)	MAXIMUM 1-HR CONC (ug/m3)
1.00	0.1657E-02	2525.00	0.1180E-04
25.00	0.1877E-02	2550.00	0.1165E-04
50.00	0.1964E-02	2575.00	0.1150E-04
75.00	0.2041E-02	2600.00	0.1135E-04
100.00	0.2108E-02	2625.00	0.1121E-04
125.00	0.2168E-02	2650.00	0.1108E-04
150.00	0.2160E-02	2675.00	0.1094E-04
175.00	0.9135E-03	2700.00	0.1081E-04
200.00	0.6063E-03	2725.00	0.1068E-04
225.00	0.4298E-03	2750.00	0.1056E-04
250.00	0.3520E-03	2775.00	0.1044E-04
275.00	0.2966E-03	2800.00	0.1032E-04
300.00	0.2553E-03	2825.00	0.1020E-04
325.00	0.2234E-03	2850.00	0.1009E-04
350.00	0.1980E-03	2875.00	0.9979E-05
375.00	0.1774E-03	2900.00	0.9871E-05
400.00	0.1603E-03	2925.00	0.9765E-05
425.00	0.1460E-03	2950.00	0.9662E-05
450.00	0.1338E-03	2975.00	0.9561E-05
475.00	0.1234E-03	3000.00	0.9463E-05
500.00	0.1142E-03	3025.00	0.9367E-05
525.00	0.1062E-03	3050.00	0.9272E-05
550.00	0.9920E-04	3075.00	0.9180E-05
575.00	0.9295E-04	3100.00	0.9090E-05
600.00	0.8735E-04	3125.00	0.9002E-05
625.00	0.8233E-04	3150.00	0.8916E-05
650.00	0.7779E-04	3175.00	0.8832E-05
675.00	0.7368E-04	3200.00	0.8749E-05
700.00	0.6993E-04	3225.00	0.8669E-05
725.00	0.6651E-04	3250.00	0.8590E-05
750.00	0.6337E-04	3275.00	0.8513E-05
775.00	0.6048E-04	3300.00	0.8437E-05
800.00	0.5781E-04	3325.00	0.8363E-05
825.00	0.5535E-04	3350.00	0.8290E-05

850.00	0.5306E-04	3375.00	0.8219E-05
875.00	0.5093E-04	3400.00	0.8150E-05
900.00	0.4894E-04	3425.00	0.8082E-05
925.00	0.4651E-04	3450.00	0.8015E-05
950.00	0.4483E-04	3475.00	0.7950E-05
975.00	0.4326E-04	3500.00	0.7885E-05
1000.00	0.4178E-04	3525.00	0.7823E-05
1025.00	0.4038E-04	3550.00	0.7761E-05
1050.00	0.3906E-04	3575.00	0.7701E-05
1075.00	0.3782E-04	3600.00	0.7642E-05
1100.00	0.3664E-04	3625.00	0.7584E-05
1125.00	0.3553E-04	3650.00	0.7527E-05
1150.00	0.3447E-04	3675.00	0.7471E-05
1175.00	0.3346E-04	3700.00	0.7417E-05
1200.00	0.3251E-04	3725.00	0.7363E-05
1225.00	0.3160E-04	3750.00	0.7310E-05
1250.00	0.3073E-04	3775.00	0.7259E-05
1275.00	0.2991E-04	3800.00	0.7208E-05
1300.00	0.2912E-04	3825.00	0.7158E-05
1325.00	0.2837E-04	3850.00	0.7109E-05
1350.00	0.2765E-04	3875.00	0.7062E-05
1375.00	0.2696E-04	3900.00	0.7015E-05
1400.00	0.2630E-04	3925.00	0.6968E-05
1425.00	0.2567E-04	3950.00	0.6923E-05
1450.00	0.2507E-04	3975.00	0.6878E-05
1475.00	0.2448E-04	4000.00	0.6835E-05
1500.00	0.2393E-04	4025.00	0.6792E-05
1525.00	0.2339E-04	4050.00	0.6749E-05
1550.00	0.2287E-04	4075.00	0.6708E-05
1575.00	0.2238E-04	4100.00	0.6667E-05
1600.00	0.2190E-04	4125.00	0.6627E-05
1625.00	0.2144E-04	4150.00	0.6588E-05
1650.00	0.2099E-04	4175.00	0.6549E-05
1675.00	0.2056E-04	4200.00	0.6511E-05
1700.00	0.2015E-04	4225.00	0.6473E-05
1725.00	0.1975E-04	4250.00	0.6437E-05
1750.00	0.1937E-04	4275.00	0.6400E-05
1775.00	0.1899E-04	4300.00	0.6365E-05
1800.00	0.1863E-04	4325.00	0.6330E-05
1825.00	0.1828E-04	4350.00	0.6295E-05
1850.00	0.1795E-04	4375.00	0.6261E-05
1875.00	0.1762E-04	4400.00	0.6228E-05
1900.00	0.1731E-04	4425.00	0.6195E-05
1924.99	0.1700E-04	4450.00	0.6162E-05
1950.00	0.1670E-04	4475.00	0.6131E-05
1975.00	0.1642E-04	4500.00	0.6099E-05
2000.00	0.1614E-04	4525.00	0.6068E-05
2025.00	0.1587E-04	4550.00	0.6038E-05
2050.00	0.1560E-04	4575.00	0.6008E-05

2075.00	0.1535E-04	4600.00	0.5978E-05
2100.00	0.1510E-04	4625.00	0.5949E-05
2125.00	0.1486E-04	4650.00	0.5920E-05
2150.00	0.1463E-04	4675.00	0.5892E-05
2175.00	0.1440E-04	4700.00	0.5864E-05
2200.00	0.1418E-04	4725.00	0.5837E-05
2225.00	0.1397E-04	4750.00	0.5810E-05
2250.00	0.1376E-04	4775.00	0.5783E-05
2275.00	0.1355E-04	4800.00	0.5757E-05
2300.00	0.1336E-04	4825.00	0.5731E-05
2325.00	0.1316E-04	4850.00	0.5705E-05
2350.00	0.1298E-04	4875.00	0.5680E-05
2375.00	0.1280E-04	4900.00	0.5655E-05
2400.00	0.1262E-04	4925.00	0.5630E-05
2425.00	0.1245E-04	4950.00	0.5606E-05
2450.00	0.1228E-04	4975.00	0.5582E-05
2475.00	0.1211E-04	5000.00	0.5558E-05
2500.00	0.1195E-04		

********************* AERSCREEN MAXIMUM IMPACT SUMMARY ********************

3-hour, 8-hour, and 24-hour scaled
concentrations are equal to the 1-hour concentration as referenced in
SCREENING PROCEDURES FOR ESTIMATING THE AIR QUALITY
IMPACT OF STATIONARY SOURCES, REVISED (Section 4.5.4)
Report number EPA-454/R-92-019
http://www.epa.gov/scram001/guidance_permit.htm
under Screening Guidance

CALCULATION PROCEDURE	MAXIMUM 1-HOUR CONC (ug/m3)	SCALED 3-HOUR CONC (ug/m3)	SCALED 8-HOUR CONC (ug/m3)	SCALED 24-HOUR CONC (ug/m3)	SCALED ANNUAL CONC (ug/m3)
FLAT TERRAIN	0.2183E-02	0.2183E-02	0.2183E-02	0.2183E-02	N/A

DISTANCE FROM SOURCE 132.00 meters

IMPACT AT THE AMBIENT BOUNDARY	0.1657E-02	0.1657E-02	0.1657E-02	0.1657E-02	N/A

DISTANCE FROM SOURCE 1.00 meters

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Appendix F: Biological Resources Assessment

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Leland Reservoir Replacement Project
Biological Resources Assessment
Updated May 2016

1.0 Introduction

East Bay Municipal Utility District (EBMUD) biologists performed an assessment of biological resources for the Leland Reservoir Replacement Project (Project) on March 9, 2010. This report describes the results of the site visit, which assessed (1) the potential of the Project to impact special status species; and (2) presence of sensitive biological resources protected by local, state, and federal laws and regulations within the Project area. This report contains an evaluation of potential impacts to special status species and sensitive biological resources that may occur as a result of the Project and potential measures to avoid those impacts. This assessment is based on information available at the time of the assessment and on-site conditions that were observed on the date of the site visits. This document is meant to provide information on biological issues associated with the Project to assist in the California Environmental Quality Act (CEQA) requirements and is not intended to be submitted to agencies as an official or unofficial Biological Assessment.

On March 9, 2010, EBMUD biologists conducted a field survey to examine the Leland Reservoir site. A report was compiled by James R. Smith, Supervising Fisheries & Wildlife Biologist, and Jim Dunne, Ranger Naturalist II following the site visit. This report was updated by Supervising Fisheries and Wildlife Biologist Bert Mulchaey following a site visit to Leland Reservoir on May 17, 2016 to confirm that there were no changes in site conditions or additional biological concerns from the previous March 9, 2010 site visit. The species lists in Tables 2 and 3 were updated on May 19, 2016.

1.1 Project setting

The Leland Reservoir site is located in the City of Lafayette about 600 feet south of Highway 24. The site is bounded by Old Tunnel Road to the north, Condit Road to the south, Leland Drive to the east and Windsor Drive to the west. The reservoir site is set within a residential community and is completely encircled by homes and a church. The Project includes replacement of the existing open-cut reservoir with two new tanks in the existing basin. Replacement of the reservoir will require breaching the embankment, demolishing the existing reservoir, re-routing the existing pipeline, tree removal, grading, and constructing the new tanks.

1.1 Project Description

EBMUD will replace its existing 18-million-gallon (MG) open-cut Leland Reservoir constructed in 1955, with two 8.0-MG pre-stressed concrete tanks within the open-cut basin. Leland Reservoir is a critical facility at the end of its useful life. The reservoir basin is a concrete-lined reservoir, with pre-cast concrete girders, columns, and a pre-cast concrete panel roof. The Project is a high priority because of the unsafe condition of the pre-cast concrete panel roofing system and the criticality of the facility.

In addition to replacing the Leland Reservoir, an existing 36-inch transmission pipeline beneath the existing reservoir would also be replaced and relocated in the street right of way around the project site. Approximately 2,700 linear feet (LF) of 36-inch-diameter pipeline would be installed in Windsor Drive, Condit Road, and Leland Drive. Another 950 LF of 36-inch pipeline would connect the new concrete tanks to the existing 36-inch transmission pipeline in Leland Drive.

2.0 Regulatory Background

The following sections explain the regulatory context of this preliminary biological resource assessment, including applicable laws and regulations that were applied to the field investigations and analysis of potential project impacts.

2.1 Sensitive and Special Status Species

Special status species include those plants and wildlife species that have been formally listed, are proposed as endangered or threatened, or are candidates for such listing under the federal Endangered Species Act (ESA) or California Endangered Species Act (CESA). These acts afford protection to both listed and proposed species. In addition, California Department of Fish and Wildlife (CDFW) Species of Special Concern, which are species that face extirpation in California if current population and habitat trends continue; U.S. Fish and Wildlife Service (USFWS) Birds of Conservation Concern, sensitive species included in USFWS Recovery Plans; and CDFW special status invertebrates are all considered special status species. Although CDFW Species of Special Concern generally have no special legal status, they are given special consideration under CEQA.

In addition to regulations for special status species, the active nests of most common bird species are protected by the Migratory Bird Treaty Act (MBTA) and the California Fish and Game Code (CFGC). While active nests of common bird species are not considered to be of special-status under CEQA, these nests are protected by state and federal law. Under the MBTA and CFGC, destroying active nests, eggs, and young is illegal. Plant species on California Native Plant Society (CNPS) Lists 1 and 2 and locally rare, unusual and significant plants (Lake 2010) are also considered special status plant species. Substantial adverse effects to these species are considered significant according to CEQA. CNPS List 3 and List 4 plants have little or no protection under CEQA, but are included in this analysis for completeness.

2.2 Sensitive and Special Status Biological Communities

Special status biological communities include communities and habitats that fulfill special functions or have special values, such as wetlands, streams, and riparian habitat, and sensitive natural plant communities. Special status biological communities and habitats are protected under federal regulations such as the Clean Water Act (CWA), state regulations such as the Porter-Cologne Act, the CDFW Streambed Alteration Program, and CEQA, or local ordinances or policies (City or County Tree Ordinances, Special Habitat Management Areas, and General Plan Elements).

Waters of the United States. The U.S. Army Corps of Engineers (Corps) regulates "Waters of the United States (U.S.)" under Section 404 of the CWA. "Waters of the U.S." are defined broadly as waters susceptible to use in commerce, including interstate waters and wetlands, all other waters (intrastate waterbodies, including wetlands), and their tributaries (33 CFR 328.3). Potential wetland areas, according to the three criteria used to delineate wetlands stated in the Corps Wetlands Delineation Manual (Environmental Laboratory 1987), are identified by the presence of (1) hydrophytic vegetation, (2) hydric soils, and (3) wetland hydrology. Areas that are inundated for sufficient duration and depth to exclude growth of hydrophytic vegetation are subject to Section 404 jurisdiction as "other waters" and are often characterized by an ordinary high water mark. Other waters, for example, generally include lakes, rivers, and streams. The placement of fill material into "Waters of the U.S." (including wetlands) generally requires an individual or nationwide permit from the Corps under Section 404 of the CWA.

Waters of the State. The term "Waters of the State" is defined by the Porter-Cologne Act as "any surface water or groundwater, including saline waters, within the boundaries of the state." The Regional Water Quality Control Board (RWQCB) protects all waters in its regulatory scope, but has special responsibility for wetlands, riparian areas, and headwaters which have high resource value, are vulnerable to filling, and are not systematically protected by other programs. RWQCB jurisdiction includes "isolated" wetlands and waters that may not be regulated by the Corps under Section 404. "Waters of the State" are regulated by the RWQCB under the State Water Quality Certification Program which regulates discharges of fill and dredged material under Section 401 of the CWA and the Porter-Cologne Water Quality Control Act. Projects that require a Corps permit, or fall under other federal jurisdiction, and have the potential to impact "Waters of the State," are required to comply with the terms of the Water Quality Certification determination. If a proposed project does not require a federal permit, but does involve dredge or fill activities that may result in a discharge to "Waters of the State," the RWQCB has the option to regulate the dredge and fill activities under its state authority in the form of Waste Discharge Requirements.

Streams, Lakes, and Riparian Habitat. Streams and lakes, as habitat for fish and wildlife species, are subject to jurisdiction by CDFW under Sections 1600-1616 of the CFGC. Alterations to or work within or adjacent to streambeds or lakes generally require a Lake and Streambed Alteration Agreement. The term stream, which includes creeks and rivers, is defined in the California Code of Regulations as follows: "a body of water that flows at least periodically or intermittently through a bed or channel having banks and supports fish or other aquatic life. This includes watercourses having a surface or subsurface flow that supports or has supported riparian vegetation" (14 CCR 1.72). In addition, the term stream can include ephemeral streams, dry washes, watercourses with subsurface flows, canals, aqueducts, irrigation ditches, and other means of water conveyance if they support aquatic life, riparian vegetation, or stream-dependent terrestrial wildlife (CDFG ESD 1994). Riparian is defined as, "on, or pertaining to, the banks of a stream;" therefore, riparian vegetation is defined as, "vegetation which occurs in and/or adjacent to a stream and is dependent on, and occurs because of, the stream itself". Removal of riparian vegetation also requires a Lake and Streambed Alteration Agreement from CDFW.

Other Sensitive Biological Communities. Other sensitive biological communities not discussed above include habitats that fulfill special functions or have special values. Natural communities considered sensitive are those identified in local or regional plans, policies, regulations, or by the CDFW. CDFW ranks sensitive communities as "threatened" or "very threatened" and keeps records of their occurrences in its California Natural Diversity Database (CNDDB). Sensitive plant communities are also identified by CDFW on their List of California Natural Communities Recognized by the CNDDB. Impacts to sensitive natural communities identified in local or regional plans, policies, and regulations or by the CDFW or the USFWS must be considered and evaluated under CEQA (California Code of Regulations: Title 14, Div. 6, Chap. 3, Appendix G).

Wildlife movement corridors are defined as areas that connect suitable wildlife habitat areas in a region otherwise fragmented by rugged terrain, changes in vegetation, or human disturbance. Natural features such as canyon drainages, ridgelines, or areas with vegetation cover provide corridors for wildlife travel. Wildlife movement corridors are important because they provide access to mates, food, and water; allow the dispersal of individuals away from high population density areas; and facilitate the exchange of genetic traits between populations (Beier and Loe 1992). Wildlife movement corridors are considered sensitive by resource and conservation agencies. In general, any activities in or adjacent to defined wildlife movement corridors (i.e., riparian corridor, areas that are contiguous with adjacent open space areas, etc.) that could potentially disturb, restrict movement or activity, disrupt natal areas, or facilitate increased predation of wildlife species would be considered a significant adverse impact.

2.3 Local Policies and 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 noise ordinances) for projects involving facilities that would produce, generate, store, or transmit water. However, it is the practice of EBMUD to work with local jurisdictions and neighboring communities during project planning, and to consider local environmental protection policies for guidance.

Contra Costa County Ordinance Code

Chapter 816-4 Heritage Tree Preservation District

816-4.202 All land within Contra Costa County shall be subject to the provisions of this chapter.

816-4.402 “Heritage tree” means:
(1) A tree seventy-two inches or more in circumference measured four and one-half feet above the natural grade; or
(2) Any tree or a group of trees particularly worthy of protection; and specifically designated as a heritage tree by the board of supervisors pursuant to the provisions of this chapter, because of:
(A) Having historical or ecological interest of significance, or
(B) Being dependent upon each other for health or survival, or
(C) Being considered an outstanding specimen of its species as to such factors as location, size, age, rarity, shape, or health.

816-4.602 Prohibition
Except as otherwise provided in this chapter, no person shall destroy or remove any designated heritage tree unless a permit has been obtained therefor. This chapter does not require a permit for nor prevent trimming, pruning, or maintenance of a heritage tree where such does not result in destruction nor substantially change the tree’s form or shape.

Chapter 816-6 Tree Protection and Preservation

816-6.6002 Prohibition
No person shall trench, grade or fill within the dripline of any protected tree or cut down, destroy, trim by topping or remove any protected tree on private property within the county without a tree permit, except as provided for in Section 816-4.1002.

816-6.6004 Protected trees
A protected tree is any one of the following:
(1) On all properties within the unincorporated area of the county:
(A) Where the tree to be cut down, destroyed or trimmed by topping is adjacent to or part of a riparian, foothill woodland or oak savanna area, or part of a stand of four or more trees, measures twenty inches or larger in circumference (approximately 6.5 inches in diameter) as measured four and one-half feet from ground level, and is included in the following list of indigenous trees:

Acer macrophyllum (Bigleaf Maple)	*Acer negundo* (Box Elder)
Aesculus californica (California Buckeye)	*Alnus rhombifolia* (White Alder)
Arbutus menziesii (Madrone)	*Heteromeles arbutifolia* (Toyon)
Juglans hindsii (California Black Walnut)	*Juniperus californica* (California Juniper)
Lithocarpus densiflora (Tanbark Oak)	*Pinus attenuata* (Knobcone Pine)
Pinus sabiniana (Grey Pine)	*Platanus racemosa* (California Sycamore)
Populus fremontii (Fremont Cottonwood)	*Populus trichocarpa* (Black Cottonwood)
Quercus agrifolia (Coast Live Oak)	*Quercus chrysolepis* (Canyon Live Oak)
Quercus douglasii (Blue Oak)	*Quercus kelloggii* (California Black Oak)
Quercus lobata (Valley Oak)	*Quercus wislizenii* (Interior Live Oak)
Salix lasiandra (Yellow Willow)	*Salix laevigata* (Red Willow)
Salix lasiolepis (Arroyo Willow)	*Sambucus callicarpa* (Red Elderberry)
Sequoia sempervirens (Coast Redwood)	*Umbellularia californica* (California Bay)

(B) Any tree shown to be preserved on an approved tentative map, development or site plan or required to be retained as a condition of approval;
(C) Any tree required to be planted as a replacement for any unlawfully removed tree.

(2) On any of the properties specified in subsection (3) of this section:
(A) Any tree measuring twenty inches or larger in circumference (approximately six and one-half inches diameter), measured four and one-half feet from the ground level including the oak trees listed above;
(B) Any multistemmed tree with the sum of the circumferences measuring forty inches or larger, measured four and one-half feet from ground level;
(C) And any significant grouping of trees, including groves of four or more trees.
(3) Specified properties referred to in subsection (2) of this section includes:
(A) Any developed property within any commercial, professional office or industrial district;
(B) Any undeveloped property within any district;
(C) Any area designated on the general plan for recreational purposes or open space;
(D) Any area designated in the county general plan open space element as visually significant riparian or ridge line vegetation and where the tree is adjacent to or part of a riparian, foothill woodland or oak savanna area.

City of Lafayette Code of Ordinances

Chapter 6-17 Tree Protection

6-1702 "Protected tree" means a tree on public or private property meeting one or more of the following standards:

(1) Developed property. Located on a developed property, that has a trunk diameter of twelve-inches or more, 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*)	Madrone (*Arbutus menziesii*)

(2) Approved development application. Of any size or species and designated to be protected and preserved as part of an approved development application;

(3) Riparian tree. Is a native riparian tree with a trunk diameter of six-inches or more or one component trunk of a multi-trunked tree with a diameter of four-inches or more and that is one of the following species:

Bigleaf maple (*Acer macrophyllum*)	Boxelder (*Acer negundo*)
White alder (*Alnus rhombifolia*)	Black walnut (*Juglans hindsii*)
Cottonwood (*Populus fremontii*)	Red willow (*Salix laevigata*)
Arroyo willow (*Salix lasiolepis*)	Coast live oak (*Quercus agrifolia*)
Valley oak (*Quercus lobata*)	California bay (*Umbellularia californica*)
California buckeye (*Aesculus californica*)	Blue Elderberry (*Sambucus mexicana,caerulea, or glauca*)

(4) Undeveloped property. Of any species with a diameter of six-inches or more and located on an undeveloped property;

(5) Replacement tree. Is a replacement tree planted as restitution for a violation of this chapter;

(6) Restricted ridgeline area. Is a native tree of any size or species within a restricted ridgeline area;

(7) Street tree. Is a tree of any size or species and is located within a public right-of-way or a private access easement; or

(8) Downtown tree. Is a tree of any size or species within a commercial zoning district.

6-1703 Destruction of a protected tree.

It is a violation of this chapter for any person to remove or destroy a protected tree without a category I or category II permit under sections 6-1706 or 6-1707, or without the approval of an exception under section 6-1705.

2.4 Conservation Plans

A Habitat Conservation Plan (HCP) is a long-term agreement between an applicant and the USFWS and is designed to offset any harmful effects that a proposed activity might have on federally-listed threatened and endangered species. The HCP process allows development to proceed while providing a conservation basis to conserve the species and provide for incidental take. A "No Surprises" policy provides assurances to landowners participating in HCP efforts.

The Natural Communities Conservation Plan (NCCP) Program, managed by CDFW, is designed to conserve multiple species and their habitats, while also providing for the compatible use of private land. Through local planning, the NCCP planning process protects wildlife and habitat before the landscape becomes so fragmented or degraded by development that listings are required under the federal ESA. Instead of saving small, disconnected units of habitat for just one species at a time, agencies, local jurisdictions, and other interested parties have an opportunity, through the NCCP, to work cooperatively to develop plans that consider broad landscapes, or "ecosystems," and the needs of many species. Partners enroll in the programs and, by mutual consent, habitat areas with high conservation values are set aside and may not be developed. Partners also agree to study, monitor, and develop management plans for these "reserve" areas. The NCCP provides a process for fostering economic growth by allowing approved development in enrolled areas with lower conservation values.

3.0 METHODS

On March 9, 2010 the Project site was traversed on foot to determine (1) plant communities and habitats present within the Proposed Project site, (2) if existing conditions provided suitable habitat for any special status plant or wildlife species, and (3) if sensitive habitats and/or species were present. All plant species encountered were recorded. On May 17, 2016 the Project site was visited to confirm that there were no changes in site conditions or additional biological concerns from the previous March 9, 2010 site visit.

3.1 Sensitive and Special Status Species

Literature Review

Potential occurrence of special status species in the Project site was evaluated by first determining which special status species occur in the vicinity of the Project site through a literature and database search. Due to the level of development in the area, CNDDB records searches for known occurrences of special status species focused on a two mile radius around the Project site. The following sources were reviewed to determine which special status plant and wildlife species may occur or have been documented to occur in the vicinity of the Project site:

- California Department of Fish and Game California Natural Diversity Database records (CDFW-CNDDB 2016)
- USFWS IPaC Trust Resource Report (USFWS 2016)
- CNPS Electronic Inventory records (CNPS 2012)

4.0 Results

4.1 Site Characteristics

Soils

Soils at the site are primarily Los Osos Clay Loam. The Los Osos series consists of moderately deep, well drained soils that formed in material weathered from sandstone and shale. Depth to a paralithic contact of sandstone or shale is 20 to 40 inches. Most of the soil to a depth of about 12 inches is continuously dry after May until October. The soil is moist or saturated the rest of the year.

4.2 Special Status Plant and Wildlife Species

Queries of the CNDDB indicate that 11 California special status plant and wildlife species have been recorded within 2 miles of the project area (Table 2). Eleven federally listed species potentially occur in the area (Table 3). Short descriptions of these potentially occurring special-status species follow.

Antioch Evening Dunes Primrose is a perennial plant that blooms from early spring to late summer. Naturally-occurring stands of this plant are located on the riverine dune areas within and directly adjacent to the Antioch Dunes National Wildlife Refuge. It has been introduced in a few other locations including Tilden Regional Park and other riverine dunes in Sacramento County.

Contra Costa goldfields typically grow in vernal pools, swales, moist flats and depressions within a grassland matrix (USFWS 2008), and have been found in three types of vernal pools: Northern Basalt Flow, Northern Claypan, and Northern Volcanic Ashflow (Sawyer and Keeler-Wolf 1995). The two most commonly reported associates are Italian ryegrass (*Lolium multiflorum*) and popcorn flower (*Plagiobothrys* spp.). Other plant species that occur at several Contra Costa goldfield sites include brass buttons (*Cotula coronipifolia*), valley downingia (*Downingia pulchella*), California eryngo (*Eryngium aristulatum*), smooth goldfields (*Lasthenia glaberrima*), common mousetail (*Myosurus minimus*), California semaphore grass (*Pleuropogon californicus*), alkali milk-vetch (*Astragalus tener* var. *tener*), few-flowered navarretia (*Navarretia leucocephala* ssp. *pauciflora*), and Greene's legenere (*Legenere limosa*) (USFWS 2008).

Big tarplant is endemic to the Mount Diablo foothills and is found primarily in eastern Contra Costa, eastern Alameda, and western San Joaquin Counties. Big tarplant occurs in annual grassland on clay to clay-loam soils, usually on slopes and often in burned areas, below 1,500 feet (ECCCHC 2006). In Contra Costa County, the occurrences are primarily on soils of the Altamont series. Associated plant species include wild oats (*Avena* sp.), brome grasses (*Bromus* sp.), panicled willow-herb (*Epilobium brachycarpum*), angle-stemmed wild buckwheat (*Eriogonum angulosum*), slender woolly wild buckwheat (*Eriogonum gracile*), Great Valley gumplant (*Grindelia camporum*), San Joaquin tarplant (*Holocarpha obconica*), virgate tarplant (*Holocarpha virgata*), common hareleaf (*Lagophylla ramosissima*), Italian ryegrass (*Lolium multiflorum*), and purple needlegrass (*Nassella pulchra*).

The **oval-leaved viburnum** is a deciduous shrub that occurs in chaparral, cismontane woodland and lower montane coniferous forest, though it occurs most often in chaparral or yellow-pine forest habitats. The shrub's range in California stretches from the North Coast and Klamath Ranges south to the North Coast Ranges, Sierra Nevada foothills and the San Francisco Bay Area, at elevations ranging from about 700 to 4,600 feet above mean sea level (msl).

The **Mount Diablo fairy-lantern** is endemic to the Diablo Range in Contra Costa County, ranging in elevation between 650 and 2,600 feet. This plant is a bulbiferous perennial herb that grows on grassy slopes and in openings in chaparral and oak woodland communities (ECCCHC 2006). Species associated with Mount Diablo fairy-lantern include manzanita (*Arctostaphylos* sp.) oaks (*Quercus* sp.) foothill pine (*Pinus sabiniana*), California buckeye (*Aesculus californica*), poison-oak (*Toxicodendron diversiloba*), Torrey melic (*Melica torreyana*), California fescue (*Festuca californica*), shooting-stars (*Dodecatheon* sp.), and phacelia (*Phacelia* sp.).

The **Northern California walnut**, is a large tree endemic to the northern half of the state, and grows in riparian woodlands, either in single species stands or mixed with California's oaks (*Quercus* sp.) and cottonwoods (*Populus* sp.). This tree is cultivated as an ornamental tree wherever it will grow in California.

Diablo helianthella is endemic to the San Francisco Bay Area, occurring in the Diablo Range, Berkeley Hills, and San Bruno Mountain (ECCCHC 2006). Diablo helianthella associated with thin, rocky, well-drained soils. This plant is found in grassy openings in woodlands, chaparral, and coastal scrub, often at the transition zone between woodland and chaparral. Species associated with Diablo Helianthella include chamise (*Adenostoma fasciculate*) California sage (*Artemisia californica*), wild oats (*Avena* sp.) coyote brush (*Baccharis pilularis*), brome grasses (*Bromus* sp.), toyon (*Heteromeles arbutifolia*), bush monkeyflower (*Mimulus aurantiacus*), needlegrass (*Nassella* sp.), coast live oak (*Quercus agrifolia*), blue oak (*Quercus douglasii*), sage (*Salvia* sp.), poison-oak (*Toxicodendron diversilobum*), California bay (*Umbellularia californica*), and mule-ears (*Wyethia* sp.).

The **vernal pool fairy shrimp** occupies a variety of different vernal pool habitats, from small, clear, sandstone rock pools to large, turbid, alkaline, grassland valley floor pools (USFWS 2007). Although the species has been collected from large vernal pools, including one exceeding 25 acres, it tends to occur in smaller pools. The species is most frequently found in pools measuring less than 0.05 acre. These pools are most commonly in grass or mud bottomed swales, or basalt flow depression pools in unplowed grasslands.

The **Callippe silverspot** was known historically to occur in grassland habitat in the seven counties bordering San Francisco Bay in California. Since 1988, they have been recorded at San Bruno Mountain and Sign Hill near South San Francisco (San Mateo County), in the hills near Pleasanton (Alameda County), at Sears Point (Sonoma County), and in the hills between Vallejo and Cordelia (USFWS 2009a). Hilltops and ridges play an important role in breeding behavior. Most observations of adults are made on hilltops. Adult females lay their eggs on the dry remains of the larval food plant, Johnny jump-up (*Viola pedunculata*), or on the surrounding debris. After diapause, larvae eat the foliage of their host plant.

The **Obscure bumblebee** is found in coastal prairies and meadows in the Coast Range where they often nest underground, in abandoned nests from other species, cavities of trees, or in tufts of grass. This species often found in the same areas as their food plants including *Ceanothus, Cirsium, Clarkia, Keckiella, Lathyrus, Lotus, Lupinus, Rhododendron, Rubus, Trifolium,* and *Vaccinium*.

San Bruno elfin butterfly is found mostly in coastal grasslands and scrub ecosystems within the fog-belt of the California Coast. All recorded populations are within San Mateo County on steep North-facing slopes. The distribution of the San Bruno elfin butterfly is closely linked with populations of the larval hostplant *Sedum spathulifolium*.

California tiger salamanders are restricted to vernal pools and seasonal ponds, including many constructed stock ponds, in grassland and oak savannah plant communities, predominantly from sea level to 2,000 feet, in central California. California tiger salamanders therefore require large contiguous areas of vernal pools (vernal pool complexes or comparable aquatic breeding habitat) containing multiple breeding ponds to ensure recolonization of individual ponds. (USFWS 2009b)

The **California red-legged frog** occupies a fairly distinct habitat, combining both specific aquatic and riparian components. Adults need dense, shrubby or emergent riparian vegetation closely associated with deep (greater than 2 1/3-foot deep) still or slow moving water (USFWS 2009c). The largest densities of California red-legged frogs are associated with deep-water pools with dense stands of overhanging willows and an intermixed fringe of cattails. Well-vegetated terrestrial areas within the riparian corridor may provide important sheltering habitat during winter. California red-legged frogs aestivate in small mammal burrows and moist leaf litter. California red-legged frogs are still locally abundant within portions of the San Francisco Bay area (including Marin County) and the central coast.

The **Alameda whipsnake** inhabits the inner coast range mostly in Contra Costa and Alameda counties, with additional occurrence records in San Joaquin and Santa Clara counties. They are typically found in chaparral, northern coastal sage scrub and coastal sage (USFWS 2005). Although home ranges of Alameda whipsnakes are centered on shrub communities, they venture up to 500 feet into adjacent habitats, including grassland, oak savanna, and occasionally oak-bay woodland. Core areas (areas of concentrated use) of the Alameda whipsnake most commonly occur on east, south, southeast, and southwest facing slopes. However, recent information indicates that whipsnakes do make use of north facing slopes in more open stands of scrub habitat.

The **giant garter snake** inhabits agricultural wetlands and other waterways such as irrigation and drainage canals, sloughs, ponds, small lakes, low gradient streams, and adjacent uplands in the Central Valley. Riparian woodlands typically do not provide suitable habitat because of excessive shade, lack of basking sites, and absence of prey populations. Habitat requirements consist of (1) adequate water during the snake's active season (early-spring through mid-fall) to provide food and cover; (2) emergent, herbaceous wetland vegetation, such as cattails and bulrushes, for escape cover and foraging habitat during the active season; (3) grassy banks and openings in waterside vegetation for basking; and (4) higher elevation uplands for cover and refuge from flood waters during the snake's dormant season in the winter (USFWS 2009d).

Throughout their distribution, **California clapper rails** occur within a range of salt and brackish marshes. In south and central San Francisco Bay and along the perimeter of San Pablo Bay, rails typically inhabit salt marshes dominated by pickleweed (*Salicornia virginica*) and Pacific cordgrass (*Spartina foliosa*). Pacific cordgrass dominates the middle marsh zone throughout the south and central Bay. In the north Bay (Petaluma Marsh, Napa-Sonoma marshes, Suisun Marsh), clapper rails also live in tidal brackish marshes which vary significantly in vegetation structure and composition. Use of brackish marshes by clapper rails is largely restricted to major sloughs and rivers of San Pablo Bay and Suisun Marsh, and along Coyote Creek in south San Francisco Bay. Clapper rails have rarely been recorded in nontidal marsh areas (USFWS 2010).

California least terns nest in colonies on relatively open beaches kept free of vegetation by natural scouring from tidal action (USFWS 2006). They are very gregarious and forage, roost, nest and migrate in colonies. Fall migration commences the last week of July and first week of August. Adults move south along the California coast. The wintering range is not clearly defined.

Pallid bats occur in a number of habitats, including coniferous forests, non-coniferous woodlands, brushy terrain, rocky canyons, open farm land, and desert (Pierson and Rainey 1998). In northern California, this species is associated with oak habitat, particularly lower elevation oak savannah. Pallid bats are primarily a crevice roosting species, and select daytime roosting sites where they can retreat from view. Common roost sites are rock crevices, old buildings, bridges, caves, mines, and hollow trees. They have been located in tree cavities in oak, Ponderosa pine, coast redwood and giant Sequoia.

Townsend's big-eared bats have been known to occur in a wide variety of habitats throughout the Western United States and Mexico, including chaparral, oak woodland, and conifer forest. Townsend's big-eared bats can be found in caves, or in human-made structures, especially along the Western coast. These bats desire large enclosed spaces with relatively large openings as roosting spots.

4.3 Sensitive and Special Status Biological Communities

The Project site is considered an urban habitat as defined by Mayer and Laudenslayer (1988). A distinguishing feature of urban wildlife habitat is the mixture of native and exotic species. Urban vegetation is relatively static in species composition because of maintenance. The vegetation on the Project site consists of planted and volunteer native and non-native landscape species. Understory vegetation of the Project site is dominated by non-native grasses and forbs. A list of plant species observed on site is included in Table 1.

Sensitive Biological Communities. A review of the CNDDB indicates that no sensitive natural communities occur within one mile of the Project site, and based on the site visit, no sensitive natural communities occur on the Project site.

Wetlands, Waters and Riparian Habitats. No waters or riparian habitats occur on the Project site.

Other Sensitive Biological Communities.

Wildlife corridors link together areas of suitable wildlife habitat that are otherwise separated by rugged terrain, changes in vegetation, or human disturbance. Wildlife movement activities usually fall into one of three movement categories: (1) dispersal (e.g., juvenile animals from natal areas, or individuals extending range distributions); (2) seasonal migration; and (3) movements related to home range activities (foraging for food or water, defending territories, searching for mates, breeding areas, or cover).

The Project site does not function as an important regional wildlife corridor or nursery site because the site and adjacent areas have been developed, paved, or landscaped. The site is surrounded by residential development on all sides.

4.4 Local Policies and Ordinances

Several large oaks trees (*Quercus sp.)* occur on the perimeter of the Project site that would typically be covered by local 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 for projects involving facilities that would produce, generate, store, or transmit water. However, it is the practice of EBMUD to work with local jurisdictions and neighboring communities during project planning, and to consider local environmental protection policies for guidance.

4.5 Conservation Plans

There are no approved HCPs or NCCPs in the Project Area. Therefore, no further discussion of this topic is provided.

5.0 Species Avoidance Measures

The following section presents standard measures that EBMUD employs to avoid or reduce impacts to sensitive habitats and species. For the purposes of this biological assessment, the Project is considered to have a significant impact if it would:

- Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service
- Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service
- Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means
- Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites
- Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance
- Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan

5.1 Sensitive and Special Status Species

5.1.1 Sensitive and Special Status Plant Species

The Project site does not contain any habitat suitable to support the sensitive and special status plant species identified in Tables 2 and 3. The Project site is landscaped and regularly maintained. The habitats present within the Project site are characteristic of disturbed and urban habitats and are dominated by planted landscape and other non-native species. No impacts to sensitive and special status plant species are anticipated.

5.1.2 Sensitive and Special Status Wildlife Species

The Project site does not contain any habitat suitable to support the sensitive species identified in Tables 2 and 3. The Project site is landscaped and regularly maintained. The habitats present within the construction area are characteristic of disturbed and urban habitats and include mostly planted landscape and other non-native species with scattered native trees. No impacts to the special status wildlife species listed in Tables 2 and 3 are anticipated.

Nesting Special Status Bird Species. Avian species that are protected under the Migratory Bird Treaty Act or the California Fish and Game Code have potential to nest within the Project area. These species may use trees, shrubs, man-made structures or the ground for nesting habitat. Disruption of nesting special status avian species could occur as a result of increased human activity (e.g., due to the use of heavy equipment and human traffic) during the breeding season (approximately February through August). Construction activities could disturb nesting avian species and lead to nest abandonment or poor reproductive success.

Implementation of EBMUD's standard biological measures will avoid impacts to nesting avian species.

Nesting Special Status Bird Species. Several raptors, including the American kestrel (*Falco sparverius*), barn owl (*Tyto alba*), Cooper's hawk (*Accipiter cooperii*), great horned owl (*Bubo virginianus*), northern saw-whet owl (*Aegolius acadicus*), red-tailed hawk (*Buteo jamaicensis*), western screech owl (*Megascops kennicottii*), sharp-shinned hawk (*Accipiter striatus*), and long-eared owl (*Asio otus*) may nest on or near the Project site. Disruption of nesting special status avian species could occur as a result of increased human activity (e.g., due to the use of heavy equipment and human traffic) during the breeding season (approximately February through August). Construction activities could disturb nesting avian species and lead to nest abandonment or poor reproductive success. Implementation of the following standard measures will avoid potential impacts to nesting avian species.

- If site clearing, demolition, and construction do not commence between September 1 and January 31, then preconstruction surveys, for nesting birds should be conducted by a qualified biologist to ensure that no nest will be disturbed during project implementation. This survey shall be conducted no more than 7 days prior to the initiation of demolition/construction activities during the breeding season. During this survey, the biologist will inspect all trees and other habitats in and immediately adjacent to the impact areas for nests. If an active nest is found sufficiently close to work areas to be disturbed by these activities, the biologist, in consultation with CDFG, will determine the extent of a construction-free buffer zone to be established around the nest to ensure that no nests of species protected by the Migratory Bird Treaty Act or State code will be disturbed during project implementation.

Special Status Bat Species. Roosting habitats for special status bat species may be present at the Project site. These species typically use buildings, trees, bridges, and rock crevices for roost habitat. Construction activities may result in the removal or disturbance of hibernation or maternal roost sites due to tree removal, ground disturbance, noise or human intrusion. This is a potentially significant impact as it may result in direct mortality and reduction in reproductive success. Implementation of the following standard measures will avoid potential impacts to bat species.

- Construction activities near potential bat roost habitat or removal of potential bat roost habitat should commence between August and March in order to avoid the bat maternity period. If this is not feasible, preconstruction bat roost surveys should be done. Preconstruction surveys for potential bat roost habitat shall be performed in all trees subject to removal or demolition for evidence of bat use (guano accumulation, visual detections). If necessary, exclusion of bats from occupied roosts shall be performed in the fall prior to construction. A qualified wildlife biologist shall be present during exclusion.

Table 1: Vegetation Observed At Leland Reservoir - March 9, 2010

COMMON NAME	SCIENTIFIC NAME	ORIGIN
Trees		
Eucalyptus	*Eucalyptus* sp.	Non-native
Ponderosa pine	*Pinus ponderosa*	Non-Native*
Coast live oak	*Quercus agrifolia*	Native
Valley oak	*Quercus lobata*	Native
Monterey pine	*Pinus radiata*	Non-native*
Shrubs		
Cotoneaster	*Cotoneaster* sp	Non-native
Pyracantha	*Pyracantha* sp.	Non-native
Privet	*Ligustrum* sp.	Non-native
Holly leaf cherry	*Prunus ilicifolia*	Native
Poison oak	*Toxicodendron diversilobum*	Native
Grasses and Forbs		
Burclover	*Medicago polymorpha*	Non-native
Vetch	*Vicia sativa*	Non-native
Sowthistle	*Sonchus asper*	Non-native
Groundsel	*Senecio* sp.	Non-native
Hedge parsley	*Torilis arvensis*	Non-native
Ripgut	*Bromus diandrus*	Non-native
Foxtail	*Vulpia myuros*	Non-native
Wild oats	*Avena fatua*	Non-native
Miniature lupine	*Lupinus bicolor*	Native
English ivy	*Hedera helix*	Non-native
Bristly ox-tongue thistle	*Picris echioides*	Non-native
Mustard	*Brassica rapa*	Non-native
Black mustard	*Brassica nigra*	Non-native
Western bitter cress	*Cardamine californica*	Native
Miner's lettuce	*Claytonia perfoliata*	Native
Annual ryegrass	*Lolium multiflorum*	Non-native

*Non-native in the East Bay

Table 2. Sensitive Species Known to Occur in the Project Vicinity, California Natural Diversity Database (May 2016).

COMMON NAME	SCIENTIFIC NAME	OBSERVATION DATE	STATE/CNPS STATUS
Plants			
Contra Costa goldfields	*Lasthenia conjugens*	1884	Endangered/1B.1
Big tarplant	*Blepharizonia plumosa*	1937	None/1B.1
Oval-leaved viburnum	*Viburnum ellipticum*	2002	None/2.3
Mt. Diablo fairy-lantern	*Calochortus pulchellus*	1970	None/1B.2
Northern California black walnut	*Juglans hindsii*	2001	None/1B.1
Diablo helianthella	*Helianthella castanea*	1990	None/1B.2
Invertebrates			
Obscure bumble bee	*Bombus caliginosus*	1956	None
Amphibians			
California tiger salamander	*Ambystoma californiense*	1954, 1938	Threatened
Reptiles			
Alameda whipsnake	*Masticophis lateralis euryxanthus*	1976	Threatened
Mammals			
Pallid bat	*Antrozous pallidus*	1907, 1931	None
Townsend's big-eared bat	*Corynorhinus townsendii*	1938	Candidate

Table 3. Federal Endangered and Threatened Species that may Occur in or may be Affected in the Project Area, USFWS IPaC Report (May 2016).

COMMON NAME	SCIENTIFIC NAME	FEDERAL STATUS	HABITAT
Plants			
Antioch Dunes Evening-primrose	*Oenothera deltoids ssp. howellii*	Endangered	Riverine dune habitats in and around Antioch Dunes NWR
Contra Costa Goldfields	*Lasthenia conjugens*	Endangered	Vernal pools, swales, and moist areas in grasslands
Invertebrates			
Vernal pool fairy shrimp	*Branchinecta lynchi*	Threatened	Vernal pools
Callippe silverspot butterfly	*Speyeria callipe callippe*	Endangered	Grasslands with *Viola pedunculata* host plant
San Bruno Elfin Butterfly	*Callophrys mossii bayensis*	Endangered	Coastal grasslands with *Sedum spathulifolium* hostplant
Amphibians			
California tiger salamander	*Ambystoma californiense*	Threatened	Vernal pools and seasonal ponds
California red-legged frog	*Rana aurora draytonii*	Threatened	Shrubby or emergent riparian vegetation closely associated with deep still or slow moving water
Reptiles			
Alameda whipsnake	*Masticophis lateralis*	Threatened	Chaparral, northern coastal sage scrub, and coastal sage
Giant garter snake	*Thamnophis gigas*	Threatened	Wetlands and other waterways such as irrigation and drainage canals, sloughs, ponds, small lakes, low gradient streams, and adjacent uplands
Birds			
California clapper rail	*Rallus longirostris obsoletus*	Endangered	Marshes of San Francisco estuary
California least tern	*Sternula antillarum*	Endangered	Open beaches free of vegetation

- Database last updated: December 1, 2009, Report Date May 19, 2016. Fish species not included.

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Appendix G: Tree Inventory for Leland Reservoir Site

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Information Obtained from Tree Decisions Inventory										Information Provided by EBMUD						All Trees to be Removed (Identified on 12/2/16 and 11/9/17 site visits with EBMUD Gardener Foreman - S. Gustafson)	
TreeDec Tag No.	TreeDec Sheet (I - VIII)	TreeDec Species	TreeDec DBH (inches)	If multi-trunked trees were a single trunk DBH (inches)	TreeDec Crown Spread (feet)	TreeDec Condition Rating (1-7 best to worst)	Oak?	Oak ≥12" Diameter	TreeDec Comments/ Recommendations	EBMUD CAD No.	EBMUD Coordinate A	EBMUD Coordinate B	EBMUD Elevation (feet)	EBMUD Tree Species	EBMUD Description	Prior to Leland Reservoir Replacement (Maintenance/Safety Related)	Part of Leland Reservoir Replacement (Project related)
1	IV	Coast live oak *(Quercus agrifolia)*	12.5, 11, 8.5, 16.5	32.33	56	1	✓	✓		1583	2152151.49	6103636.212	327.93	Oak	12"D 24'SPREAD		1
2	IV	Coast live oak *(Quercus agrifolia)*	12		30	2	✓	✓		1581	2152126.988	6103600.408	334.58	Oak	10"D 20'SPREAD		1
3	IV	Coast live oak *(Quercus agrifolia)*	23.5		40	2	✓	✓		1562	2152103.359	6103630.853	328.59	Oak	20"D35'SPREAD		1
4	IV	Valley oak *(Quercus lobata)*	10		25	3	✓			1561	2152092.475	6103609.23	331.84	Oak	8"D 16'SPREAD		1
5	IV	Canary Island pine *(Pinus canariensis)*	18.5		28	2				1560	2152081.721	6103590.519	335.14	Pine	16"D 24"SPREAD		1
6	IV	Valley oak *(Quercus lobata)*	12, 13.5	17.00	30	3	✓	✓		1559	2152064.011	6103572.886	336.2	Oak	16"D 26'SPREAD		1
7	IV	Almond *(Prunus dulcis)*	5, 5.5	7.5	20	3				1584	2152097.691	6103564.135	338.63	Fruit	7"D 12'SPREAD		1
8	IV	Canary Island pine *(Pinus canariensis)*	12		20	3				1616	2152095.815	6103548.142	342.83	Pine	10"D 15'SPREAD		1
9	IV	Canary Island pine *(Pinus canariensis)*	9		12	3				1617	2152106.512	6103547.969	344.02	Pine	8"D 12'SPREAD		1
10	IV	Canary Island pine *(Pinus canariensis)*	9.5		16	4				1618	2152124.476	6103554.074	344.19	Pine	8"D 12'SPREAAD		1
11	IV	Canary Island pine *(Pinus canariensis)*	26		40	2			Co-dominant stems at 16 feet above ground, each stem 14 inches diameter--consider cabling.	1619	2152142.827	6103556.079	344.89	Pine	30"D 40'SPREAD		1
12	IV	Canary Island pine *(Pinus canariensis)*	12		18	3				1620	2152165.01	6103549.2	345.65	Pine	10"D 15'SPREAD		1
13	IV	Valley oak *(Quercus lobata)*	10, 9, 10.5, 7.5	24.67	40	2	✓	✓		1621	2152184.401	6103561.694	345.15	Oak	20"D 30'SPREAD		1
14	IV	Blue gum eucalyptus *(Eucalyptus globulus)*	21.5		35	4				1657	2152228.929	6103581.671	344.45	Euc	22"D 30'SPREAD		1
15	IV	Blue gum eucalyptus *(Eucalyptus globulus)*	38		55	3				1667	2152282.437	6103547.314	347.05	Euc	36"D 48'SPREAD		1
16	IV	Blue gum eucalyptus *(Eucalyptus globulus)*	74.5		80	3			Consider removing larger dead branches	1656	2152246.425	6103549.096	347.52	Euc	34"D 80'SPREAD		1

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17	IV	Blue gum eucalyptus *(Eucalyptus globulus)*	36.5		25	3			Consider removing larger dead branches	1654	2152228.63	6103521.424	348.33	Euc	40"D 50'SPREAD		1
18	IV	Blue gum eucalyptus *(Eucalyptus globulus)*	32.5		50	3			Consider removing larger dead branches	1653	2152214.6	6103518.83	348.47	Euc	30"D 40'SPREAD		1
19	IV	Blue gum eucalyptus *(Eucalyptus globulus)*	35		60	3			Consider removing larger dead branches	1655	2152222.056	6103532.823	347.55	Euc	32"D 40'SPREAD		1
20	IV	Valley oak *(Quercus lobata)*	6.5		20	2	✓			1651	2152178.281	6103502.603	349.2	Oak	6"D 10'SPREAD		1
21	IV	Valley oak *(Quercus lobata)*	7		18	2	✓			1650	2152182.295	6103483.484	352	Oak	6"D 10'SPREAD		1
22	IV	Valley oak *(Quercus lobata)*	10.5, 11.5	14.67	30	2	✓	✓		1649	2152184.696	6103468.136	357.7	Oak	14"D 20'SPREAD		1
23	IV	Coast live oak *(Quercus agrifolia)*	12.5		30	2	✓	✓		1648	2152165.954	6103464.081	358.23	Oak	10"D 15'SPREAD		1
24	IV	Canary Island pine *(Pinus canariensis)*	24		40	2				1644	2152159.686	6103507.682	348.8	Pine	24"D 30'SPREAD		1
25	IV	Canary Island pine *(Pinus canariensis)*	20, 20	28	45	2			Co-dominant stems at 16 feet above ground, each stem 20 inches in diameter--consider cabling.	1645	2152144.491	6103493.444	350.21	Pine	30"D 36'SPREAD		1
26	IV	Valley oak *(Quercus lobata)*	8.5		15	2	✓			1647	2152143.173	6103476.317	351.63	Oak	8"D 12'SPREAD		1
27	IV	Canary Island pine *(Pinus canariensis)*	22.5		40	3				1614	2152100.547	6103485.519	350.64	Pine	20"D 25'SPREAD		1
28	IV	Canary Island pine *(Pinus canariensis)*	22.5		30	3								NEW			
29	IV	Canary Island pine *(Pinus canariensis)*	20		35	2				1615	2152100.105	6103502.403	347.96	Pine	18"D 25'SPREAD		1
30	IV	Canary Island pine *(Pinus canariensis)*	16.5		35	5				1613	2152088.293	6103478.389	351.37	Pine	16"D 20'SPREAD		1
31	IV	Canary Island pine *(Pinus canariensis)*	12		15	2								NEW			
32	IV	Canary Island pine *(Pinus canariensis)*	22.5		40	3								NEW			
33	IV	Canary Island pine *(Pinus canariensis)*	11.5		18	4								NEW			
34	IV	Valley oak *(Quercus lobata)*	15		30	2	✓	✓		1603	2152069.43	6103517.231	345.53	Oak	12"D 20'SPREAD		1

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35	IV	Valley oak *(Quercus lobata)*	4		10	2	✓			1604	2152071.19	6103506.087	346.85	Oak	3"D 6'SPREAD		1
36	IV	Canary Island pine *(Pinus canariensis)*	18.5		50	3				1605	2152073.523	6103495.042	348.53	Pine	18"D 24'SPREAD		1
37	IV	Canary Island pine *(Pinus canariensis)*	24		40	2				1612	2152073.74	6103467.571	352.74	Pine	24"D 30'SPREAD		1
38	IV	Coast live oak *(Quercus agrifolia)*	9, 6	11	20	3	✓		Crown overwhelmed by adjacent Canary Island Pine #37; consider pruning back pine branches	1611	2152072.886	6103452.349	356.66	Oak	7"D 14'SPREAD		1
39	IV	Coast live oak *(Quercus agrifolia)*	7, 4	8	25	2	✓			1607	2152065.668	6103478.079	351.04	Oak	8"D 16'SPREAD		1
40	IV	Canary Island pine *(Pinus canariensis)*	20		50	2				1606	2152059.117	6103478.652	350.92	Pine	20"D 24'SPREAD		1
41	IV	Valley oak *(Quercus lobata)*	8		25	3	✓			1610	2152058.308	6103454.602	354.52	Oak	8"D 16'SPREAD		1
42	IV	Canary Island pine *(Pinus canariensis)*	20.5		40	3				1609	2152037.69	6103452.435	355.64	Pine	20"D 24'SPREAD		1
43	IV	Coast live oak *(Quercus agrifolia)*	16.5		40	2	✓	✓		1608	2152037.777	6103473.362	352.37	Oak	14"D 20'SPREAD		1
44	IV	Valley oak *(Quercus lobata)*	6		12	5	✓		Considerable crown dieback is probably from drought Tree to be removed by EBMUD prior to Leland Reservoir Replacement project	1558	2152043.58	6103531.544	343.23	Oak	6"D 10'SPREAD	1	
45	IV	Coast live oak *(Quercus agrifolia)*	10.5		45	2	✓			1557	2152038.168	6103528.619	342.84	Oak	10"D 15'SPREAD		1
46	IV	Coast live oak *(Quercus agrifolia)*	7.5, 6	9.5	25	2	✓		Suppressed by downslope eucalyptus tree	1556	2152027.292	6103512.974	345.28	Oak	8"D 12'SPREAD		1
47	IV	Coast live oak *(Quercus agrifolia)*	4, 4	5.5	20	3	✓		Moderate goat browse damage on one trunk; overwhelmed by adjacent eucalyptus	N/A					NEW		
48	IV	Coast live oak *(Quercus agrifolia)*	4, 3.5	5.5	20	3	✓		Considerable browse damage; both overwhelmed by adjacent eucalyptus	N/A					NEW		
49	IV	Coast live oak *(Quercus agrifolia)*	10.5		30	2	✓			1555	2151996.205	6103469.711	349.24	Oak	10"D 15'SPREAD		1
50	IV	Coast live oak *(Quercus agrifolia)*	7, 5	8.5	30	2	✓		Minor goat browse damage	1554	2151986.368	6103449.944	354.2	Oak	8"D 12'SPREAD		1
51	IV	Coast live oak *(Quercus agrifolia)*	11.5, 10.5	14.67	35	1	✓	✓		1553	2151977.008	6103438.537	355.55	Oak	10'D 15'SPREAD		1

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52	IV	Coast live oak *(Quercus agrifolia)*	10, 7.5	11.67	25	2	✓		Overwhelmed by adjacent eucalyptus	3136	2151947.93	6103396.132	356.33	Oak	8"D 16'SPREAD		1
53	IV	Coast live oak *(Quercus agrifolia)*	16, 10.5	19	40	1	✓	✓		3135	2151927.169	6103372.641	356.76	Oak	14"D 28'SPREAD		
54	IV	Firethorn *(Pyracantha sp.)*	4, 4, 4	7	15	4			Goat browse damage	3134	2151919.015	6103358.386	357.29	Deciduous	3@4"decid		
55	IV	Coast live oak *(Quercus agrifolia)*	7, 6	9	35	2	✓			3132	2151889.305	6103360.616	343.9	Oak	2@5"oak		
56	IV	Blue gum eucalyptus *(Eucalyptus globulus)*	26.5		40	4				1464	2151904.019	6103406.616	341.32	Euc	28"D 50'SPREAD		1
57	IV	Blue gum eucalyptus *(Eucalyptus globulus)*	44		75	3			Was once severely pruned and has vigorously resprouted	1489	2151935.724	6103424.647	343.82	Euc	50"D 60'SPREAD		1
58	IV	Blue gum eucalyptus *(Eucalyptus globulus)*	13		30	4			Sparse, asymmetric crown is suppressed by large adjacent eucalyptus	1488	2151946.229	6103429.092	345.35	Euc	12"D 20'SPREAD		1
59	IV	Blue gum eucalyptus *(Eucalyptus globulus)*	36		45	3				1465	2151945.276	6103457.273	339.68	Euc	40"D 50'SPREAD		1
60	IV	Blue gum eucalyptus *(Eucalyptus globulus)*	48		45	3				1462	2151906.436	6103443.978	330.61	Euc	50"D 65'SPREAD		1
61	IV	Gray pine (Pinus sabiniana)	10.5		20	2				1459	2151923.119	6103470.237	328.26	Pine	9"D 20'SPREAD		1
62	IV	Blue gum eucalyptus *(Eucalyptus globulus)*	39		35	4				1460	2151900.339	6103463.882	322.9	Euc	40"D 50'SPREAD		1
63	IV	Blue gum eucalyptus *(Eucalyptus globulus)*	24		35	3				1461	2151896.069	6103463.05	322.21	Euc	24"D 30'SPREAD		1
64	IV	Buckthorn *(Rhamnus sp.)*	4.5		10	6			Severe goat browse damage Tree is dead and will be removed by EBMUD prior to Leland Reservoir Replacement project	1428	2151922.666	6103529.216	322.13	Deciduous	5"D 8'SPREAD	1	
65	IV	Coast live oak *(Quercus agrifolia)*	7.5		18	2	✓			1429	2151909.621	6103532.17	319.7	Deciduous	5"D 8'SPREAD		1
66	IV	Eucalyptus *(Eucalyptus sp.)*	36, 42	51	75	3			Double trunk; 1491 and 1492 are one tree	1491	2151965.961	6103517.128	330.31	Euc	28"D 40'SPREAD		1
66	IV								1491 and 1492 are one tree	1492	2151970.138	6103517.693	331.14	Euc	36"D 45'SPREAD		

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67	IV	Eucalyptus *(Eucalyptus sp.)*	45		75	4				1493	2152001.38	6103514.531	337.04	Euc	44"D 60'SPREAD		1
68	IV	Eucalyptus *(Eucalyptus sp.)*	21		30	4				1490	2151978.832	6103487.536	337.83	Euc	17"D 25'SPREAD		1
69	IV	Valley oak *(Quercus lobata)*	44		65	1	✓	✓	Excellent vigor and appearance; advanced decay in open trunk cavity; tree is likely to survive upright for at least a decade, but longevity is significantly reduced because decay has compromised structural integrity of the trunk.	1504	2151950.503	6103597.009	319.17	Oak	40"D 60'SPREAD		1
70	IV	Valley oak *(Quercus lobata)*	7.5		24	1	✓			1505	2151959.662	6103593.202	320.14	Oak	6"D 10'SPREAD		1
71	IV	Valley oak *(Quercus lobata)*	16.5		35	2	✓	✓		1573	2152021.185	6103604.158	325.03	Oak	13"D 20'SPREAD		1
72	VI	Blue gum eucalyptus *(Eucalyptus globulus)*	36.5		60	4			Consider removing larger dead branches	1669	2152313.469	6103582.419	344.64	Euc	36"D 48'SPREAD		1
73	VI	Blue gum eucalyptus *(Eucalyptus globulus)*	41.5		70	3			Consider removing larger dead branches	1668	2152312.779	6103560.815	346.44	Euc	44"D 60'SPREAD		1
74	VI	Blue gum eucalyptus *(Eucalyptus globulus)*	53		80	3			Evidence of brittleness with three major branch failures; consider making proper cleanup pruning cuts and removing major deadwood.	1670	2152325.305	6103533.531	347.6	Euc	54"D 80'SPREAD		1
75	VI	Blue gum eucalyptus *(Eucalyptus globulus)*	11.5		30	5			Consider removal; very asymmetric; end-weighted; poor height to diameter ratio	1671	2152332.418	6103519.329	348.71	Euc	8"D 12'SPREAD		1
76	VI	Blue gum eucalyptus *(Eucalyptus globulus)*	17		35	3			Overwhelming adjacent oak; consider removal	1672	2152343.853	6103521.884	348.56	Euc	16"D 20'SPREAD		1
77	VI	Coast live oak *(Quercus agrifolia)*	16		45	2	✓	✓	Overwhelmed by adjacent eucalyptus	1673	2152347.733	6103523.694	348.4	Oak	12"D 18'SPREAD		1
78	VI	Valley oak *(Quercus lobata)*	14		40	1	✓	✓	Remove small hanging eucalyptus branch	1740	2152376.109	6103507.734	353.69	Oak	12"D 30'SPREAD		1
79	VI	Valley oak *(Quercus lobata)*	6		25	2	✓			1739	2152365.919	6103535.029	348.38	Oak	4"D 10'SPREAD		1
80	VI	Valley oak *(Quercus lobata)*	4		15	3	✓			1738	2152371.126	6103548.923	348.42	Oak	4"D 10'SPREAD		1
81	VI	Valley oak *(Quercus lobata)*	11, 15, 9.5	23.67	50	1	✓	✓		1737	2152357.635	6103566.725	347.34	Oak	16"D 40'SPREAD		1

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82	VI	Canary Island pine *(Pinus canariensis)*	22		45	2				1701	2152397.274	6103564.568	357.9	Pine	22"D 40'SPREAD		
83	VI	Coast live oak *(Quercus agrifolia)*	7.5		25	3	✓		Browse damage	1703	2152404.164	6103585.435	362.02	Oak	6"D 10'SPREAD		
84	VI	Coast live oak *(Quercus agrifolia)*	7		25	5	✓		Trunk compromised by severe browse damage \	1702	2152408.43	6103574.975	358.7	Oak	6"D 12'SPREAD		
85	VI	Canary Island pine *(Pinus canariensis)*	3.5		5	5			Severe goat browse damage; will likely continue to decline and become a standing dead tree Tree to be removed by EBMUD prior to Leland Reservoir Replacement						NEW	1	
86	VI	Valley oak *(Quercus lobata)*	12		35	2	✓	✓		1705	2152406.096	6103544.167	357.85	Oak	8"D 20'SPREAD		
87	VI	Valley oak *(Quercus lobata)*	6		12	3	✓			1706	2152406.041	6103547.688	356.27	Oak	6"D 5'SPREAD		
88	VI	Coast live oak *(Quercus agrifolia)*	14.5		40	1	✓	✓		1708	2152409.758	6103510.773	355.97	Oak	10"D 30'SPREAD		
89	VI	Coast live oak *(Quercus agrifolia)*	7		20	3	✓		Tree will likely overcome goat browse damage	1704	2152415.931	6103550.145	358.93	Oak	6"D 10'SPREAD		
90	VI	Canary Island pine *(Pinus canariensis)*	15		25	2				1698	2152424.241	6103548.319	360.96	Pine	16"D 20'SPREAD		
91	VI	Valley oak *(Quercus lobata)*	8.5		20	2	✓		Consider pruning to remove lowest dead branches	1707	2152432.752	6103507.956	359.17	Oak	8"D 15'SPREAD		
92	VI	Canary Island pine *(Pinus canariensis)*	17.5		25	2			The "Very Good" condition rating is for vitality; the co-dominant top stems could be cabled to prevent failure	1699	2152426.061	6103566.559	364.33	Pine	20"D 30'SPREAD		
93	VI	Canary Island pine *(Pinus canariensis)*	19		40	2				1700	2152415.624	6103582.782	364.94	Pine	18"D 40'SPREAD		
94	VI	Canary Island pine *(Pinus canariensis)*	18		40	3				1693	2152445.291	6103530.359	363.12	Pine	18"D 40'SPREAD		
95	VI	Valley oak *(Quercus lobata)*	7		15	2	✓			1694	2152448.2	6103524.243	362.97	Oak	6"D 6'SPREAD		
96	VI	Coast live oak *(Quercus agrifolia)*	6, 7.5	9.5	35	2	✓			1695	2152448.327	6103533.613	363.68	Oak	6"D 20'SPREAD		
97	VI	Canary Island pine *(Pinus canariensis)*	20.5		40	1				1696	2152450.346	6103553.691	368.75	Pine	20"D 30'SPREAD		
98	VI	Canary Island pine *(Pinus canariensis)*	19.5		45	2			Dead lower branch; bark flaking; consider removal of the lower 5" diameter branch	1763	2152449.48	6103605.109	375.38	Pine	18"D 50'SPREAD		

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99	VI	Canary Island pine *(Pinus canariensis)*	18		25	2				1697	2152469.567	6103568.065	374.45	Pine	18"D 30'SPREAD		
100	VI	Gray pine (Pinus sabiniana)	4.5		15	4									NEW		
101	VI	Canary Island pine *(Pinus canariensis)*	20.5		45	2				1691	2152481.223	6103542.584	374.82	Pine	22"D 40'SPREAD		
102	VI	Valley oak *(Quercus lobata)*	9		30	2	✓			1690	2152493.279	6103543.061	376.53	Oak	6"D 10'SPREAD		
103	VI	Canary Island pine *(Pinus canariensis)*	20.5		45	2				1692	2152467.802	6103525.406	368.89	Pine	20"D 40'SPREAD		
104	VI	Valley oak *(Quercus lobata)*	3.5		10	3	✓		An overwhelmed understory tree						NEW		
105	VI	Valley oak *(Quercus lobata)*	12, 7.5, 10.5	17.5	50	2	✓	✓		1709	2152471.769	6103476.333	361.62	Oak	12"D 30'SPREAD		
106	VI	Valley oak *(Quercus lobata)*	12.5		25	1	✓	✓	Minor goat browse damage	1710	2152524.331	6103457.005	363.8	Oak	10"D 20'SPREAD		
107	VI	Coast live oak *(Quercus agrifolia)*	10		25	3	✓		Overwhelmed by adjacent pine	1688	2152522.863	6103463.139	377.89	Oak	8"D 15'SPREAD		
108	VI	Canary Island pine *(Pinus canariensis)*	18		40	3				1687	2152525.857	6103464.336	379.19	Pine	18"D 30'SPREAD		
109	VI	Coast live oak *(Quercus agrifolia)*	11.5		30	2	✓		Goat browse damage on lower branches; consider removal of the lower 8 feet of branches	1689	2152537.208	6103496.83	383.53	Oak	6"D 15'SPREAD		
110	VI	Canary Island pine *(Pinus canariensis)*	13, 22.5		40	3			1685 and 1686 are one tree	1686	2152550.264	6103451.062	382.21	Pine	16"D 50'SPREAD		
110	VI								1685 and 1686 are one tree	1685	2152552.038	6103450.845	382.7	Pine	26"D 50'SPREAD		
111	VI	Canary Island pine *(Pinus canariensis)*	23		40	1				1684	2152538.045	6103435.86	377.42	Pine	20"D 40'SPREAD		
112	VI	Carolina cherry laurel *(Prunus caroliniana)*	5.5		20	5			Significant browse damage Tree to be pruned by EBMUD prior to Leland Reservoir Replacement	1683	2152555.128	6103413.44	374.18	Deciduous	6"D 20'SPREAD		
113	VI	Coast live oak *(Quercus agrifolia)*	20		30	1	✓	✓		1784	2152679.863	6103529.588	416.58	Oak	18"D 30'SPREAD		
114	VI	Gray pine *(Pinus sabiniana)*	25		40	3			Consider 25-degree lean toward reservoir; consider removal of dead lower branches up to 25 feet Tree to be removed by EBMUD prior to Leland Reservoir Replacement	1681	2152569.763	6103367.533	364.79	Pine	26"D 40'SPREAD	1	

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115	II	Gray pine *(Pinus sabiniana)*	31		45	3			Consider removing lower deadwood; tree has 20-degree lean toward reservoir. Consider branch pruning to eliminate "fire ladders"; consider removing many of the small dead trees within 200 feet of the North end of the reservoir	1680	2152585.988	6103357.643	364.13	Pine	30"D 50'SPREAD		
116	VI	Carolina cherry laurel *(Prunus caroliniana)*	7		10	3				1786	2152589.722	6103377.431	368.99	Deciduous	8"D 12'SPREAD		
117	V	Blue gum eucalyptus *(Eucalyptus globulus)*	55		60	2			General understory cleanup recommended to prevent fire ladders	1764	2152544.061	6103643.106	388.37	Euc	60"D 60'SPREAD		
118	VI	Carolina cherry laurel *(Prunus caroliniana)*	5		25	3			Good condition except for goat browse damage	1787	2152610.998	6103383.138	374.32	Deciduous	6"D 10'SPREAD		
119	VI	Coast live oak *(Quercus agrifolia)*	8		20	2	✓			1788	2152609.661	6103370.044	370.11	Oak	5"D 10'SPREAD		
120	VI	Gray pine *(Pinus sabiniana)*	12		20	4			Prune deadwood in understory for fire ladder clearance	1789	2152622.635	6103389.79	377.39	Pine	10"D 15'SPREAD		
121	V	Blue gum eucalyptus *(Eucalyptus globulus)*	15		40	5			General understory cleanup recommended to prevent fire ladders	1765	2152556.646	6103648.071	385.67	Euc	14"D 30'SPREAD		
122	V	Blue gum eucalyptus *(Eucalyptus globulus)*	38		60	4			General understory cleanup recommended to prevent fire ladders	1766	2152562.379	6103640.639	386.96	Euc	36"D 50'SPREAD		
123	V	Blue gum eucalyptus *(Eucalyptus globulus)*	21		40	3			General understory cleanup recommended to prevent fire ladders	1767	2152565.576	6103630.39	388.16	Euc	20"D 30'SPREAD		
124	V	Gray pine (Pinus sabiniana)	14		30	3			Consider removing lower branches up to 7 feet	1780	2152569.501	6103663.692	375.74	Pine	16"D 30'SPEAD		
125	V	Coast live oak *(Quercus agrifolia)*	6.5		20	4	✓			1778	2152580.695	6103664.003	375.74	Oak	6"D 20'SPREAD		
126	V	Coast live oak *(Quercus agrifolia)*	13		40	2	✓	✓	Consider removing lower branches up to 7 feet	1779	2152587.724	6103667.799	374.74	Oak	12"D 25'SPREAD		
127	V	Gray pine (Pinus sabiniana)	16		35	3			Consider removing lower branches up to 10 feet	1775	2152614.726	6103666.03	375.15	Pine	16"D 25'SPREAD		
128	V	Coast live oak *(Quercus agrifolia)*	14		35	3	✓	✓	Good condition despite branch tearout years ago						NEW		
129	V	Dead	5		20	7			DEAD					Dead Tree	NEW		
130	V	Coast live oak *(Quercus agrifolia)*	7		12	3	✓		Overwhelmed by other trees	1777	2152629.574	6103669.874	373.77	Oak	6"D 15'SPREAD		

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131	V	Coast live oak *(Quercus agrifolia)*	19		50	1	✓	✓	Consider removing lower branches up to 12 feet	1776	2152626.656	6103669.275	374.13	Oak	14"D 20'SPREAD		
132	V	Coast live oak *(Quercus agrifolia)*	13		30	3	✓	✓	Consider removing lower branches up to 8 feet						NEW		
133	V	Cherry plum *(Prunus cerasifera)*	8		15	5			Consider pruning to remove fire ladder						NEW		
134	II	Carolina cherry laurel *(Prunus caroliniana)*	6, 6	8.5	25	3				1800	2152603.479	6103294.398	347.17	Deciduous	6"D		
135	II	Carolina cherry laurel *(Prunus caroliniana)*	5.5		20	3			Consider pruning to remove fire ladder	1801	2152601.624	6103284.447	344.64	Deciduous	6"D		
136	II	Carolina cherry laurel *(Prunus caroliniana)*	6, 5	8	20	4			Second trunk (five inch) is dead and dry--consider removal	1802	2152611.143	6103289.72	346.3	Deciduous	6"D		
137	II	Carolina cherry laurel *(Prunus caroliniana)*	7, 5	8.5	25	3			Crown is in very good condition; trunk is compromised by decay	1803	2152612.741	6103288.528	346.15	Deciduous	6"D		
138	II	Carolina cherry laurel *(Prunus caroliniana)*	6, 4	7	25	2			Very good crown; consider pruning understory to remove fire ladder	1804	2152587.309	6103298.018	347.48	Deciduous	6"D		
139	II	Carolina cherry laurel *(Prunus caroliniana)*	5.5, 5, 4	8.5	25	2				1805	2152528.713	6103324.798	358.04	Deciduous	6"D		
140	II	Carolina cherry laurel *(Prunus caroliniana)*	5, 4	6.5	15	3				1843	2152625.416	6103324.511	358.82	Deciduous	6"D 12'SPREAD		
141	II	Carolina cherry laurel *(Prunus caroliniana)*	6.5		15	3				1815	2152546.778	6103290.95	347.74	Deciduous	6"D		
142	II	Carolina cherry laurel *(Prunus caroliniana)*	5, 5	7	20	3				N/A					NEW		
143	II	Gray pine (Pinus sabiniana)	33		50	4			Consider removing dead branches up to 15 feet	1799	2152591.185	6103321.077	354.49	Pine	34"D		
144	II	Gray pine (Pinus sabiniana)	24		40	4				1798	2152572.135	6103298.437	347.9	Pine	26"D		
145	II	Coast live oak *(Quercus agrifolia)*	10.5		25	2	✓			1806	2152526.869	6103301.409	355.36	Oak	8"D		
146	II	Coast live oak *(Quercus agrifolia)*	10		25	3	✓			1807	2152525.035	6103295.124	355.82	Oak	8"D		
147	II	Coast live oak *(Quercus agrifolia)*	7		25	3	✓			1808	2152526.075	6103282.742	354.63	Oak	6"D		

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148	II	Valley oak *(Quercus lobata)*	5.5		18	3	✓		Consider removing lower branches up to 8 feet	1814	2152537.975	6103280.671	348.54	Oak	4"D		
149	II	Coast live oak *(Quercus agrifolia)*	7.5		25	2	✓			1811	2152542.986	6103269.749	346.23	Oak	6"D		
150	II	Coast live oak *(Quercus agrifolia)*	8		25	2	✓			1812	2152550.651	6103262.947	342.97	Oak	6"D		
151	II	Coast live oak *(Quercus agrifolia)*	17.5		45	1	✓	✓		1809	2152521.703	6103257.093	354.16	Oak	16"D		
152	II	Coast live oak *(Quercus agrifolia)*	12.5		25	2	✓	✓		1810	2152524.865	6103257.126	356.9	Oak	8"D		
153	II	Valley oak *(Quercus lobata)*	16.5		40	2	✓	✓	Elliptical trunk; dead pine stem 9" in diameter is dangerously hung up in this tree and should be removed	1813	2152550.243	6103244.929	340.82	Oak	12"D		
154	II	Valley oak *(Quercus lobata)*	13, 7, 6, 6.5, 7, 9, 10, 10, 10, 7	28	60	2	✓	✓		1862	2152618.596	6103267.57	342.68	Oak	9-12"OAKS		
155	II	Gray pine (Pinus sabiniana)	14.5		30	3				1841	2152623.354	6103302.767	351.3	Pine	12"D 24'SPREAD		
156	II	Gray pine (Pinus sabiniana)	32		60	4 5 (Updated Rating)			Tree is falling down and will be removed by EBMUD prior to Leland Reservoir Replacement Project.	1797	2152583.941	6103277.563	343.67	Pine	34"D	1	
157	II	Valley oak *(Quercus lobata)*	18		45	2	✓	✓		1833	2152661.333	6103245.698	347.53	Oak	18" 20'SPREAD		
158	II	Valley oak *(Quercus lobata)*	12.5		25	3	✓	✓		11151							
159	II	Coast live oak *(Quercus agrifolia)*	13.5		40	2	✓	✓	Consider removing lower branches up to 8 feet	1861	2152599.058	6103201.827	334.49	Oak	12"D		
160	II	Coast live oak *(Quercus agrifolia)*	13.5, 18.5	23	45	2	✓	✓		11147							
161	II	Valley oak *(Quercus lobata)*	17		30	3	✓	✓		11148							
162	II	Coast live oak *(Quercus agrifolia)*	14		25	2	✓	✓		11327							
163	II	Gray pine (Pinus sabiniana)	32		60	4			Consider removing lower branches up to 20 feet Tree to be pruned by EBMUD prior to Leland Reservoir Replacement						NEW		
164	II	Coast live oak *(Quercus agrifolia)*	11.5		40	2	✓			11328							

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165	II	Carolina cherry laurel *(Prunus caroliniana)*	5		25	4			Consider removing dead lower branches for fire clearance	N/A					NEW		
166	II	Valley oak *(Quercus lobata)*	22		50	2	✓	✓		11338							
167	II	Valley oak *(Quercus lobata)*	11.5		45	2	✓			11329							
168	II	Coast live oak *(Quercus agrifolia)*	12		40	2	✓	✓		1860	2152541.113	6103139.94	332.24	Oak	6"D		
169	II	Coast live oak *(Quercus agrifolia)*	16.5		40	2	✓	✓		1859	2152544.935	6103132.31	327.93	Oak	18"D 30'SPREAD		
170	II	Carolina cherry laurel *(Prunus caroliniana)*	3.5		10	3			Consider pruning understory to remove fire ladders	11141							
171	II	Carolina cherry laurel *(Prunus caroliniana)*	4		15	3			Consider pruning understory to remove fire ladders (note: EBMUD inventory number of this tree is 11140	1140							
172	II	Gray pine (Pinus sabiniana)	26		50	4			Consider removal of dead wood up to 30 feet	N/A					NEW		
173	II	Gray pine (Pinus sabiniana)	24		60	4				N/A					NEW		
174	II	Gray pine (Pinus sabiniana)	22		25	5			Consider removal of dead wood up to 30 feet Tree to be pruned by EBMUD prior to Leland Reservoir Replacement	N/A					NEW		
175	II	Gray pine (Pinus sabiniana)	25		25	5			Tree to be pruned by EBMUD prior to Leland Reservoir Replacement	N/A					NEW		
176	II	Gray pine (Pinus sabiniana)	21		35	5			Tree to be pruned by EBMUD prior to Leland Reservoir Replacement	N/A					NEW		
177	II	Coast live oak *(Quercus agrifolia)*	6		20	2	✓			11150							
178	II	Coast live oak *(Quercus agrifolia)*	15		40	2	✓	✓		11149							
179	II	Coast live oak *(Quercus agrifolia)*	14.5, 7	16	40	2	✓	✓		N/A					NEW		
180	II	Coast live oak *(Quercus agrifolia)*	9.5, 6	11	35	2	✓			1870	2152477.241	6103132.061	348.78	Oak	8"D 16"SPREAD		
181	II	Carolina cherry laurel *(Prunus caroliniana)*	4.5		20	2				1879	2152591.421	6103108.314	319.35	Deciduous	6"D 12'SPREAD		

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182	II	Carolina cherry laurel *(Prunus caroliniana)*	6		10	4				1878	2152584.302	6103109.303	320.35	Deciduous	6"D 12'SPREAD		
183	II	Coast live oak *(Quercus agrifolia)*	10		25	3	✓			1877	2152571.58	6103127.178	326.54	Oak	8"D 16'SPREAD		
184	II	Coast live oak *(Quercus agrifolia)*	6		20	4	✓		This tree is supporting the weight of a fallen adjacent tree that could be removed to eliminate a fire ladder	N/A					NEW		
185	II	Carolina cherry laurel *(Prunus caroliniana)*	4		8	6			Recommend removal at least the first 8 feet should be deadwooded to prevent fire ladder Tree to be pruned by EBMUD prior to Leland Reservoir Replacement	1858	2152582.348	6103142.63	328.85	Deciduous	8"D		
186	II	Carolina cherry laurel *(Prunus caroliniana)*	4		8	3				1876	2152557.884	6103103.242	322.98	Deciduous	6"D 20'SPREAD		
187	II	Carolina cherry laurel *(Prunus caroliniana)*	3.5		15	3				N/A					NEW		
188	II	Coast live oak *(Quercus agrifolia)*	7.5		25	3	✓			1873	2152527.198	6103112.863	326.34	Oak	6"D 12'SPREAD		
189	II	Valley oak *(Quercus lobata)*	15.5		40	2	✓	✓		1875	2152522.401	6103125.165	331.85	Oak	12"D 24'SPREAD		
190	II	Coast live oak *(Quercus agrifolia)*	5		12	4	✓			N/A					NEW		
191	II	Coast live oak *(Quercus agrifolia)*	4		20	4	✓			N/A					NEW		
192	II	Valley oak *(Quercus lobata)*	21		80	2	✓	✓		1874	2152540.127	6103096.931	323.46	Oak	18"D36'SPREAD		
193	II	Coast live oak *(Quercus agrifolia)*	7		25	3	✓			N/A					NEW		
194	II	Carolina cherry laurel *(Prunus caroliniana)*	3.5		8	4				N/A					NEW		
195	II	Carolina cherry laurel *(Prunus caroliniana)*	6		15	4			Consider removal of dead wood up to 10 feet	N/A					NEW		
196	II	Coast live oak *(Quercus agrifolia)*	7		20	3	✓			11318							
197	II	Coast live oak *(Quercus agrifolia)*	7		20	3	✓			1872	2152493.538	6103109.607	338.46	Oak	6"D 12'SPREAD		

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198	II	Coast live oak *(Quercus agrifolia)*	9.5		25	2	✓			1871	2152472.052	6103111.927	347.05	Oak	8"D 16'SPREAD		
199	II	Coast live oak *(Quercus agrifolia)*	3		10	3	✓			N/A					NEW		
200	II	Coast live oak *(Quercus agrifolia)*	5		20	3	✓			N/A					NEW		
201	II	Coast live oak *(Quercus agrifolia)*	9		30	2	✓			2123	2152456.922	6103090.725	349.07	Oak	8"D 10'SPREAD		
202	II	Coast live oak *(Quercus agrifolia)*	9		30	2	✓			N/A					NEW		
203	II	Toyon *(Heteromeles arbutifolia)*	5			7			Consider removing the dead trunk and allowing the base to continue sprouting Tree to be pruned by EBMUD prior to Leland Reservoir Replacement	N/A					NEW		
204	II	Monterey pine *(Pinus radiata)*	19		35	4				1907	2152533.699	6103085.174	323.34	Pine	20"D		
205	II	Monterey pine *(Pinus radiata)*	34		80	3			A 13" diameter lower branch, facing south, has a structural weakness about 30 feet above ground--a portion has ripped out and the remaining branch could fail at any time	1908	2152536.678	6103064.58	320.96	Pine	30"D		
206	II	Monterey pine *(Pinus radiata)*	27		50	4				1909	2152541.822	6103043.787	317.28	Pine	26"D		
207	I	California bay laurel *(Umbellularia californica)*	5, 4.5	7	25	3				N/A					NEW		
208	I	Monterey pine *(Pinus radiata)*	25		70	5				1910	2152545.774	6103024.527	315.19	Pine	24"D		
209	II	California bay laurel *(Umbellularia californica)*	5		15	3				N/A					NEW		
210	I	Monterey pine *(Pinus radiata)*	29		75	4				1911	2152548.911	6103002.971	312.79	Pine	30"D		
211	I	Monterey pine *(Pinus radiata)*	32		50	4			Lower branches are dead up to 40 feet; consider removing dead branches or removing entire tree	1912	2152553.967	6102982.797	309.01	Pine	34"D		
212	II	Coast live oak *(Quercus agrifolia)*	2		10	3	✓			N/A					NEW		
213	II	Coast live oak *(Quercus agrifolia)*	4		20	3	✓			N/A					NEW		

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214	II	Coast live oak *(Quercus agrifolia)*	5		20	3	✓			N/A					NEW		
215	II	California bay laurel *(Umbellularia californica)*	3, 2	3.5	15	3				N/A					NEW		
216	II	English walnut *(Juglans regia)*	9		30	3				N/A					NEW		
217	II	Valley oak *(Quercus lobata)*	17.5		40	3	✓	✓		N/A					NEW		
218	I	California bay laurel *(Umbellularia californica)*	5, 5.5, 4.5	8.5	30	2				1921	2152564.452	6103007.591	313.05	Bay	6"D 20'SPREAD		
219	I	Valley oak *(Quercus lobata)*	9		40	3	✓			1914	2152545.237	6102960.95	312.54	Deciduous	8"D 20'SPEAD		
220	II	Coast live oak *(Quercus agrifolia)*	15		35	2	✓	✓		N/A					NEW		
221	II	Valley oak *(Quercus lobata)*	11		30	4	✓			N/A					NEW		
222	II	Valley oak *(Quercus lobata)*	8, 9	12	25	3	✓	✓		N/A					NEW		
223	I	Coast redwood *(Sequoia sempervirens)*	6		20	4				1916	2152557.712	6102939.08	306.42	Redwood	6"D 10'SPREAD		
224	I	Coast redwood *(Sequoia sempervirens)*	14		30	3			Lowest branch may have localized canker; remove lowest branch; sterilize tool after cut	1915	2152559.151	6102926.185	304.96	Redwood	12"D 20'SPREAD		
225	I	Coast redwood *(Sequoia sempervirens)*	9		10	4				N/A					NEW		
226	I	Coast redwood *(Sequoia sempervirens)*				7			Dead; should be removed	N/A					NEW		
227	I	Coast redwood *(Sequoia sempervirens)*	9			7			Dead; should be removed	1917	2152560.312	6102912.247	304.31	Redwood	10"D 20'SPREAD		
228	II	Cherry plum *(Prunus cerasifera)*	5		25	4				N/A					NEW		

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229	II	Valley oak *(Quercus lobata)*	19		50	2	✓	✓		N/A					NEW		
230	II	Acacia silver wattle *(Acacia dealbata)*	6		25	5				N/A					NEW		
231	II	Glossy privet *(Ligustrum lucidum)*	4		10	4				N/A					NEW		
232	II	Glossy privet *(Ligustrum lucidum)*	3.5		10	4				N/A					NEW		
233	II	Glossy privet *(Ligustrum lucidum)*	5		15	4				N/A					NEW		
234	II	Glossy privet *(Ligustrum lucidum)*	3, 3.5	4.5	20	4				N/A					NEW		
235	I	Glossy privet *(Ligustrum lucidum)*	6.5		25	3				1918	2152577.506	6102924.308	301.49	Deciduous	6"D 16'SPREAD		
236	I	Glossy privet *(Ligustrum lucidum)*	6.5		30	3				1919	2152580.554	6102913.479	300.25	Deciduous	6"D 16'SPREAD		
237	I	Glossy privet *(Ligustrum lucidum)*	4		10	4				N/A					NEW		
238	I	Glossy privet *(Ligustrum lucidum)*	4.5		10	4				N/A					NEW		
239	I	California bay laurel *(Umbellularia californica)*	6, 6	8.5	35	3				1992	2152575.768	6102859.175	296.37	Deciduous	6"D 12'SPREAD		
240	I	California bay laurel *(Umbellularia californica)*	9.5		25	3				N/A					NEW		
241	I	California bay laurel *(Umbellularia californica)*	7		15	2				1991	2152583.604	6102831.988	293.29	Deciduous	6"D 12'SPREAD		
242	I	Glossy privet *(Ligustrum lucidum)*	6		20	5				1988	2152583.89	6102807.313	294.5	Deciduous	8"D 16'SPREAD		
243	I	California bay laurel *(Umbellularia californica)*	8.5		30	3				1986	2152593.861	6102776.832	288.06	Deciduous	10"D 20'SPREAD		
244	I	Valley oak *(Quercus lobata)*	20, 21, 15	32.5	60	3	✓	✓		2023	2152616.528	6102781.972	281.92		3@20" OAKS		
245	I	Coast live oak *(Quercus agrifolia)*	21, 22.5, 19	36	70	1	✓	✓		2027	2152636.911	6102808.954	282.67		3@18" OAKS		

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246	I	California bay laurel *(Umbellularia californica)*	5.5, 5.5	8	35	3				1920	2152569.697	6102958.664	304.29	Deciduous	6"D 16'SPREAD		
247	II	Coast live oak *(Quercus agrifolia)*	5		12	2	✓			N/A					NEW		
248	II	Canary Island pine *(Pinus canariensis)*	18.5		20	5			Tree to be removed by EBMUD prior to Leland Reservoir Replacement	2108	2152433.993	6103124.647	364.75	Pine	17"D 35'SPREAD	1	
249	II	Blue gum eucalyptus *(Eucalyptus globulus)*	56		75	3			Tree to be removed by EBMUD prior to Leland Reservoir Replacement. Tree is a maintenance hazard.	2109	2152427.299	6103140.217	365.97	Euc	54"D 60'SPREAD	1	
250	II	Canary Island pine *(Pinus canariensis)*	16.5		30	5			Tree to be removed by EBMUD prior to Leland Reservoir Replacement	2107	2152414.888	6103115.877	369.2	Pine	14"D 30'SPREAD	1	
251	II	Carolina cherry laurel *(Prunus caroliniana)*	4		15	5			Prune dead branches up to 5 feet Tree to be pruned by EBMUD prior to Leland Reservoir Replacement	N/A					NEW		
252	II	Valley oak *(Quercus lobata)*	6		20	4	✓			2167	2152401.427	6103142.103	363.53	Oak	5"D 10'SPREAD		
253	II	Valley oak *(Quercus lobata)*	8.5		25	3	✓			2166	2152393.022	6103138.578	366.59	Oak	8"D 16'SPREAD		
254	II	Valley oak *(Quercus lobata)*	6, 3.5	7	6	4	✓			2165	2152387.902	6103133.597	369.68	Oak	8"D 16'SPREAD		
255	II	Blue gum eucalyptus *(Eucalyptus globulus)*	11, 10, 9, 20	26.5	40	3			2168, 2169, 2170 are one tree Tree to be removed by EBMUD prior to Leland Reservoir Replacement. Tree is a fire hazard.	2168	2152363.53	6103119.904	376.37	Euc	16"D 30'SPREAD	1	
255	II								2168, 2169, 2170 are one tree Tree to be removed by EBMUD prior to Leland Reservoir Replacement. Tree is a fire hazard.	2169	2152365.831	6103118.234	376.58	Euc	9"D 20'SPREAD		
255	II								2168, 2169, 2170 are one tree Tree to be removed by EBMUD prior to Leland Reservoir Replacement. Tree is a fire hazard.	2170	2152364.014	6103117.288	376.25	Euc	8"D 16'SPREAD		
256	II	Coast live oak *(Quercus agrifolia)*	6		25	3	✓		Tree to be saved - revised assessment after 11/9/17 site visit	2157	2152373.471	6103105.523	374.86	Oak	4"D 10'SPREAD	0	

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257	II	Coast live oak *(Quercus agrifolia)*	7		15	3	✓			2158	2152362.524	6103095.443	374.37	Oak	6"D 18'SPREAD		
258	II	Coast live oak *(Quercus agrifolia)*	7.5, 10.5	13	35	2	✓	✓		2159	2152358.506	6103092.197	374.51	Oak	9"D20'SPREAD		
259	II	Coast live oak *(Quercus agrifolia)*	4		12	2	✓			N/A					NEW		
260	II	Coast live oak *(Quercus agrifolia)*	6		20	3	✓			2156	2152361.286	6103109.087	375.63	Oak	5"D 12'SPREAD		
261	II	Coast live oak *(Quercus agrifolia)*	7, 13	15	35	1	✓	✓		2161	2152343.349	6103109.175	375.87	Oak	10"D 20'SPREAD		
262	II	Valley oak *(Quercus lobata)*	4.5		12	4	✓			2160	2152345.356	6103104.109	375.22	Oak	4"D 10'SPREAD		
263	II	Coast live oak *(Quercus agrifolia)*	4		15	3	✓			N/A					NEW		
264	II	Coast live oak *(Quercus agrifolia)*	6		20	2	✓			2164	2152368.89	6103135.995	368.7	Oak	4"D 8'SPREAD		
265	II	Coast live oak *(Quercus agrifolia)*	4.5		15	3	✓			N/A					NEW		
266	II	Coast live oak *(Quercus agrifolia)*	6		20	3	✓			2200	2152319.956	6103145.178	364.24	Oak	4"D 8'SPREAD		
267	II	Coast live oak *(Quercus agrifolia)*	10		20	3	✓			2163	2152326.565	6103132.306	373.03	Oak	10"D 20'SPREAD		
268	II	Coast live oak *(Quercus agrifolia)*	10		25	2	✓			2197	2152326.364	6103131.889	372.66	Oak	8"D 16'SPREAD		
269	II	Valley oak *(Quercus lobata)*	3.5		8	3	✓			2199	2152321.955	6103137.144	369.29	Oak	4"D 8'SPREAD		
270	II	Coast live oak *(Quercus agrifolia)*	3		8	4	✓			2198	2152312.41	6103134.264	371.26	Oak	4"D 8'SPREAD		
271	II	Coast live oak *(Quercus agrifolia)*	4, 3.5	5.5	20	3	✓			N/A					NEW		
272	II	Canary Island pine *(Pinus canariensis)*	29		50	3			Tree to be pruned by EBMUD prior to Leland Reservoir Replacement	2196	2152316.345	6103120.385	374.96	Pine	27"D 50'SPREAD		
273	II	Coast live oak *(Quercus agrifolia)*	8, 8	11.5	25	2	✓			2162	2152323.635	6103106.035	374.23	Oak	7'D 14'DPREAD		
274	II	Coast live oak *(Quercus agrifolia)*	3		10	3	✓		Overwhelmed by adjacent pine	N/A					NEW		
275	II	Almond *(Prunus dulcis)*	3, 3.5	4.5	6	5			Tree to be removed by EBMUD prior to Leland Reservoir Replacement	N/A					NEW	1	

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276	II	Canary Island pine *(Pinus canariensis)*	20, 12	23.5	45	4 5 (Updated Rating)			Tree to be removed; is interferring with adajacent Oak Tree	2195	2152296.727	6103111.945	372.26	Pine	30"D 50'SPREAD	1	
277	II	Coast live oak *(Quercus agrifolia)*	13.5		35	1	✓	✓		2174	2152301.137	6103093.344	371.85	Oak	12"D 24'SPREAD		
278	II	Valley oak *(Quercus lobata)*	4.5		20	2	✓			2175	2152290.517	6103094.898	370.74	Oak	4"D 8'SPREAD		
279	II	Coast live oak *(Quercus agrifolia)*	6.5, 5	8	25	3	✓			2176	2152291.895	6103121.28	372.36	Oak	5"D 10'SPREAD		
280	VIII	Gray pine (Pinus sabiniana)	25		60	3			Tree to be removed by EBMUD prior to Leland Reservoir Replacement	2194	2152280.656	6103120.237	370.8	Pine	36"D 40'SPREAD	1	
281	VIII	Gray pine (Pinus sabiniana)	19		15	6			Consider removal of this tree. It is precariously perched in an adjacent Canary Island pine; if it fails it could destroy a fence and other oaks Tree to be removed by EBMUD prior to Leland Reservoir Replacement	2192	2152264.694	6103106.043	367.5	Pine	28"D 40'SPREAD	1	
282	VIII	Coast live oak *(Quercus agrifolia)*	7, 5, 5	10	30	2	✓			2177	2152273.66	6103135.222	370.56	Oak	6"D 10'SPREAD		
283	VIII	Canary Island pine *(Pinus canariensis)*	18		45	2			Tree number 281, a gray pine, is lodged in this tree	2193	2152259.703	6103135.001	368.57	Pine	16"D 30'SPREAD		
284	VIII	Coast live oak *(Quercus agrifolia)*	3.5		20	3	✓								NEW		
285	VIII	Coast live oak *(Quercus agrifolia)*	2.5		10	4	✓								NEW		
286	VIII	Coast live oak *(Quercus agrifolia)*	3		12	3	✓								NEW		
287	VIII	Coast live oak *(Quercus agrifolia)*	7		20	2	✓			2179	2152255.976	6103092.241	365.4	Oak	6"D 12'SPREAD		
288	VIII	Monterey pine *(Pinus radiata)*	35		60	3			Consider removal of deadwood up to 25 feet above grade; some branches are heavily end weighted; consider removal of the entire tree because of its location above a residential incense cedar in very good condition Tree to be removed by EBMUD prior to Leland Reservoir Replacement	2191	2152243.852	6103102.534	364.47	Pine	50"D 60'SPREAD	1	
289	VIII	Incense cedar *(Calocedrus decurrens)*	14		25	1				2224	2152242.726	6103084.545	362.49	Cedar	14"D 20'SPREAD		

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290	VIII	Incense cedar *(Calocedrus decurrens)*	9.5		15	2			Tag placed on fence	2225	2152230.099	6103084.445	360.7	Cedar	8"D 10'SPREAD		
291	VIII	Coast live oak *(Quercus agrifolia)*	8, 7.5	11	25	1	✓			2178	2152220.532	6103096.65	360.35	Oak	10"D 15'SPREAD		
292	VIII	Canary Island pine *(Pinus canariensis)*	16, 19	25	40	2			This tree, about 80 feet in height, has codominant stems that could split apart. Consider the possibility of stem failure. Consider installing a cable between codominant stems or tree removal. Tree is in vigorous condition but codominant stems should be addressed	2190	2152229.668	6103112.068	362.66	Pine	36"D 50'SPREAD		
293	VIII	Coast live oak *(Quercus agrifolia)*	3		10	3	✓								NEW		
294	VIII	Coast live oak *(Quercus agrifolia)*	5		20	3	✓								NEW		
295	VIII	Coast live oak *(Quercus agrifolia)*	6		25	2	✓			2180	2152237.915	6103135.455	364.55	Oak	5"D 10'SPREAD		
296	VIII	Coast live oak *(Quercus agrifolia)*	7		15	3	✓			2181	2152232.174	6103135.122	363.61	Oak	5"D 10'SPREAD		
297	VIII	Coast live oak *(Quercus agrifolia)*	6		20	2	✓			2182	2152230.569	6103133.624	363.34	Oak	5"D 10'SPREAD		
298	VIII	Coast live oak *(Quercus agrifolia)*	4.5		15	3	✓			2183	2152226.601	6103131.08	362.77	Oak	4"D 8'SPREAD		
299	VIII	Coast live oak *(Quercus agrifolia)*	6, 8.5	10.5	30	2	✓			2184	2152247.123	6103150.828	363.46	Oak	4"D 8'SPREAD		
300	VIII	Blue gum eucalyptus *(Eucalyptus globulus)*	26		35	4			Tree to be removed by EBMUD prior to Leland Reservoir Replacement	2231	2152204.256	6103145.024	359.21	Euc	26"D 40'SPREAD	1	
301	VIII	Blue gum eucalyptus *(Eucalyptus globulus)*	43		70	3			Tree to be removed by EBMUD prior to Leland Reservoir Replacement	2230	2152198.165	6103139.9	357.42	Euc	34"D 50'SPREAD	1	
302	VIII	Coast live oak *(Quercus agrifolia)*	7		20	3	✓			2186	2152216.051	6103111.469	359.83	Oak	5"D 10'SPREAD		
303	VIII	Coast live oak *(Quercus agrifolia)*	7		20	3	✓			2185	2152211.626	6103116.139	358.91	Oak	5"D 10'SPREAD		
304	VIII	Canyon live oak *(Quercus chrysolepis)*	4.5		20	3	✓			2187	2152208.295	6103109.653	358.2	Oak	4"D 8'SPREAD		
305	VIII	Canary Island pine *(Pinus canariensis)*	17		25	3				2189	2152205.556	6103104.551	357.78	Pine	6"D 8'SPREAD		

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306	VIII	Canary Island pine *(Pinus canariensis)*	12		25	4			Top apparently broke off Tree to be removed by EBMUD prior to Leland Reservoir Replacement	2188	2152208.734	6103133.866	359.05	Oak	14"D 28'SPREAD	1	
307	VIII	Valley oak *(Quercus lobata)*	9		30	2	✓			2234	2152196.971	6103087.451	353.7	Deciduous	12"D 14'SPREAD		
308	VIII	Monterey pine *(Pinus radiata)*	15		50	5			This tree has a heavily weighted end branch over a cabana on an adjacent residential property Not on EBMUD property	2233	2152195.151	6103081.776	351.65	Pine	14"D 25'SPREAD		
309	VIII	Valley oak *(Quercus lobata)*	3.5		15	3	✓			2254	2152187.933	6103100.381	351.35	Oak	12"D 24'SPREAD		
310	VIII	Valley oak *(Quercus lobata)*	6		20	3	✓			2255	2152185.06	6103097.6	350.86	Oak	5"D 10' SPREAD		
311	VIII	Valley oak *(Quercus lobata)*	6		20	3	✓			2256	2152176.409	6103088.31	348.09	Oak	5"D 10'SPREAD		
312	VIII	Red ironbark *(Eucalyptus sideroxylon)*	8.5		20	4				2253	2152173.651	6103101.655	347.62	Deciduous	8"D 16'SPREAD		
313	VIII	Valley oak *(Quercus lobata)*	5		25	3	✓			2257	2152170.516	6103102.009	346.02	Oak	5"D 10'SPREAD		
314	VIII	Valley oak *(Quercus lobata)*	5		15	3	✓			2258	2152157.808	6103095.84	341.99	Oak	4"D 8'SPREAD		
315	VIII	Coast live oak *(Quercus agrifolia)*	8		25	2	✓			2259	2152162.067	6103109.975	344.32	Oak	6"D 12'SPREAD		
316	VIII	Red ironbark *(Eucalyptus sideroxylon)*	15, 14, 11.5	23.5	50	3				2252	2152164.463	6103133.834	348.69	Deciduous	3@12" DECID		
317	VIII	Red ironbark *(Eucalyptus sideroxylon)*	21		50	3				2248	2152153.332	6103107.814	341.12	Deciduous	14""D 28'SPREAD		
318	VIII	Red ironbark *(Eucalyptus sideroxylon)*	8, 12	14.5	35	5			Tree to be removed by EBMUD prior to Leland Reservoir Replacement	2249	2152153.582	6103119.504	342.6	Deciduous	10'D 20'SPREAD	1	
319	VIII	Red ironbark *(Eucalyptus sideroxylon)*	15		25	5			Topped in the past; habitat tree Tree to be removed by EBMUD prior to Leland Reservoir Replacement	2250	2152152.331	6103127.855	344.28	Deciduous	16"D 32'SPREAD	1	
320	VIII	Red ironbark *(Eucalyptus sideroxylon)*	14		35	4				2251	2152136.787	6103126.845	344.24	Deciduous	12"D 24'SPREAD		
321	VIII	Firethorn *(Pyracantha sp.)*	3.5, 4, 4.5	7	20	3				2260	2152149.804	6103149.186	356.39	Deciduous	6"D 12'SPREAD		

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322	VIII	Coast live oak *(Quercus agrifolia)*	10, 8, 13, 13	22.5	50	1	✓	✓		2261	2152124.071	6103153.057	357.14	Oak	4@10" OAK		
323	VIII	Valley oak *(Quercus lobata)*	3		10	4	✓								NEW		
324	VIII	Valley oak *(Quercus lobata)*	3		8	4	✓								NEW		
325	VIII	Valley oak *(Quercus lobata)*	4		7	6	✓		Consider tree removal as the entire top is dead. Tree to be removed by EBMUD prior to Leland Reservoir Replacement	2247	2152129.438	6103106.474	339.47	Oak	4"D 4'SPREAD	1	
326	VIII	Red ironbark *(Eucalyptus sideroxylon)*	16		40	4			Tree is outside EBMUD fence; branches are heavily end-weighted with at least one questionable stem attachment; consider pruning or removal	2239	2152121.642	6103078.826	331.34	Deciduous	16'D 40'SPREAD		
327	VIII	Coast live oak *(Quercus agrifolia)*	13.5		35	2	✓	✓		2244	2152113.445	6103107.362	340.13	Deciduous	12"D 25'SPREAD		
328	VIII	Red ironbark *(Eucalyptus sideroxylon)*	28		50	4			Consider lightening or removing a large heavily-weighted end branch that extends toward reservoir	2245	2152108.889	6103112.511	340.86	Deciduous	22"D 40'SPREAD		
329	VIII	Red ironbark *(Eucalyptus sideroxylon)*	7, 10, 10, 12, 13	23	30	2				2246	2152106.358	6103124.437	341.72	Deciduous	5@10" DECID		
330	VIII	Coast live oak *(Quercus agrifolia)*	19		50	1	✓	✓		2262	2152114.329	6103134.234	348.35	Oak	14"D 28'SPREAD		
331	VIII	Coast live oak *(Quercus agrifolia)*	6		20	3	✓			2263	2152100.654	6103140.567	351.02	Oak	6"D 12'SPREAD		
332	VIII	Valley oak *(Quercus lobata)*	**8.5, 12**	13.67	25	6	✓	✓	Tree to be removed by EBMUD prior to Leland Reservoir Replacement	2264	2152091.056	6103136.689	348.29	Oak	12"D 24'SPREAD	1	
333	VIII	Coast live oak *(Quercus agrifolia)*	10.5, 15	18.5	50	2	✓	✓		2321	2152082.586	6103127.039	343.73	Oak	12"D 24'SPREAD		
334	VIII	Coast live oak *(Quercus agrifolia)*	19		60	1	✓	✓		2265	2152068.806	6103156.537	357.68	Oak	16"D 35'SPREAD		
335	VIII	Valley oak *(Quercus lobata)*	4.5, 5	7	15	3	✓		2322 and 2323 are one tree	2322	2152057.347	6103137.883	348.58	Oak	4"D 8'SPREAD		
335	VIII								2322 and 2323 are one tree	2323	2152057.771	6103139.039	348.94	Oak	4"D 8'SPREAD		
336	VIII	Valley oak *(Quercus lobata)*	7.5		12	4 5 (Updated Rating)	✓		Tree to be removed by EBMUD prior to Leland Reservoir Replacement						NEW	1	
337	VIII	Coast live oak *(Quercus agrifolia)*	5.5		20	3	✓			2243	2152105.97	6103093.106	331.53	Oak	5"D 10'SPREAD		
338	VIII	Coast live oak *(Quercus agrifolia)*	4.5		25	3	✓								NEW		

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339	VIII	Monterey pine *(Pinus radiata)*	34		80	3			Tree is on other side of EBMUD fence; consider pruning or removal of heavy end-weighted branches that extend over residential area	2356	2152087.5	6103080.916	325.55	Pine	34"D 60'SPREAD		
340	VIII	Red ironbark *(Eucalyptus sideroxylon)*	14		20	4			Tree to be removed.	2364	2152070.291	6103115.28	340.63	Deciduous	12"D 20'SPREAD	1	
341	VIII	Valley oak *(Quercus lobata)*	8		20	4	✓			2357	2152078.802	6103083.13	323.98	Deciduous	6"D 12'SPREAD		
342	VIII	Coast live oak *(Quercus agrifolia)*	8.5		30	2	✓			2358	2152067.304	6103082.29	325.85	Oak	6"D 12'SPREAD		
343	VIII	California bay laurel *(Umbellularia californica)*	5, 5	7	20	3				2365	2152061.963	6103091.093	329.8	Oak	8"D 16'SPREAD		
344	VIII	Coast live oak *(Quercus agrifolia)*	4.5		20	1	✓								NEW		
345	VIII	Valley oak *(Quercus lobata)*	3		10	4	✓		Tree to be removed by EBMUD prior to Leland Reservoir Replacement. Vegetation and fire prevention management.						NEW	1	
346	VIII	Valley oak *(Quercus lobata)*	3		6	6	✓		Tree to be removed by EBMUD prior to Leland Reservoir Replacement. Vegetation and fire prevention management.						NEW	1	
347	VIII	Coast live oak *(Quercus agrifolia)*	5		15	1	✓								NEW		
348	VII	Red ironbark *(Eucalyptus sideroxylon)*	13, 8, 11, 11, 9.5, 9	25.5	70	3				2325	2152044.9	6103115.966	340.77		6@10" DECID		
349	VII	Red ironbark *(Eucalyptus sideroxylon)*	20, 24	31	45	4				2324	2152040.268	6103130.418	344.47		2@18" DECID		
350	VII	Red ironbark *(Eucalyptus sideroxylon)*	25		30	3				2363	2152028.143	6103117.879	340.66	Deciduous	24"D 40'SPREAD		
351	VII	Coast live oak *(Quercus agrifolia)*	8.5		25	3	✓			2360	2152045.272	6103097.435	333.47	Oak	10"D 20'SPREAD		
352	VII	Coast live oak *(Quercus agrifolia)*	2		12	3	✓								NEW		
353	VII	Coast live oak *(Quercus agrifolia)*	2		10	3	✓								NEW		
354	VII	Valley oak *(Quercus lobata)*	2		6	4	✓								NEW		
355	VII	Valley oak *(Quercus lobata)*	9.5		20	3	✓			2835	2152017.276	6103079.058	328.84	Oak	8"D 16'SPREAD		

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356	VII	Coast live oak *(Quercus agrifolia)*	9, 6	11	25	2	✓			2361	2152035.232	6103099.277	332.96	Oak	8"D 16'SPREAD		
357	VII	Coast live oak *(Quercus agrifolia)*	4.5		12	4	✓								NEW		
358	VII	Coast live oak *(Quercus agrifolia)*	9		25	2	✓								NEW		
359	VII	Red ironbark *(Eucalyptus sideroxylon)*	22		45	3			Was severely topped years ago	2362	2152019.723	6103102.455	334.93	Deciduous	20"D 40'SPREAD		
360	VII	Valley oak *(Quercus lobata)*	9		30	2	✓								NEW		
361	VII	Valley oak *(Quercus lobata)*	6.5, 8	10.5	20	3	✓			2858	2151990.356	6103104.171	336.07	Oak	8"D 16'SPREAD		
362	VII	Coast live oak *(Quercus agrifolia)*	11.5		30	1	✓			2859	2151989.18	6103113.375	337.91	Oak	10"D 20'SPREAD		
363	VII	Valley oak *(Quercus lobata)*	5.5, 6, 6.5	10.5	35	3	✓			2860	2151977.576	6103113.928	338.12	Oak	10"D 20'SPREAD		
364	VII	Valley oak *(Quercus lobata)*	11		35	2	✓			2861	2151958.592	6103108.974	338.22	Oak	12"D 24'SPREAD		
365	VII	Valley oak *(Quercus lobata)*	17.5		45	2	✓	✓		2862	2151951.777	6103130.37	340.16	Oak	18"D 36'SPREAD		
366	VII	Valley oak *(Quercus lobata)*	20		60	1	✓	✓	Tree is on the other side of the EBMUD barbed wire fence	2857	2151938.711	6103069.974	332.99	Oak	24"D 50'SPREAD		
367	VII	Coast live oak *(Quercus agrifolia)*	17		50	1	✓	✓		2980	2152031.124	6103157.488	357.88	Oak	18"D 36'SPREAD		
368	VII	Valley oak *(Quercus lobata)*	7, 11	13	30	2	✓	✓		2979	2151995.646	6103170.056	358.75	Oak	18"D 36'SPREAD		
369	VII	Coast live oak *(Quercus agrifolia)*	9, 9.5, 14	19	50	1	✓	✓		2978	2151978.588	6103180.312	358.26	Oak	24"D 48'SPREAD		
370	VII	Coast live oak *(Quercus agrifolia)*	14, 15	20.5	55	1	✓	✓		2977	2151957.519	6103201.086	358.05	Oak	24"D 48"SPREAD		
371	VII	Coast live oak *(Quercus agrifolia)*	8		30	1	✓			2976	2151945.873	6103221.821	357.16	Oak	8"D 18'SPREAD		
372	VII	**Gray pine *(Pinus sabiniana)***	22		45	**3**			Tree to be removed as part of Leland Reservoir Replacement project to construct a new access road to access site location designated for construciton trailers	2974	2151943.366	6103195.132	349.43	Pine	24"D 35'SPREAD		1

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373	VII	**Coast live oak *(Quercus agrifolia)***	5, 4	6.5	20	**3**	✓		Tree to be removed as part of Leland Reservoir Replacement project to construct a new access road to access site location designated for construciton trailers	2973	2151939.679	6103186.669	345.92	Oak	6"D 12'SPREAD		1
374	VII	**Valley oak *(Quercus lobata)***	10.5, 8, 9.5	**18.67**	30	3	✓	✓	Tree to be removed as part of Leland Reservoir Replacement project to construct a new access road to access site location designated for construciton trailers	2972	2151941.002	6103176.787	345.02	Oak	24"D 48'SPREAD		1
375	VII	Valley oak *(Quercus lobata)*	7, 8	10.5	30	3	✓			2889	2151905.026	6103148.428	339.99	Oak	2@8"OAKS		
376	VII	**Canary Island pine *(Pinus canariensis)***	18		25	2			Tree to be removed as part of Leland Reservoir Replacement project to construct a new access road to access site location designated for construciton trailers	2934	2151921.114	6103174.303	343.58	Pine	18"D 36'SPREAD		1
377	VII	**Canary Island pine *(Pinus canariensis)***	18		30	2			Tree to be removed as part of Leland Reservoir Replacement project to construct a new access road to access site location designated for construciton trailers	2933	2151918.142	6103191.005	345.95	Pine	18"D 36'SPREAD		1
378	VII	**Canary Island pine *(Pinus canariensis)***	17		25	2			Tree to be removed as part of Leland Reservoir Replacement project to construct a new access road to access site location designated for construciton trailers	2935	2151924.58	6103216.107	352.23	Pine	18"D 36'SPREAD		1
379	VII	Coast live oak *(Quercus agrifolia)*	9		25	3	✓			2936	2151913.949	6103230.666	355.39	Oak	9"D 18'SPREAD		
380	VII	**Canary Island pine *(Pinus canariensis)***	18.5, 18.5	26	50	1			This vigorous and attractive pine has two codominant stems that originate from just above ground level; I recommend cabling to prevent either trunk from failing. Tree to be removed as part of Leland Reservoir Replacement project to construct a new access road to access site location designated for construciton trailers	2939	2151918.923	6103245.246	359.78	Pine	2@18"pine		1
381	VII	Canary Island pine *(Pinus canariensis)*	17		25	2				2887	2151897.565	6103169.911	340.54	Pine	17"D 34'SPREAD		

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382	VII	Canary Island pine *(Pinus canariensis)*	19.5		35	3				2888	2151903.929	6103184.564	341.02	Pine	19"D 38'SPREAD		
383	VII	Canary Island pine *(Pinus canariensis)*	16		30	3				2885	2151889.571	6103194.512	340.29	Pine	16"D 32'SPREAD		
384	VII	Coast live oak *(Quercus agrifolia)*	9, 10	13.5	30	2	✓	✓		2886	2151880.941	6103185.11	339.55	Oak	2@10"OAK		
385	VII	Canary Island pine *(Pinus canariensis)*	19		35	3				2932	2151905.924	6103199.168	343.18	Pine	18"D 36'SPREAD		
386	VII	Coast live oak *(Quercus agrifolia)*	9.5		30	2	✓			2931	2151900.603	6103215.716	345.15	Oak	9"D 18'SPREAD		
387	VII	Canary Island pine *(Pinus canariensis)*	20		30	3			Has codominant stems at top; consider cabling or removal of one stem	2937	2151907.376	6103226.314	350.5	Pine	24"D 48'SPREAD		
388	VII	Coast live oak *(Quercus agrifolia)*	11		25	1	✓			2930	2151891.075	6103216.701	341.95	Oak	10"D 20'SPREAD		
389	VII	Valley oak *(Quercus lobata)*	5, 9.5	10.5	30	3	✓			2884	2151871.138	6103218.541	339.56	Oak	4"D 8'SPREAD		
390	VII	Valley oak *(Quercus lobata)*	10		25	3	✓			2883	2151870.191	6103219.907	339.44	Oak	9"D 18'SPREAD		
391	VII	Canary Island pine *(Pinus canariensis)*	24		50	1				2941	2151876.711	6103249.209	343.56	Pine	22"D 44'SPREAD		
392	VII	Coast live oak *(Quercus agrifolia)*	8.5		25	2	✓			2938	2151891.808	6103248.602	350.35	Oak	9"D 18'SPREAD		
393	VII	Valley oak *(Quercus lobata)*	7		15	3	✓			3073	2151891.808	6103273.98	352.93	Oak	6"D 12'SPREAD		
394	VII	Valley oak *(Quercus lobata)*	7.5		20	3	✓			3072	2151898.235	6103269.293	355.95	Oak	6"D 12'SPREAD		
395	VII	Coast live oak *(Quercus agrifolia)*	8		30	1	✓			3074	2151895.837	6103295.558	355.59	Oak	6"D 12'SPREAD		
396	VII	Coast live oak *(Quercus agrifolia)*	8		15	3	✓			3076	2151868.842	6103332.987	341.91	Oak	6"D 12'SPREAD		
397	VII	Coast live oak *(Quercus agrifolia)*	15, 13	20	35	1	✓	✓		3075	2151873.806	6103329.9	344.36	Oak	18"D 35'SPREAD		
398	VII	Firethorn *(Pyracantha sp.)*	5		8	4									NEW		
399	VII	Coast live oak *(Quercus agrifolia)*	10		25	1	✓			2863	2151889.289	6103092.721	336.49	Oak	10"D 20'SPREAD		
400	VII	*Prunus sp.*	5		15	4									NEW		
401	VII	Valley oak *(Quercus lobata)*	13, 14	19	50	1	✓	✓	2864 and 2865 are one tree	2864	2151867.39	6103082.504	332.68	Oak	14"D 28'SPREAD		

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401	VII								2864 and 2865 are one tree	2865	2151868.997	6103080.608	332.68	Oak	12"D 24'SPREAD		
402	VII	Coast live oak *(Quercus agrifolia)*	7.5		25	3	✓			2866	2151857.304	6103091.822	333.46	Oak	6"D 12'SPREAD		
403	VII	Valley oak *(Quercus lobata)*	8, 14.5	16.5	50	2	✓	✓		2867	2151848.59	6103087.137	331.85	Oak	14"D 28'SPREAD		
404	VII	Valley oak *(Quercus lobata)*	15		35	2	✓	✓		2868	2151844.436	6103087.725	331.4	Oak	13"D 26'SPREAD		
405	VII	Coast live oak *(Quercus agrifolia)*	8		25	2	✓			3179	2151832.571	6103079.328	329.02	Oak	6"D 12'SPREAD		
406	VII	Valley oak *(Quercus lobata)*	6		6	4	✓			3178	2151828.464	6103080.95	328.52	Oak	5"D 10'SPREAD		
407	VII	Valley oak *(Quercus lobata)*	4.5, 6	7.5	15	2	✓			3177	2151826.245	6103078.375	328.06	Oak	6"D 2'SPREAD		
408	VII	Valley oak *(Quercus lobata)*	5, 8	9.5	30	2	✓			2869	2151827.989	6103107.744	331.37	Oak	5&8"OAKS		
409	VII	Valley oak *(Quercus lobata)*	14, 8.5	16.5	30	3	✓	✓		3180	2151818.999	6103109.707	330.24	Oak	16"D 32'SPREAD		
410	VII	Valley oak *(Quercus lobata)*	9, 12	15	30	3	✓	✓		3181	2151818.731	6103124.372	330.87	Oak	16"D 32'SPREAD		
411	VII	Valley oak *(Quercus lobata)*	5		10	4	✓			2870	2151829.181	6103134.77	333.72	Oak	5"D 10'SPREAD		
412	VII	Gray pine (Pinus sabiniana)	8		8	4				2871	2151828.05	6103149.733	334.78	Pine	8"D 12'SPREAD		
413	VII	Coast live oak *(Quercus agrifolia)*	8.5		15	1	✓			2872	2151824.59	6103159.668	333.96	Oak	6"D 12'SPREAD		
414	VII	Coast live oak *(Quercus agrifolia)*	5		20	2	✓			2873	2151832.351	6103165.17	335.92	Oak	4"D 8'SPREAD		
415	VII	Valley oak *(Quercus lobata)*	17, 11	20	40	1	✓	✓		2877	2151825.207	6103170.888	334.99	Oak	15&1"OAK		
416	VII	Cherry plum *(Prunus cerasifera)*	7, 8	10.5	10	7			Dead Tree to be removed by EBMUD prior to Leland Reservoir Replacement	2875	2151831.012	6103171.884	335.98	Cherry	2@8" CHERRY	1	
417	VII	Coast live oak *(Quercus agrifolia)*	13, 14	19	35	1	✓	✓		2874	2151833.684	6103171.525	336.74	Oak	2@12"OAKS		
418	VII	Valley oak *(Quercus lobata)*	11, 13	17	45	2	✓	✓		2876	2151833.244	6103182.47	336.52	Oak	14"D 28'SPREAD		
419	VII	Valley oak *(Quercus lobata)*	5.5		15	3	✓			2878	2151829.595	6103199.161	335.6	Oak	6"D 12'SPREAD		

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420	VII	Valley oak *(Quercus lobata)*	8, 5.5, 9.5	13.5	30	3	✓	✓		2879	2151829.086	6103203.972	335.36	Oak	8&10"OAKS		
421	VII	Coast live oak *(Quercus agrifolia)*	13		25	2	✓	✓		2880	2151830.914	6103208.54	335.7	Oak	12"D 24'SPREAD		
422	VII	Valley oak *(Quercus lobata)*	4.5		10	4	✓								NEW		
423	VII	Valley oak *(Quercus lobata)*	4.5		12	3	✓								NEW		
424	VII	Coast live oak *(Quercus agrifolia)*	6.5, 6.5	9	20	3	✓			2882	2151827.573	6103221.117	334.68	Deciduous	8"D 16'SPREAD		
425	VII	Coast live oak *(Quercus agrifolia)*	8, 9, 10	15.5	25	2	✓	✓		2881	2151831.811	6103221.192	335.75	Oak	2@10"OAKS		
426	VII	Valley oak *(Quercus lobata)*	8.5, 6	10.5	30	3	✓		3090 and 3091 are one tree	3090	2151824.621	6103239.202	332.94	Oak	9"D 18'SPREAD		
426	VII								3090 and 3091 are one tree	3091	2151825.201	6103239.65	332.95	Oak	6"D 12'SPREAD		
427	VII	Valley oak *(Quercus lobata)*	9		30	3	✓			3089	2151825.35	6103251.248	331.94	Oak	10"D 20'SPREAD		
428	VII	Valley oak *(Quercus lobata)*	4.5		12	4	✓			3088	2151821.524	6103273.747	329.74	Oak	6"D 12'SPREAD		
429	VII	Valley oak *(Quercus lobata)*	14		40	3	✓	✓		3087	2151826.603	6103272.765	330.31	Oak	15"D 30'SPREAD		
430	VII	Valley oak *(Quercus lobata)*	12		30	3	✓	✓		3086	2151825.749	6103277.872	329.34	Oak	12"D 24'SPREAD		
431	VII	Valley oak *(Quercus lobata)*	4		8	3	✓								NEW		
432	VII	Valley oak *(Quercus lobata)*	8.5, 8.5	12	35	2	✓	✓	3083 and 3084 are one tree	3083	2151822.798	6103311.517	326.68	Oak	10"D 20'SPREAD		
432	VII								3083 and 3084 are one tree	3084	2151821.518	6103311.52	326.43	Oak	6"D 12'SPREAD		
433	VII	Coast live oak *(Quercus agrifolia)*	10.5		35	2	✓			3085	2151823.215	6103313.546	326.55	Oak	10"D 20'SPREAD		
434	VII	Monterey pine *(Pinus radiata)*	21		50	2				1398	2151807.178	6103314.185	321.83	Pine	21"D 30'SPREAD		
435	VII	Valley oak *(Quercus lobata)*	4		6	4	✓			3082	2151823.972	6103329.507	326.49	Oak	4"D 8'SPREAD		
436	VII	Valley oak *(Quercus lobata)*	10		25	3	✓			3081	2151825.932	6103328.432	326.91	Oak	10"D 20'SPREAD		
437	III	Coast live oak *(Quercus agrifolia)*	4		10	4	✓								NEW		

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438	III	Valley oak *(Quercus lobata)*	11		20	3	✓			3080	2151829.912	6103339.841	326.89	Oak	12"D 24'SPREAD		
439	III	Valley oak *(Quercus lobata)*	6		8	4	✓			3079	2151827.724	6103343.318	325.31	Oak	6"D 12'SPREAD		
440	III	Valley oak *(Quercus lobata)*	12, 10, 5, 9	19	50	2	✓	✓		3078	2151823.177	6103344.231	323.65	Oak	13"D 26'SPREAD		
441	III	Valley oak *(Quercus lobata)*	4		12	3	✓			3077	2151824.07	6103360.175	321.76	Oak	5"D 10'SPREAD		
442	III	Canary Island palm *(Phoenix canariensis)*	34		28	2				1399	2151801.406	6103376.388	315.49	Palm	48"D 24'SPREAD		
443	III	Buckthorn *(Rhamnus sp.)*	4		10	4				1401	2151810.286	6103385.725	316.22	Oak	3"D 6'SPREAD		
444	III	Coast live oak *(Quercus agrifolia)*	16		50	1	✓	✓		1403	2151824.674	6103389.366	316.7	Oak	13"D 26'SPREAD		
445	III	Valley oak *(Quercus lobata)*	3.5		8	4	✓		Other side of fence	N/A					NEW		
446	III	Valley oak *(Quercus lobata)*	9.5		25	2	✓			1402	2151815.33	6103407.239	314.14	Oak	6"D 12'SPREAD		1
447	III	Buckthorn *(Rhamnus sp.)*	4		12	3				1404	2151829.989	6103411.288	315.33	Deciduous	4"D 5'SPREAD		1
448	III	Buckthorn *(Rhamnus sp.)*	3		5	4			1405 and 1406 are one tree	1405	2151826.658	6103414.711	315.04	Deciduous	2"D 4'SPREAD		1
448	III								1405 and 1406 are one tree	1406	2151824.479	6103413.463	314.82	Deciduous	2"D 4'SPREAD		
449	III	Almond *(Prunus dulcis)*	8		12	3				1408	2151820.334	6103434.402	313.39	Fruit	6"D 12'SPREAD		1
450	III	Valley oak *(Quercus lobata)*	40		65	1	✓	✓		1365	2151766.375	6103467.517	303.82	Oak	38"D 70'SPREAD		
451	III	Coast live oak *(Quercus agrifolia)*	8		20	2	✓			1376	2151811.947	6103481.01	307.51	Oak	6"D 12'SPREAD		1
452	III	Firethorn *(Pyracantha sp.)*	4.5		12	4				1377	2151812.965	6103485.536	307.72	Oak	4"D 8'SPREAD		1
453	III	Valley oak *(Quercus lobata)*	10.5		35	2	✓			1375	2151811.866	6103499.463	307.79	Oak	8"D 10'SPREAD		1
454	III	Buckthorn *(Rhamnus sp.)*	4		15	4				N/A					NEW		
455	III	Valley oak *(Quercus lobata)*	8.5		20	3	✓			1432	2151824.491	6103510.581	309.41	Oak	6"D 10'SPREAD		1

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456	III	Buckthorn *(Rhamnus sp.)*	5		15	4				1431	2151841.255	6103522.127	311.25	Deciduous	4"D 8'SPREAD		1
457	III	Buckthorn *(Rhamnus sp.)*	5.5		15	4			Tree in on the other side of a fence, perhaps off property	N/A					NEW		
458	III	Coast live oak *(Quercus agrifolia)*	14.5		40	1	✓	✓		3131	2151871.254	6103383.828	335.15	Oak	13"D 26'SPREAD		
459	III	Blue gum eucalyptus *(Eucalyptus globulus)*	32		20	5			Vigorously resprouting 10 sprouts on 32 inch stump; consider stump grinding Tree to be **remov**ed by EBMUD prior to Leland Reservoir Replacement						NEW	1	

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460	III	Blue gum eucalyptus *(Eucalyptus globulus)*	49		60	2				1463	2151882.898	6103408.421	333.52	Euc	54"D 65'SPREAD		1
461	III	Valley oak *(Quercus lobata)*	8.5		20	2	✓			1374	2151822.942	6103497.109	308.03	Oak	6"D 5'SPREAD		1
462	III	Valley oak *(Quercus lobata)*	11		25	2	✓			N/A					NEW		
463	III	Valley oak *(Quercus lobata)*	23		65	1	✓	✓		1347	2151577.519	6103592.887	266.77	Oak	18"D 40'SPREAD		
464	III	Valley oak *(Quercus lobata)*	22, 20.5	30	35	1	✓	✓		1333	2151587.225	6103577.05	268.15	Oak	18"D 20'SPREAD		
465	III	Valley oak *(Quercus lobata)*	22		50	1	✓	✓		1334	2151626.089	6103590.526	273.06	Oak	18"D 20'SPREAD		
466	III	Coast live oak *(Quercus agrifolia)*	22.5		50	1	✓	✓		1214	2151766.22	6103679.957	276.66	Oak	18"D 20'SPREAD		
467	IV	Valley oak *(Quercus lobata)*	25		46	1	✓	✓		1170	2152010.99	6103735.681	304.82	Oak	22"D 40'SPREAD		
D	II	Coast live oak *(Quercus agrifolia)*	12.5			7			DEAD, TOPPLED	1842	2152628.798	6103308.678	353.87	Oak	10"D 20'SPREAD		
D	II					7			Dead	1796	2152568.696	6103271.775	343.82	57 Dead Tre	24"		
D	III					7			Dead	1400	2151815.852	6103370.59	317.8	Deciduous	4"D 5'SPREAD		
D	III					7			Dead	1407	2151819.786	6103431.755	314.21	Deciduous	6"D 12'SPREAD		
D	IV					7			Dead, remove	1658	2152170.513	6103585.684	342.57	Deciduous	6"D 10'SPREAD		
D	IV					7			Dead, remove	1659	2152168.259	6103582.142	342.74	Deciduous	6"D 10'SPREAD		
D	VI					7			Dead; remaining trunk is potential bird habitat	1682	2152549.564	6103370.085	364.4	Pine	30"D 30'SPREAD		
D	VI					7				1736	2152336.047	6103600.007	344.28	Dead Tree	8"D		
M	II								Missing; not found on site.	11146				Oak	6"		
M	I								Missing; not found on site.	1913	2152573.105	6102967.727	306.97	Pine	24"D 50'SPREAD		
M	II								Missing; not found on site.	11145							
N/A	II								Present, but not tagged; off EBMUD property in residential backyard	1943	2152553.205	6103072.226	316.61	Conifer	10"D 25'SPREAD		
N/A	VII								Present, but not tagged; appears to be off EBMUD property.	2359	2152053.311	6103081.627	326.73	Oak	6"D 12'SPREAD		
R	II								Removed-stump remains.	2111	2152400.959	6103085.878	369.48	Oak	44"D 50'SPREAD		
R	II								Removed-stump remains.	2201	2152285.059	6103143.76	366.06	Euc	5@10" EUC		
R	I								Removed-stump remains.	1989	2152579.992	6102838.351	294.38	OAK	32"D		
R	II								Removed-stump remains.	11144							
R	II								Removed-stump remains.	1880	2152585.057	6103094.101	318.49	Pine	36"D 70'SPREAD		
R	II								Removed; eucalyptus stump vigorously resprouting	2110	2152446	6103141.336	361.84	Euc	46"D 50'SPREAD		
R	II								Removed-stump remains.	2171	2152345.124	6103142.355	365.91	Euc	3@9" 20'SPREAD		
R	IV								Removed-stump remains.	1563	2152115.682	6103643.784	326.22	Deciduous	8"D 12'SPREAD		
R	IV								Removed-stump remains.	1570	2152079.562	6103648.317	322.57	Deciduous	6"D 12'SPREAD		
R	IV								Removed-stump remains.	1571	2152063.184	6103645.12	322.88	Deciduous	5"D 10'SPREAD		
R	IV								Removed-stump remains.	1572	2152041.094	6103597.569	328.27	Deciduous	6"D 12'SPREAD		
R	IV								Removed-stump remains.	1580	2152127.019	6103610.342	330.77	Deciduous	8"D 12'SPREAD		
R	IV								Removed-stump remains.	1582	2152140.267	6103627.644	328.05	Deciduous	6"D 12'SPREAD		

TreeDec Tag No.	TreeDec Sheet (I - VIII)	TreeDec Species	TreeDec DBH (inches)	If multi-trunked trees were a single trunk DBH (inches)	TreeDec Crown Spread (feet)	TreeDec Condition Rating (1-7 best to worst)	Oak?	Oak ≥12" Diameter	TreeDec Comments/ Recommendations	EBMUD CAD No.	EBMUD Coordinate A	EBMUD Coordinate B	EBMUD Elevation (feet)	EBMUD Tree Species	EBMUD Description	Prior to Leland Reservoir Replacement (Maintenance/Safety Related)	Part of Leland Reservoir Replacement (Project related)
R	IV								Removed-stump remains.	3133	2151906.434	6103341.266	357.74	Deciduous	8"D 12'SPREAD		
R	VI								Removed-stump remains.	1785	2152587.695	6103396.34	374.84	Pine	37"D 60'SPREAD		
R	VII								Removed-stump remains.	2975	2151939.156	6103234.606	358.74	Pine	24"D 35'SPREAD		
R	VIII								Removed-stump remains.	2232	2152224.261	6103146.382	361.5	Euc	24"D 40'SPREAD		
R	VIII								Removed-stump remains.	2242	2152102.945	6103090.425	329.84	Pine	10"D 20'SPREAD		
U	III								Underbrush; not a tree.	1421	2151822.317	6103481.97	313.09	Deciduous	8"D 16'SPREAD		
U	III								Underbrush; not a tree.	1430	2151854.535	6103512.461	312.6	Deciduous	4"D 8'SPREAD		
																27	88

General Condition Rating		
1	Excellent	unusually vigorous with strong and integrated structure
2	Very Good	vigorous with strong and integrated structure
3	Good	healthy with structure appropriate to its location
4	Moderate	within an average range of health and structure
5	Fair	struggling against adversity to maintain health
6	Poor	unlikely to regain a state of good health
7	Dead	devoid or nearly devoid of moisture

Appendix H: Cultural Resources Assessment Report

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CULTURAL RESOURCES ASSESSMENT REPORT
Leland Reservoir Replacement Project
Lafayette, California

PREPARED FOR:

RMC WATER AND ENVIRONMENT
2175 North California Boulevard, Suite 315
Walnut Creek, CA 94596

PREPARED BY:

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WSA

November 2016

CULTURAL RESOURCES ASSESSMENT REPORT
Leland Reservoir Replacement Project
Lafayette, California

PREPARED BY:

Allen Estes, Ph.D., Christine Alonzo, M.A., and Nazih Fino, M.A.,

SUBMITTED BY:

James Allan Ph.D. Principal Investigator

Project Number 2016-25

November 2016

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Management Summary

RMC Water and Environment (RMC) has contracted with WSA, Inc. (WSA) to conduct a cultural resource assessment of the Leland Reservoir Replacement Project (Project). The Project is located in Township 1 North, Range 2 West, Section 33, as depicted on the Walnut Creek, California 7.5' USGS topographic quadrangle maps.

A records search conducted on May 24, 2016 at the Northwest Information Center at Sonoma State University (NWIC) indicated that no previously recorded resources are located within the Project area. Three previously recorded resources (two prehistoric sites, P-07-000117 and P-07-000118, and one historic site, P-07-002742) are located within ¼-mile of the Project area. A total of nine cultural resources studies have been conducted within ¼-mile of the Project area. None of these studies include or cross any portion of the Project components.

WSA contacted the Native American Heritage Commission (NAHC) with a request for information on sacred sites or traditional cultural properties within the Project area, and for a list of interested Native American representatives. No information on sacred sites or traditional cultural properties was obtained from either the NAHC or from any of the interested Native American representatives, whom WSA contacted by letter.

WSA conducted a pedestrian archaeological survey of the proposed Project area on June 17, 2016. No new archaeological sites were identified during the survey. Because the Leland Reservoir is over 50 years old, it was evaluated as a historical resource under CEQA and is not being recommended as eligible for the California Register of Historical Resources, and therefore no significant impacts are anticipated during Project construction.

1.0 Introduction

1.1 Project Description

The East Bay Municipal Utility District (EBMUD) is proposing to replace the Leland Reservoir (reservoir) located on a 14.5-acre site opposite 1050 Leland Drive in the City of Lafayette, with two pre-stressed 8-million-gallon (MG) concrete tanks within the open-cut basin (Figures 1-4). The reservoir currently provides water service to customers in the Leland Pressure Zone, which encompasses the southwest portion of the City of Pleasant Hill, most of the City of Walnut Creek and parts of the City of Lafayette and unincorporated areas within Contra Costa County. The existing reservoir basin is a concrete-lined reservoir, with pre-cast concrete girders, columns and a pre-cast concrete panel roof. The Leland Reservoir Replacement Project (Project) is high priority because the reservoir is at the end of its useful service life, and its replacement is necessary due to the deteriorated condition of the pre-cast concrete roof (including rainwater ponding), mature trees growing in the earthen embankment, obsolete mechanical and electrical equipment, and the reservoir's criticality in serving the Leland Pressure Zone. In addition, a 36-inch critical transmission pipeline that is located beneath the existing reservoir basin and adjacent unimproved rights-of way will be replaced.

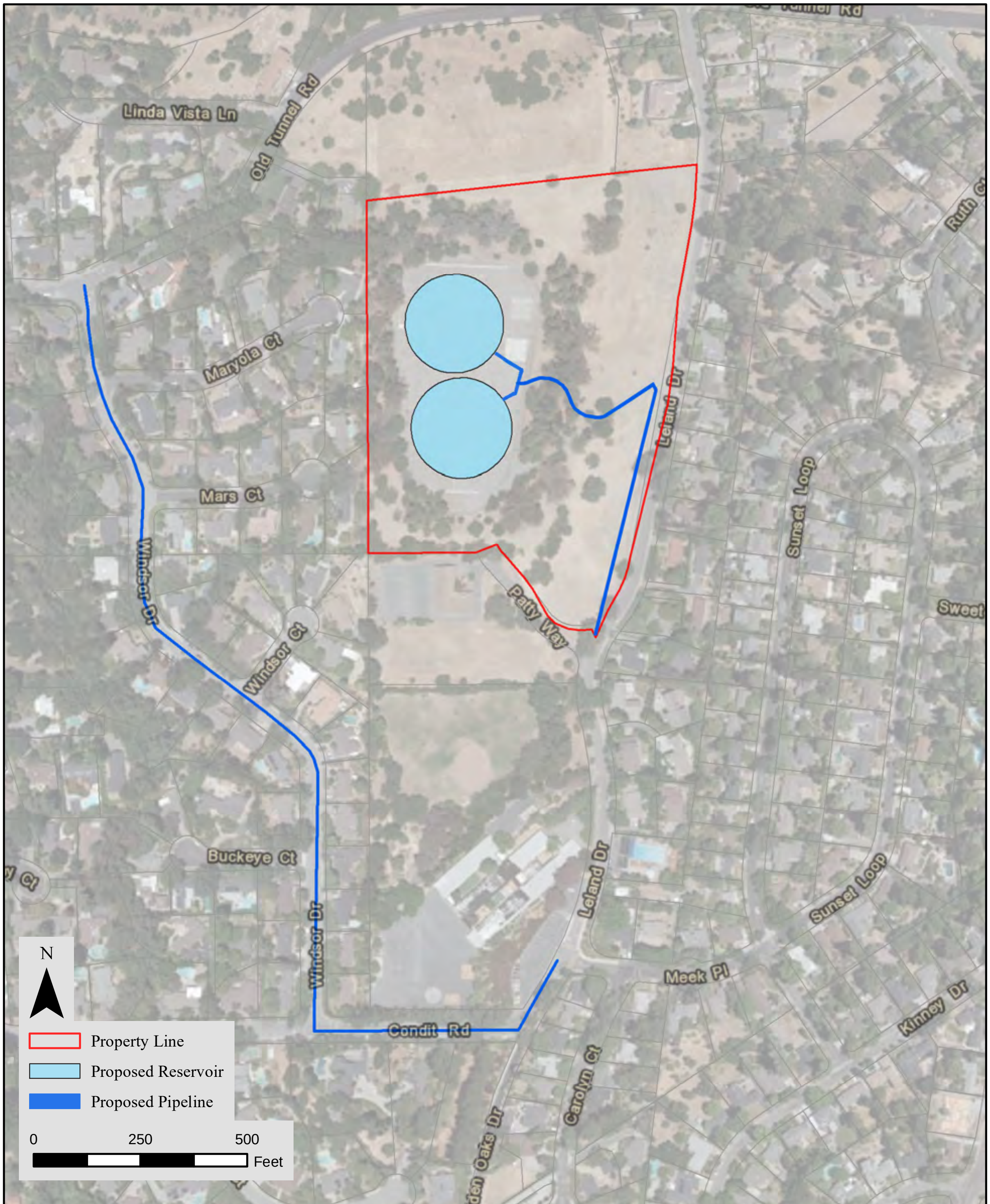
The Project will require demolition of the existing reservoir structure, a widening of the cut of the current basin by as much as 70 feet to the east, 35 feet to the south, and 55 feet to the west, and then construction of two approximately 37-feet-high, 224-foot diameter, pre-stressed concrete tanks with a capacity of 8 MG each (refer to Figure 4). A new, 12-foot-wide paved access roadway will be constructed into the existing hillside on the eastside of the reservoir to allow access to the basin from Leland Drive. The cut for road construction will be approximately 215 feet wide at its widest point and approximately 50 feet wide where it narrows to connect to the existing access road.

In addition to the reservoir replacement, an existing 36-inch, 1,700 linear feet (LF) water distribution pipeline beneath the existing reservoir will also be replaced with two new pipelines. The first pipeline is an approximately 2,700 LF 36-inch-diameter pipeline that will be constructed from the intersection of Old Tunnel Road and Windsor Drive along Windsor Drive until it intersects Condit Road, where it will turn left and follow Condit Road until it intersects with Leland Drive. It will follow Leland Drive to the north to intersect with an existing pipeline near the intersection of Meek Place and Leland Drive (refer to Figure 4). The second pipeline will be constructed on the Leland Reservoir property and is an approximately 950 LF 36-inch-diameter pipeline that will connect with the existing pipeline along Leland Drive and extend north approximately 500 LF where it will turn east and enter

WSA	Project Vicinity Map	Figure 1 EBMUD Leland Reservoir Contra Costa County, CA

WSA	Project Area Map	Figure 2 EBMUD Leland Reservoir Contra Costa County, CA

WSA	Project Location Map	Figure 3 EBMUD Leland Reservoir Contra Costa County, CA



WSA

Project Components

Figure 4
EBMUD
Leland Reservoir
Contra Costa County, CA

the tank area along the new access road alignment where it will terminate (refer to Figure 4). The existing pipeline will be filled and abandoned in place.

The pipeline construction technique will be the open trench (also known as "cut and cover") technique. Open trench construction involves:

- Utility location/potholing
- Sawcutting the pavement
- Excavating a trench
- Removing and stockpiling soils
- Installing the pipeline
- Backfilling the trench and applying temporary paving
- Pressure testing and disinfecting the pipeline
- Repaving

A minimum construction easement width of 25 feet will be needed to accommodate pipe storage and to allow trucks and equipment access along the trench. In some areas where the pipeline will need to be installed at greater depth to avoid other utilities, a wider trench and construction easement of up to 40 feet may be required. The open trench will be a minimum 5 feet wide and 6.5 feet in depth to accommodate the 36-inch diameter pipeline.

Construction of the Project will require preparation of an Environmental Impact Report (EIR). To assist RMC Water and Environment (RMC) in preparing the EIR, WSA, Inc. (WSA) prepared this Cultural Resources Assessment Report (CRAR).

1.2 Project Location

The Project is located in the City of Lafayette, Contra Costa County, California, in an area bounded by Windsor Drive on the west and south, Leland Drive on the east, and Old Tunnel Road on the north (refer to Figure 3). The Project is located in Township 1 North, Range 2 West, Section 33 as depicted on the Walnut Creek, California 7.5-minute USGS topographic quadrangle maps.

2.0 Setting

2.1 Environmental Setting

The Project area is situated within the broad north-south trending San Ramon Valley through which Walnut Creek flows and is composed of alluvial deposits accumulated between low lying hills (100-200 feet elevations). The Project area is within what is now a densely populated urban area.

Temperatures in the summer are high, often reaching over 38° C (100° F) (Brown 1985:87). Annual precipitation in the region averages 20 to 30 inches with precipitation concentrated in the fall, winter, and spring months. The climate is much like that found in the Mediterranean with mild, rainy winters and hot, dry summers. After the first rain at the end of October or early November, the vegetation becomes green and remains green, but not growing, until late February, when the grasses begin to grow rapidly. By early May, the area has usually changed to dry golden-colored grasses, and stays that way until fall.

Since historic and prehistoric times, with some exceptions, the flora and fauna have not changed as dramatically in this part of Contra Costa County as in other areas of California. Common vegetation throughout the valley includes valley oak (*Quercus lobata*), live oak (*Quercus agrifolia*), California buckeye (*Aesculus californica*), California bay laurel (*Umbellularia californica*), star thistle (*Centaurea solstitialis*), wild oats (*Avena fatua*), morning glories (*Convolvulus*), lupine (*Lupinus*), poppies (*Papaver*), wild artichokes (*Cynara scolymus*), and various other native and imported grasses.

Prior to Euroamerican contact, the Native Americans used fire to manage native flora and fauna, maintaining grassland and chaparral by periodic burning. In prehistoric times, animals such as pronghorn sheep, antelope, tule elk, mule deer, black-tail deer, and grizzly bear occupied the area. Today, animal life within the region is similarly diverse but favors small, herbivorous mammals, especially voles, pocket gophers, ground squirrels, and pocket mice. The larger, open areas of the surrounding hills are home to some larger animals including deer, coyote, rabbit, skunk, opossum, raccoon, and a number of birds including red-tailed hawks and turkey vultures.

2.2 Cultural Setting

Regional Prehistoric Archaeological Background

Research into local prehistoric cultures began when Nels C. Nelson of the University of California, Berkeley, conducted the first intensive archaeological surveys of the San Francisco Bay region from 1906 to 1908. Nelson documented hundreds of shellmounds along the shoreline of the San Francisco Bay, when much of the area was still ringed by salt marshes (Nelson 1909:322ff.). Nelson maintained that the intensive use of shellfish – a subsistence strategy reflected in both coastal and bayshore middens – indicated a general economic unity in the region during prehistoric times, and introduced the idea of a distinctive San Francisco Bay archaeological region (Moratto 1984:227).

In 1911, Nelson supervised excavations at CA-SFR-7 (the Crocker Mound) near Hunter's Point in San Francisco County, a site later dated from 1050 B.C. to A.D. 450. L. L. Loud identified archaeological components from this same period in Santa Clara County in 1911 while excavating at CA-SCL-1 (the Ponce, Mayfield, or Castro Mound site). R. J. Drake recognized them in San Mateo County in 1941–42 at CA-SMA-23 (Mills Estate) in San Bruno (Moratto 1984:233).

The work of Nelson and Loud in the Bay Area provided the impetus for investigation into the prehistory of central California, which began in earnest in the 1920s. Stockton-area amateur archaeologists J. A. Barr and E. J. Dawson excavated a number of sites and made substantial collections in the area from 1893 through the 1930s. On the basis of artifact comparisons, Barr identified what he believed were two distinct cultural traditions. Dawson later refined his work into a series of Early, Middle, and Late sites (Ragir 1972; Schenck and Dawson 1929).

Professional or academic-sponsored archaeological investigations began in the 1930s when J. Lillard and W. Purves of Sacramento Junior College formed a field school, conducting excavations throughout the Sacramento Delta area. By seriating artifacts and mortuary traditions, they identified a three-phase sequence similar to Barr's and Dawson's, including Early, Intermediate, and Recent cultures (Lillard and Purves 1936). This scheme went through several permutations, including Early, Transitional, and Late Periods (Lillard et al. 1939) and Early, Middle, and Late Horizons (Heizer and Fenenga 1939). In 1948 and again in 1954, Richard Beardsley refined this scheme and extended it to include the region of San Francisco Bay. The result is referred to as the Central California Taxonomic System (CCTS) (Beardsley 1948, 1954; Moratto 1984). Subsequently the CCTS system of Early, Middle, and Late Horizons was applied widely to site dating and taxonomy throughout central California.

Inevitably, as more data were acquired through continued fieldwork, local exceptions to the CCTS were discovered. Coupled with the accumulation of these exceptions, the development of radiocarbon dating, introduced in the 1950s, and of obsidian hydration in the 1970s, opened up the possibility of dating deposits more accurately. Much of the subsequent archaeological investigation in central California focused on the creation and refinement of local versions of the CCTS.

The difficulties of creating a broadly applicable cultural history are fully discussed by Bennyhoff and Fredrickson (1994). Given the expanse of central California as well as the complex nature of cultural change over space and time, the CCTS is limited to providing a general framework for assigning newly found materials to existing culture chronologies. Nonetheless, a modification of the CCTS (Bennyhoff and Hughes 1987; Milliken and

Bennyhoff 1993) that presents an Early, Middle, and Late Period with associated transitional periods and subperiod phases remains a useful way to assign dates or cultural periods, or both, to newly discovered features or assemblages. Complementary techniques such as obsidian hydration or radiometric measurements further increase the accuracy of these temporal assignments.

Of some relevance for the current Project is a chronological scheme developed by Bennyhoff and Hughes (1987:149). In brief and general form, this scheme includes the following periods and chronology:

- Early Period, ca. 6000–500 B.C.
- Early/Middle Period Transition, ca. 500–200 B.C.
- Middle Period, ca. 200 B.C.–A.D. 700
- Middle/Late Period Transition, ca. A.D. 700–900
- Late Period, ca. A.D. 900–1750

These periods of the CCTS are associated with patterns such as the Windmiller, Berkeley, and Augustine patterns. A pattern is

> [an] adaptive mode(s) extending across one or more regions, characterized by particular technological skills and devices, particular economic modes, including participation in trade networks and practices surrounding wealth, and by particular mortuary and ceremonial practices. (Fredrickson 1973:7–8)

The Windmiller pattern sites are most often found in the Early period (ca. 6000–500 B.C.), but they are known to extend into the Middle period, possibly as late as A.D. 500 in certain areas (Moratto 1984:210). Windmiller pattern sites are often situated in riverine, marshland, or valley floor settings, as well as atop small knolls above prehistoric seasonal floodplains, locations that provided a wide variety of plant and animal resources. Most Windmiller pattern sites have burials with remains that are extended ventrally, oriented to the west, and that contain copious amounts of mortuary artifacts. These artifacts often include large projectile points and a variety of fishing gear such as net weights, bone hooks, and spear points. The faunal remains indicate that the inhabitants hunted a range of both large and small mammals. Stone mortars and grindstones for seed and nut processing are common finds. Other artifacts—such as charmstones, ocher, quartz crystals, and *Olivella* shell beads and *Haliotis* shell ornaments—suggest the practice of ceremonialism and trade.

Some scholars have suggested that Windmiller pattern sites are associated with an influx of people from outside California who introduced subsistence strategies adapted for a riverine-wetlands environment (Moratto 1984:207). Windmiller assemblages have been found to overlap in time with those of the Berkeley pattern (Moratto 1984).

The Berkeley pattern has been found from at least 3000 B.C. in the east San Francisco Bay (e.g., Alameda District) (Bennyhoff 1982; Hughes 1994), with the number of sites increasing through A.D. 1 (Moratto 1984:282). The people characterized by the Berkeley pattern expanded eastward to the Central Valley after about 500 B.C. Berkeley pattern sites are much more common and well documented, and therefore better understood, than Windmiller pattern sites. Berkeley sites are scattered in more diverse environmental settings, but riverine settings are prevalent.

Deeply stratified midden deposits that developed over generations of occupation are common to Berkeley pattern sites. These middens contain numerous milling and grinding stones for food preparation. The typical body position for burials is tightly flexed, with no particular preference for orientation. Associated grave goods are much less frequent than with either the Windmiller or the Augustine pattern. Projectile points in this pattern are larger in earlier times but become progressively smaller and lighter over time, culminating in the introduction of the bow and arrow during the Late period. Wiberg (1997:10) claims that large obsidian lanceolate projectile points or blades are unique to the Berkeley pattern. *Olivella* shell beads include Saddle (F) and Saucer (G) types. *Haliotis* pendants and ornaments are occasionally found. Slate pendants, steatite beads, stone tubes, and ear ornaments are unique to Berkeley pattern sites (Fredrickson 1973:125–126; Moratto 1984:278–279). As with the Windmiller Pattern sites, evidence of warfare or interpersonal violence is present, including cranial trauma, parry fractures, and embedded projectile points.

The Augustine pattern coincides with the Late period, ranging from as early as A.D. 700 to about A.D. 1750 and is typified by intensive fishing, hunting, and gathering (especially of acorns), a large population increase, expanded trade and exchange networks, increased ceremonialism, and the practice of cremation in addition to flexed burials. Certain artifacts are also distinctive in the Augustine pattern: bone awls used in basketry, small notched and serrated projectile points that are indicative of bow-and-arrow usage, occasional pottery, clay effigies, bone whistles, and stone pipes. *Olivella* bead and *Haliotis* ornaments increase in number of types and frequency of occurrence, sometimes numbering in the hundreds in single burials. Beginning in the latter half of the 18th century, the Augustine pattern was disrupted by the Spanish explorers and the mission system (Moratto 1984:283).

The establishment of a chronology allows archaeologists to explore other kinds of evidence and research questions that focus on cultural responses to environmental change, settlement and subsistence strategies, trade and exchange routes, population movement, and related topics. Shifting focus from typology to adaptation in the 1970s, Fredrickson identified widespread cultural patterns on the basis of technology (artifacts and inferred skills), economic modes (inferred from processing equipment and food remains), and cultural tradition (e.g., mortuary practices) (Breschini 1983; Fredrickson 1973). Fredrickson identified Paleoindian, Archaic, and Emergent periods inspired by original work by Willey and Phillips (1958). Table 1 summarizes the taxonomic framework developed by Fredrickson (1994).

Fredrickson's scheme places subsistence, organization, and exchange patterns and strategies within a chronological framework. Projectile point types, shell bead and ornament types, and other specific artifact types can be associated with a period by virtue of the dates that may be assigned to them, but Fredrickson's scheme is not defined on the basis of specific types of objects, as is the scheme associated with Bennyhoff, the CCTS.

Table 1. Summary of the taxonomic framework developed by Fredrickson (1973, 1994).

Period and Time Range	Technology, Subsistence	Exchange	Organization
Paleoindian 8000–6000 B.C. Wet and cool; lakeside habitation	Foraging: large projectile points imply hunting with dart and atlatl; groups change habitat to find resources	Ad hoc between individuals	Extended family; little emphasis on wealth
Lower Archaic 6000–3000 B.C. Drying of pluvial lakes, habitations move to rivers, streams	Foraging: milling stones indicate plant food; dart and atlatl imply hunting also important; use of local materials	Ad hoc between individuals	Extended family; little emphasis on wealth
Middle Archaic 3000–500 B.C. Climatic amelioration; local specializations of marine, upland, riverine environments	Foraging: mortars and pestles imply acorn economy; dart and atlatl persist; hunting remains important; tool kits diversify	If changes occur, do not see in archaeological record	Extended family, sedentism begins; growth of population and expansion into diverse niches
Upper Archaic 500 B.C.–A.D. 800 Cooler climate	Foraging, but also some collecting; mortars, pestles; dart and atlatl	More complex: regular exchange between groups; ad hoc continues	Sociopolitical complexity; status distinctions imply wealth; group-oriented religious orgs.; no firm territories
Lower Emergent A.D. 800–1500	Collecting dominates, some foraging; small projectile points imply use of bow and arrow; mortars and pestles persist	Regularized exchanges between groups; more materials in network; ad hoc continues	Status distinctions more pronounced; established territories

Period and Time Range	Technology, Subsistence	Exchange	Organization
Upper Emergent A.D. 1500–1800	Collecting dominates, some foraging; bow and arrow; mortars, pestles; local specialization re: production;	Clam disk beads imply money; local specialization; exchange materials move farther distances; ad hoc continues	

Local Prehistory

Archaeological investigation in the Walnut Creek drainage began with Loud in 1913 when he recorded known and obvious (surficial) sites for the University of California at Berkeley Anthropology Museum (Fredrickson 1980:4).

During the 1950s and into the 1960s, local archaeological investigations were limited to sites revealed during construction. After the initiation of environmental protection laws in the mid-1970s, some project-specific, systematic archaeological surveys were conducted in addition to the salvaging of sites discovered during construction projects. To date, no systematic survey of the entire Walnut Creek drainage has been undertaken. Given the urban and suburban sprawl in the heavily populated Walnut Creek drainage area, as well as the deeply buried nature of many sites older than a few hundred years within the alluvial setting of the Walnut Creek floodplain and drainage, it is unlikely that such a survey would provide information of use in the construction of a local chronology.

Funded by the U.S. Army Corps of Engineers stream channel stabilization effort known as the Walnut Creek Project, Fredrickson synthesized the state of knowledge of the prehistory of the Walnut Creek drainage and identified avenues for future research (Fredrickson 1980). In association with the same project and project sponsor, Banks, Orlins, and McCarthy (Banks et al. 1984) reviewed and updated Fredrickson's synthesis in the context of test excavation and evaluation of CA-CCO-431, the Murwood School site (Banks et al. 1984).

Fredrickson characterized the earliest inhabitants of the Walnut Creek drainage area, known from at least 2000 B.C., as almost completely dependent on local resources. The artifacts that were imported originated from a wide variety of sources, suggesting that trade was random and that no trade networks had been established. The early society must have been egalitarian, as burials were similar to each other with very few, if any, associated artifacts. During the subsequent two millennia both social and economic networks expanded, leading to specialization of production and to fixed trading relationships. As trade increased and became more integral to the society, the status and wealth of those controlling the factors of production increased as well. Wealth, ascribed status, and prestige are seen in the differential mortuary complexes of burials dating to the later periods.

Up until 2004, the Rossmoor Site (CA-CCO-309) located in Walnut Creek was known as a near-surface Late Period occupation site with burials. In 2006, it was found to have two deeply buried components ranging from over 3000 B.C. to ca. 1000 B.C. providing a new opportunity to extend and refine the local chronology (Price et al. 2006).

Banks et al. (1984) discuss the cultural changes observed in Contra Costa County prehistory in terms of regional climatic shifts. The first shift occurs around 2,800 years ago with the onset of the Recess Peak Glacial Advance. For Banks et al. the shift marks the transition from warmer, drier conditions to cooler and wetter conditions that caused heavy alluvial deposition. At around A.D. 500 the entrance of the Ancestral Bay Miwok into the Diablo area corresponds with another shift back toward warmer and drier conditions.

Banks et al. (1984:3.16) summarize prehistoric occupation of the Walnut Creek drainage as follows:

- There is evidence of continuous occupation from 3,000 years ago to the mid-19th century.
- Many habitation sites are located at or near the confluence of a major drainage and a tributary.
- Several sites are located on natural levees along the banks of major drainages.
- Some of the burials represent off-site or the edge of village cemeteries, but more commonly burials were integrated within villages.
- Periods of intense alluvial deposition separated components with periods of stability, indicated by buried surfaces or paleosols found at various sites in the drainage.
- These components may be somewhat offset from one another so that they are not directly superimposed.

The evidence from the Rossmoor site pushes back the earliest occupation of the area to at least 3000 B.C. Native American archaeological sites located in this portion of Contra Costa County tend to be situated within creek floodplains and are often buried under alluvium of varying thickness.

Ethnographic Background

This section provides a brief summary of the ethnography of the San Francisco Bay Area and is only intended to provide a general background. More extensive reviews of Ohlone ethnography are presented in Bocek (1984), Cambra et al. (1996), Kroeber (1925), Levy (1978), Milliken (1995), and Shoup et al. (1995).

The Project area lies within the region occupied by the Ohlone or Costanoan group of Native Americans at the time of historic contact with Europeans (Kroeber 1925:462-473). Although the term Costanoan is derived from the Spanish word costaños, or "coast people," its application as a means of identifying the native Ohlone population is based in linguistics. The Costanoans spoke a language now considered one of the major subdivisions of the Miwok-Costanoan, which belonged to the Utian family within the Penutian language stock (Shipley 1978:82 84). Costanoan designates a family of eight languages.

Costanoan-speaking tribal groups occupied the area from the Pacific Coast to the Diablo Range and from San Francisco to Point Sur. Modern descendants of the Costanoan prefer to be known as Ohlone. The name Ohlone is derived from the Oljon group, which occupied the San Gregorio watershed in San Mateo County (Bocek 1984:8). The two terms (Costanoan and Ohlone) are used interchangeably in much of the ethnographic literature.

On the basis of linguistic evidence, it has been suggested that the ancestors of the Ohlone arrived in the San Francisco Bay area about A.D. 500, having moved south and west from the Sacramento-San Joaquin Delta. The ancestral Ohlone displaced speakers of a Hokan language and were probably the producers of the artifact assemblages that constitute the Augustine Pattern described below (Levy 1978:486). On the basis of archaeological evidence, Milliken et al. (2007:99) dates the arrival of the Ohlone earlier, to about 2550 B.C. The three thousand year difference in interpretations remains to be resolved.

Although linguistically linked as a family, the eight Costanoan languages comprised a continuum in which neighboring groups could probably understand each other. However, beyond neighborhood boundaries, each group's language was reportedly unrecognizable to the other. Each of the eight language groups was subdivided into smaller village complexes or tribal groups. The groups were independent political entities, each occupying specific territories defined by physiographic features. Each group controlled access to the natural resources of their territories, which also included one or more permanent villages and numerous smaller campsites used as needed during a seasonal round of resource exploitation.

The vestiges of many village sites within the San Francisco Bay Area have been found in numerous locations around the Bay shoreline in the form of shell mounds -- large accumulations of shell, ash, artifacts, and occasionally human remains. With the influx of European settlers in the mid-19th century, most of these sites were destroyed or buried (Alvarez 1992:4-22).

Extended families lived in domed structures thatched with tule, grass, wild alfalfa, or ferns (Levy 1978:492). Semisubterranean sweathouses were built into pits excavated in stream banks and covered with a structure against the bank. The tule raft, propelled by double-bladed paddles, was used to navigate across San Francisco Bay (Kroeber 1925:468).

Mussels were an important staple in the Ohlone diet, as were acorns of the coast live oak, valley oak, tanbark oak and California black oak. Seeds and berries, roots and grasses, and the meat of deer, elk, grizzly, rabbit, and squirrel formed the Ohlone diet. Careful management of the land through controlled burning served to ensure a plentiful, reliable source of all these foods (Levy 1978:491).

In the more recent prehistoric times through European contact and the early historic period, the Ohlone usually cremated a corpse immediately upon death, but if there were no relatives to gather wood for the funeral pyre, interment occurred. Mortuary goods comprised most of the personal belongings of the deceased (Levy 1978:490).

The arrival of the Spanish in 1775 led to a rapid and major reduction in native California populations. Diseases, declining birth rates, and the effects of the mission system served to disrupt aboriginal life ways (which are currently experiencing resurgence among Ohlone descendants). Brought into the missions (the Yelamu inhabitants joined Mission San Francisco from 1777 to 1787 [Milliken, 1995:260]), the surviving Ohlone, along with the Esselen, Yokuts, and Miwok, were transformed from freely moving hunters and gatherers, into agricultural laborers tethered to the mission locale (Levy, 1978; Shoup et al. 1995). With Mexican independence in 1821 and the subsequent abandonment of the mission system, numerous ranchos were established. Many former mission Indians disbursed, and those who remained were then forced by necessity to work on the ranchos.

In the 1990s, some Ohlone groups (e.g., the Muwekma, Amah, and Esselen further south) submitted petitions for federal recognition (Esselen Nation 2013; Muwekma Ohlone Tribe 2015). Many Ohlone are active in preserving and reviving elements of their traditional culture and actively consult on archaeological investigations.

Historical Background

Spanish Exploration and Colonization

The 1769 expedition led by Captain Gaspar de Portolá initiated contact between Spanish explorers and the native people of the Bay region. The Portolá party set off from San Diego and from Monterey onward followed the coast route north, spending late October and early November on the San Francisco Peninsula. After having traveled north up the Peninsula along the coast, where they were greeted warmly by a succession of native villages (Milliken 1995:31-34), the Portolá party crossed the Coast Range ridge and began their journey south along the eastern portion of the Peninsula. The Portolá party camped on San Francisquito Creek on November 10, 1769. Father Juan Crespí, who recorded the details of the expedition, wrote:

> At once upon our reaching here, several very well-behaved heathens, most of them well-bearded, came to the camp, giving us to understand that they were from three different villages, and I do not doubt there must be many of these, from the many smokes seen in different directions (Shoup et al. 1995:22).

After a mission and settlement had been established at Monterey, parties began exploring north from a new base of operations. The first to return to the Bay Area in 1770 was Pedro Fages and his party, who chose the inland route instead of the coastal route to the north. Fages and his party explored the eastern shore of San Francisco Bay, passing through the Fremont Plain and eventually reaching the location of modern-day north Oakland. Just south of Alameda Creek, in Fages' only mention of native people in his diary of the exploration, the party encountered a group of local native people:

> Up close to the lake we saw many friendly good-humored heathens, to whom we made a present of some strings of beads, and they responded with feathers and geese stuffed with grass, which they avail themselves of to take countless numbers of these birds (Milliken 1995:36).

In 1772, a second Fages expedition traveled from Monterey passing through the Santa Clara Valley (Levy 1978:398). After passing northward through the region in March 1772, they explored the inland Diablo Valley as far north as the Carquinez Strait and returned south through the Santa Clara Valley in early April 1772.

Fernando Javier Rivera y Moncada and Father Francisco Palou next explored the region in the fall of 1774 (Beck and Haase 1988:17). They, too, followed the inland route and instead of exploring the east side of the Bay, continued north up the San Francisco Peninsula in search of suitable sites for future missions and military installations. The party distributed gifts to native groups along the length of their route.

The final sites for a military base and the first of the Bay Area missions were chosen during the Anza expedition of 1776. Anza and his men traveled up the Peninsula, where a wounded Indian they encountered in modern-day Belmont made them understand that local tribes were in the midst of a conflict. The party explored the entire area that would become San Francisco and continued on to explore portions of the East Bay. At Alameda Creek they came upon thirty Indian men "speaking a language unlike any they had yet heard" (Milliken 1995:54).

The first mission in the San Francisco Bay Area was established in San Francisco with the completion of Mission San Francisco de Asis (Mission Dolores) in 1776. Mission Santa Clara de Asis, located forty miles south of San Francisco, was established just a year later. Mission San Jose, located in modern Fremont, would not be established for another twenty years. Mission lands were used primarily for the cultivation of wheat, corn, peas, beans, hemp, flax, and linseed, and for grazing cattle, horses, sheep, pigs, goats, and mules. In addition, mission lands were used for growing garden vegetables and orchard trees such as peaches, apricots, apples, pears, and figs.

The missions relied on the Native American population both as their source of Christian converts and their primary source of labor. Though some Indians gave up their traditional way of life by choice, many were coerced, manipulated, and forced into the missions. Soldiers stationed at the Presidio were called upon to both punish those Indian people the priests could not control through more diplomatic means, as well as to retrieve people who attempted to return to their native villages. By the mid 1790s, traditional Costanoan lifeways had been significantly disrupted, and diseases introduced by the early expeditions and missionaries, and the contagions associated with the forced communal life at the missions, resulted in the death of a large number of local peoples. Cook (1943) estimates that by 1832, the Costanoan population had been reduced from a high of over 10,000 in 1770 to less than 2,000.

Mexican Rule and Secularization of the Mission System

Following Mexican independence from Spain in 1821, control of Spain's North American colonial outposts was ceded to the Republic of Mexico. Alta California became a province of the new republic and under Mexican rule Californians could now trade with foreigners and, further, foreigners could own property once they had been naturalized and converted to Catholicism. These new regulations made California more attractive to permanent settlers and, not surprisingly, the numbers of Mexican and non-Mexican born immigrants continued to increase during this period.

However, life remained difficult for Indian people within the mission system. Locally, tensions mounted in the summer of 1829 when Indians of the San Jose and Santa Clara missions rebelled under the leadership of an Indian chieftain, Estanislao, and his companion, Cipriano (Shoup et al 1995:83). The confrontations that took place that summer resulted in casualties for both the Indian rebels and the soldiers serving the mission (Shoup et al. 1995:86). The fact that Indian people who had maintained long-term relationships with local missions were motivated to rebel against them reflected poorly on the institution's ultimate success. Difficulties like these on the local level, as well as the larger issues of administering such a widespread institution, and the desire of the Mexican government to remove the missions' vast land holdings from the control of Franciscan priests, resulted in the secularization of the mission system.

The process of secularization began in California in 1834. Very few Indian people received land as a result of secularization. In the end, former mission lands were parceled out in large land grants, and just as they had done in the missions, Native Americans served as a source of labor for the new landowners. Fifty-eight percent of land grants were made to Mexican citizens, while forty-two percent were made to non-Mexicans who had become naturalized and baptized, gaining access to property in the process (Beck and Haase 1988:24). Prior to secularization, 51 grants had been made in Alta California. "Of the 813 grants ultimately claimed, 453 were filed between 1841 and 1846, 277 from 1844 to 1846, and 87 in the last few months before United States occupation" (Beck and Haase 1988:24).

Throughout the state the land grants meant that the agricultural economy that was once limited to the missions and pueblos quickly encompassed a growing number of cattle ranches run by men interested primarily in the hide and tallow trade. The current Project area was situated within the 3,329-acre area of Rancho Acalanes (Beck and Haase 1988:30). In 1834-5, California Governor José Figueroa granted the rancho to Candelario Valencia (Kyle 1990:56).

The Mexican-American War and the Gold Rush Lead to Statehood

As overland migration of American settlers from the east into Alta California became more common in the 1840s, relations between the United States and Mexico became strained, with Mexico fearing American encroachment into their territories. The political situation continued to deteriorate and twice Mexico rejected an American offer to purchase California. In 1836, a revolution in Texas drove out the Mexican government and created an independent republic that was annexed to the United States in 1845, causing a rift in the diplomatic relations of the two nations. The following year Mexico and the United States were at war. American attempts to seize control of California quickly ensued, and within two months, California was conquered by the United States. Skirmishes between the two sides continued until California was officially annexed to the United States in 1848 (Kyle 1990:xiii-xiv).

Shortly after the signing of the Treaty of Guadalupe Hidalgo, the discovery of gold in the Sierra Nevada ignited a major population increase in the northern half of California as immigrants poured into the territory seeking gold or the opportunities inherent in producing goods or services for miners. Prior to the Gold Rush, San Francisco was a small settlement with an approximate population of 800 inhabitants. With the discovery of gold and the sudden influx of thousands of optimistic gold seekers, a city of canvas and wood sprang up as men and goods streamed into the once isolated outpost.

California statehood and the end of Mexican rule ushered in yet another body of laws that governed life in this rapidly changing landscape. Of particular importance to both the people who had established themselves in California during the Mexican era and to those recent immigrants who hoped to settle in California after the gold rush, were the laws governing property ownership. Although Mexican citizens had been assured of their property rights after annexation, the frenzy of the gold rush made northern California's vast rancho lands irresistible to new arrivals, who often squatted on property that they did not own. In 1851 the U.S. government established a land commission to bring order to the increasingly chaotic situation. The three-member commission was assigned the formidable task of authenticating land titles granted by the Mexican government, placing the burden of proof on the property owners themselves. Long-time residents spent much of the next two decades trying to gain clear title to their land, often gaining title only to have to use the land itself to pay the legal bills that had accumulated during the process.

Much of present-day Lafayette was within the 3,300-acre Acalanes land grant, deeded to Candelario Valencia. 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 (Kyle 1990:56-57; Town of Moraga 2005). In 1848, Brown built the first of three homes in today's Lafayette, as well as a horse-drawn gristmill and a steam-powered mill, on Lafayette Creek near First Street (City of Lafayette 2012). In 1848, the first three homes were built, making Lafayette the first community in central Contra Costa County.

The Final Decades of the Nineteenth Century

In 1850, Contra Costa became one of the 27 initial counties within the State of California (Hart 1987). The agricultural history of Contra Costa County is underwritten by a variety of cultural traditions, technological developments, and ideological views. As Caltrans (2007:14-18) has argued, California was seen as a land of economic opportunity, not just for its mining resources, but for its productive land where farmers could cultivate a variety of crops. Agriculture became important in the California economy in the late 1850s, and in the 1850s and 1860s homesteading became a means by which people could achieve the dream of private land-ownership and the family farm (Caltrans 2007:13). While politicians recognized the importance of the family farm in the 1870s, rising land prices were making the family farm a less attainable dream. Large-scale commercial operations that took advantage of mechanical innovations and irrigation developed beginning in the early 1880s. Ironically, at the turn of the century popular culture began advocating the return to agrarian values, in contrast with urban life and industrialization, as part of the "back-to-the-land" movement just as the family farm was becoming less and less sustainable (Caltrans 2007:16-17).

In 1852, the Lafayette Grammar School was established in the downtown area near Moraga Road and Mount Diablo Boulevard (City of Lafayette 2012). A steam-powered gristmill was built by Elam Brown in Lafayette Creek near First Street, which helped advance the city’s commercial center. In the 1860's the downtown consisted of the gristmill, Pioneer Store, grammar school, blacksmith shop, and the hotel. The Brown family deeded the parcel of land that contained the downtown area in 1864, and turned it into one of the first public parks in California, now present-day Lafayette Plaza.

Between 1860 and 1861, the Pony Express stopped in Lafayette 19 times to exchange horses. The increase in traffic brought about new opportunities with the local businesses to serve travelers such as stagecoach and train passengers, and cattlemen.

In the era of increasing industrialization, Contra Costa County made an effort to portray itself as preserving the ideal of the small-scale family farm. As early as 1887 the Contra Costa Board of Trade produced an advertising pamphlet on the virtues of the county as a place to build a farming operation in an effort to draw a larger population to the area (Contra Costa Board of Trade 1887). The pamphlet speaks to the beneficial soils conditions, the types of crops that grow, rainfall, and climate, in addition to describing the pleasant character of each town, its accessibility, and its schools. Perhaps to set the county apart from the trend toward mechanization, the pamphlet mentions in several places that there is "No Irrigation" necessary as oranges, lemons, olives, pomegranates, figs and grapes flourished without it (Contra Costa Board of Trade 1887). The quality of the fruits produced in the county is actually attributed to the lack of need for irrigation itself, as the authors contended that fruits grown without irrigation matured slower and thus were preserved longer (Contra Costa Board of Trade 1887:12).

The benefits of Contra Costa County were similarly touted in 1902 when William L. Metcalfe published *Contra Costa County: Under the Vitascope*. This publication, which served to profile the county and advertise it to potential settlers, discussed not only the growing conditions within the area, but also highlighted the people and places that made the county unique. Extensive photographs, descriptions of each town, prominent figures, and businesses make up the majority of the book. As with the 1887 pamphlet, the author was careful to note that a variety of crops grew "without irrigation" within this region of "almost perpetual spring" (Metcalfe 1902, Reprinted 1994).

Different crops flourished in different areas of California due to each area's climate. At the same time, changes in the agricultural industry over time encouraged farmers to change their operations to stay competitive and relevant. In the 1860s, for example, William Chapman developed wheat as a dominant crop in the San Joaquin Valley by experimenting with cultivation techniques (Jelinek 1982:29). The large international market for wheat, and the high quality wheat the Central Valley was able to produce, were also responsible for keeping much of California dominated by large-scale commercial farms rather than small farms that allowed individual farmers to thrive (Jelinek 1982:39). Because wheat was being shipped all the way to England, California needed to produce large quantities of the crop in order to remain competitive, which ultimately led to innovations in mechanization. As Jelinek (1982:41) points out, "mechanization was possible only because the lands of the Central and Salinas valleys were predominantly flat, free of rocks and trees, deep in light soils, and dry in summer." The 1870s saw combine harvesters become commonplace and in 1886, the first steam powered tractor was used (Jelinek 1982).

Specialty crop agriculture was also an important component of agricultural history in California. At the same time as the wheat boom, "experimentation in fruit and vegetable cultivation had moved intensive agriculture to the threshold of prominence by 1900" (Jelinek 1982: 47). Between 1880 and 1900, a shift from apples to fruits like peaches, plums, prunes, apricots, and pears boosted California's orchard industries, especially as growth of the drying and canning industries accelerated (Jelinek 1982:49). The development of these specialized crops gave California an economic buffer when wheat prices declined in the early-20th century.

Twentieth-Century Expansion

In the beginning of the 20th century, downtown Lafayette had two hotels, two blacksmith shops, one Methodist Church, a grammar school, Pioneer Store, post office, library, telephone office, and Good Templar Hall (City of Lafayette 2012). By 1914, the town hall was built to house community gatherings.

Beginning in 1913, train service ran between Oakland and Sacramento through Lafayette's downtown station. This train, known as the Oakland Antioch or Eastern Railroad, was changed to the Sacramento Northern Railroad. In 1941, the last passenger train ran through the Lafayette station, and in 1957, the last freight train pulled through. This train line became the Lafayette-Moraga Trail.

A steady increase in the population occurred after the Caldecott Tunnel opened in 1937 and allowed traffic to flow between Oakland/Berkeley and Contra Costa County. The largest growth spurt in the area occurred in the 1950's and 1960's when Lafayette almost tripled in size from 7,000 to 20,000. In 1965, to help remedy some of the new traffic complaints, the city selected the site of the future BART station.

Planning for the downtown area began in the 1950's by the Lafayette Design Project. These local citizens working with the Frank Lloyd Wright Foundation helped to start the guidelines that all subsequent planning in Lafayette has followed. The City of Lafayette was incorporated in 1968 (City of Lafayette 2005).

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 Water Treatment Plant in 1928 (EBMUD 1991, 2005).

East Bay Municipal Utility District (EBMUD) was formed in 1923 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 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).

In 1928, five years after EBMUD 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 EBMUD 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 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 EBMUD 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 EBMUD 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 (i.e., the Orinda Water Treatment Plant) in 1936, which continues to be the largest of EBMUD's six water treatment plants.

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 1955, the Leland Reservoir was built (EBMUD 2015). In 1958, Pardee Reservoir was opened for public recreation. In 1964, EBMUD constructed the Sobrante Water Treatment Plant. In 1966, the Lafayette and Chabot reservoirs were opened for public recreation; the Upper San Leandro Water Treatment Plant 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 Water Treatment Plant. By 1970, EBMUD was serving 220 mgd to an East Bay population of 1,100,000 (Noble 1970; EBMUD 2005).

3.0 Results of the Record

On May 24, 2016, WSA conducted a records search for the Project at the Northwest Information Center at Sonoma State University (NWIC) (File No. 15-1701). The records search included a review of cultural resource and excavation reports and recorded cultural resources within a ¼-mile radius of the Project area. The records search also included a review of the Office of Historic Preservation's "Directory of Historic Property Data File for Contra Costa County" and "Archaeological Determinations of Eligibility" for Contra Costa County.

A total of nine cultural resources studies have been conducted within ¼-mile of the Project area (Table 2). None of these studies include or cross any portion of the Project components.

Table 2. Cultural resource studies within ¼-mile of the Project area

Survey #	Date	Author	Title
S-000494	1976	Mara Melandry	Excess Parcel 37539-01-01 on Rescinded Route 77 in the City of Lafayette, Contra Costa County (Caltrans)
S-009210	1987	Suzanne Baker	Preliminary Report, Archaeological Test Excavations at CA-CCO-236, Old Tunnel Road, Lafayette, California (Assessor's Parcel Number 185020034)
S-009212	1987	Suzanne Baker	Final Report, Archaeological Test Excavations at CA-CCO-236, Old Tunnel Road, Lafayette, California
S-012260	1987	Michael Henn and Kathryn Gualtieri	HUD971002B, Concurrence Correspondence, Re: CA-CCO-236, Old Tunnel Road
S-016504	1990	Mick Hayes and Mara Melandry	Negative Archaeological Survey Report, an excess parcel of land between Old Tunnel Road and an on-ramp to Highway 24, 04-CCO-24 P.M. 7.6 04402-332609 (Caltrans)
S-022480	1994	Suzanne Baker, Laurie Hager, Dwight Simons, and James P. Quinn	Archaeological Burial Recovery at CA-CCO-236, Contra Costa County, California
S-022702	2000	Kimberly Esser	A Cultural Resources of the Lands of Gene and Pamela Schmidt (APN 185-450-011, 185-450-014) Lafayette, Contra Costa County, California
S-030912	2000	Jeffrey Hall, Eduardo Serafin, and Christopher D. Dore	Cultural Resources Inventory for the Lamorinda Recycled Water Project, Contra Costa County, California: A study on the Briones Valley, Las Trampas Ridge, Oakland East, Vine Hill, and Walnut Creek U.S.G.S. 7.5' Topographic Quadrangles
S-031827	2005	Leigh Martin	Archaeological Survey and Assessment of a 3-Acre Parcel (APN 185-080-018), Located at 1018 Hoedel Court, Lafayette, Contra Costa, California. (letter report)

The records search indicated that no previously recorded resources are located within the Project area. Three previously recorded resources (two prehistoric sites, P-07-000117 and P-07-000118, and one historic site, P-07-002742) are located within ¼-mile of the Project area (Table 3).

Table 3. Cultural resources within ¼-mile of the Project area

Primary Number	Trinomial	Site Description	Recording Events
P-07-000117	CA-CCO-000235	Prehistoric midden/ lithic scatter; burials; hearths/pit features; habitation debris	1913 (Loud); 1954 (J. A. Bennyhoff)
P-07-000118	CA-CCO-000236	Prehistoric midden/ habitation debris; burials	1913 (Loud, by Pilling); 1978 (M. Melandry, C. Sutton)
P-07-002742	N/A	Historic Farm/ranch	2005 (Leigh Martin)

4.0 Native American Consultation

WSA contacted the Native American Heritage Commission (NAHC) by email on May 19, 2016, requesting information on sacred lands and a contact list of local tribal representatives. A response was received from the NAHC on June 3, 2016 that indicated there are no sites within the Project vicinity listed in the Sacred Lands File. The NAHC also provided a list of Contra Costa County Native American Contacts. The list of Native American contacts included Irene Zwierlein, Amah/Mutsun Tribal Band; Katherine Erolinda Perez; Ann Marie Sayers, Indian Canyon Mutsun Band of Costanoan; Raymond Hitchcock, Chairperson, Wilton Rancheria; Rosemary Cambra, Muwekma Ohlone Indian Tribe of the SF Bay Area; and Andrew Galvan, The Ohlone Indian Tribe. WSA contacted the Native American representatives by letter, on June 14, 2016, informing them of the Project. Follow-up phone calls to the Native American representatives were placed on June 24 and June 29, 2016. Irene Zwierlein recommended that all construction crews be given "cultural resource and sensitivity training," and Ann Marie Sayers recommended that Native American monitors be used in addition to archaeological monitors. No other comments or recommendations have received to date. A record of the Native American consultation can be found in Appendix A.

5.0 Survey Methods

A pedestrian archaeological reconnaissance survey was conducted on June 17, 2016 by WSA Staff Archaeologist Brenna Wheelis using survey transects of not more than 20 m intervals. Digital photographs were taken of the survey area for use in preparation of DPR 523 forms and the final report. Photographs included general views of the topography and vegetation density, structures, artifacts, and other relevant images. A photo log was maintained to include, at a minimum, photo number, date, orientation, and photo description.

All of the exposed ground surface within the Project area was examined for the presence of historic or prehistoric site indicators. Historic site indicators include, but are not limited to foundations, fence lines, ditches, standing buildings, objects or structures such as sheds, or concentrations of materials at least 50 years in age, such as domestic refuse (glass bottles, ceramics, toys, buttons or leather shoes), or refuse from other pursuits such as agriculture (e.g., metal tanks, farm machinery parts, horse shoes) or structural materials (e.g., nails, glass window panes, corrugated metal, wood posts or planks, metal pipes and fittings). Prehistoric site indicators include, but are not limited to areas of darker soil with concentrations of ash, charcoal, bits of animal bone (burned or unburned), shell, flaked stone, ground stone, or even human bone.

Because the Leland Reservoir structure is historic (over 45 years of age), it was recorded on California Department of Parks and Recreation (DPR) Primary Record Form.

6.0 Results of the Field Survey

The archaeological survey began in the southeast corner of the Project area at the top of the reservoir rim and covered the rim area in a clockwise direction. The survey then covered the northwestern slope area. Active rodent burrows are present on the northern slope area and the spoil from these burrows provides the only visibility of the soils in this area, where visibility is restricted due to thick grasses (Appendix B: Photos 1-2). Soils consist of hard baked clay (Munsell: 10 YR 4/4, 4/3), with moderate to coarse granularity. The northeast quarter of the Project area has a small flat area from which the slope declines at a sharp angle down to Leland Drive (Appendix B: Photo 3). The soils at the north fence line on the plateau before the slope declines are highly pliable and semi-damp (Munsell: 10 YR 3/2, 3/1). Portions of the hillside contain sun-baked, dark reddish brown clayey loam (Munsell: 5YR 4/4, 4/3).

The eastern rim of the reservoir slopes down through a grove of trees toward Leland Drive. A possible Franciscan chert core was observed at the base of the slope, 10 feet north of a north-south axis (Appendix B: Photo 4). Further investigation of the area where the chert core was found yielded no additional artifacts or archaeological evidence. The occurrence of an isolated find of this sort is not surprising since two prehistoric sites (P-07-000117 and P-07-000118) are known to have been located in the vicinity of the Project area (see the results of the records search above). The prehistoric inhabitants of these sites undoubtedly traversed the Project area and surrounding areas for many years. The core is a non-diagnostic artifact and offers no significant information regarding the inhabitants of the surrounding area. The source of the chert could not be ascertained, but probably is from nearby stream cobbles. The find location was recorded with a Trimble hand-held GPS recorder and the artifact was photographed and left on site. The chert core is in an area disturbed during construction of the reservoir in 1955.

Duff is thick under the tree line (3-4 inches thick), consisting of sorrel, oak and eucalyptus leaves. Gall wasp pods appear in high frequency in this area, in addition to large, unidentifiable mushroom caps. The southeastern slope and plateau have active rodent burrows with small angular and rounded rock present (>5 cm in size). The area appears to consist of sandstone and decomposed granite. Visibility of ground surface is low due to the presence of milkweed, mustard flower, and thick grasses.

The southern boundary of the Project area slopes gently to a flat area containing scrub brush (Appendix B: Photo 5). Rodent burrows contain small angular rock (>5 cm in size). No cultural materials were observed in the burrow spoil. The southwestern portion of the Project area contains a large area of flat ground with shady tree canopy. Surface visibility is low due to thick grasses and duff. Modern trash was observed, consisting primarily of beer bottles, beer cans, and concrete fragments. There is sparse rodent burrow activity in this area of the Project parcel. The narrow western slope of the reservoir was surveyed and the clay and concrete spillways there were photographed (Appendix B: Photo 6).

A windshield survey of Windsor Drive where the distribution pipeline will be constructed was conducted. The surrounding homes are heavily landscaped, no native soils were observed. The area of impact in the roadway is obscured by asphalt blacktop.

6.1 Leland Reservoir

The reservoir is located at the top of the 14.5-acre Project site opposite 1050 Leland Drive. The existing reservoir basin is a concrete-lined reservoir, with pre-cast concrete girders, columns, and a pre-cast concrete panel roof that was constructed circa 1955 (EBMUD 2015). The reservoir basin is roughly trapezoidal in plan, and is wider on the northern edge (approximately 328 feet at the roof) than the southern edge (approximately 244 feet at the roof). The reservoir is approximately 557 feet long at the roof and then slopes down to form a basin. It holds approximately 18 MG of treated water. The reservoir is cut into the natural hilltop to a depth of approximately 30 feet. Pre-cast concrete girders held in place by concrete columns support the roof, which is constructed of precast concrete panels laid into wood frames (Appendix B: Photo 7). The reservoir is connected to the distribution system through a 36-inch diameter transmission pipeline that enters the reservoir on the northeast and leaves the reservoir on the southwest. The reservoir was recorded on Department of Parks and Recreation (DPR) forms that can be found in Appendix C.

7.0 Impact Assessment and Recommendations Regarding Discoveries during Construction

7.1 CRHR Criteria for Evaluation

Under the California Environment Quality Act (CEQA) both public and private projects with financing or approval from a public agency must assess the project's effects on cultural resources (Public Resources Code Section 21082, 21083.2 and 21084 and California Code of Regulations 10564.5).

Cultural resources are buildings, sites, humanly modified landscapes, traditional cultural properties, structures, or objects that may have historical, architectural, cultural, or scientific importance. CEQA states that if a project will have a significant impact on important cultural resources, then project alternatives and mitigation measures must be considered. However, only significant cultural resources need to be considered in the mitigation plans.

CEQA defines significant historical resources as "resources listed or eligible for listing in the California Register of Historical Resources (CRHR)" (Public Resources Code Section 5024.1). A property may be considered historically significant if it meets the following criteria for listing on the CRHR:

1. It is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;
2. It is associated with the lives of persons important to California's past;
3. It 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
4. It has yielded or is likely to yield information important in prehistory or history (Public Resources Code Section 5024.1).

<u>Integrity</u>

In addition to meeting one or more of the four specific criteria listed above, a historic property or historic resource must possess "integrity" to qualify for listing in the CRHR. Integrity is generally evaluated with reference to qualities including location, design (i.e., site structure), materials, workmanship, setting, feeling, and association. A potentially eligible site must retain the integrity of the values that would make it significant. Typically, integrity is indicated by evidence of the preservation of the contextual association of artifacts, food remains, and features within the archaeological matrix (as would be required under Criterion 4 above) or the retention of the features that maintain contextual association with historical developments or personages that render them significant (Criteria 1, 2, or 3 above). Evidence of the preservation of this context is typically determined by stratigraphic analysis and analysis of diagnostic artifacts and other temporal data (e.g., obsidian hydration, radiocarbon assay) to ascertain depositional integrity or by the level of preservation of historic and architectural features that associate a property with significant events, personages, or styles.

Integrity refers both to the authenticity of a property's historic identity, as shown by the survival of physical characteristics that existed during its historic period, and to the ability of the property to convey its significance. This is often not an all-or-nothing scenario (determinations can be subjective); however, the final judgment must be based on the relationship between a property's features and its significance.

7.2 Assessment and Recommendations

WSA conducted the archaeological survey of the Project area on June 17, 2016. The archaeological survey of the Project area did not identify any evidence of previously unrecorded archaeological resources and the records search results indicated that no previously recorded archaeological resources were located on the property. WSA recommends no further action regarding prehistoric archaeological resources.

WSA recorded the Leland Reservoir as a historic built resource since its construction date of circa 1955 means that it meets the 50 year age requirement for historic resources. The reservoir was evaluated for its eligibility for listing in the CRHR.

Assessment of Leland Reservoir

Criterion 1. The reservoir is not associated with events that have made a significant contribution to the broad patterns of California's history. It represents a later expansion of an already existing system of water storage in the mid-20th century development of Contra Costa County. As a result, WSA recommends that the Leland Reservoir is not eligible for listing in the CRHR under Criterion 1, as it is not associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage.

Criterion 2. The Leland Reservoir is not associated with the lives of people considered important to California's past. As a result, WSA recommends that the reservoir is not eligible for listing in the CRHR under Criterion 2.

Criterion 3. The reservoir does not embody the distinctive characteristics of a type, period, region, or method of construction, nor does it represent the work of an important creative individual or possess high artistic values. The reservoir is functional in design and does not reflect a specific aesthetic and the builder used available building materials. As a result, WSA recommends that the reservoir is not eligible for listing in the CRHR under Criterion 3.

Criterion 4. Criterion 4 is not typically applied to built resources, and is not considered in relation to the potential eligibility of the Leland Reservoir.

Integrity

As discussed above, in order to be eligible for the CRHR, a resource must meet one or more of the criteria and must also possess "integrity," which includes consideration of the resource's location, design (i.e., site structure), materials, workmanship, setting, feeling, and association. The Leland Reservoir does not meet any of the criteria discussed above and therefore any further discussion of integrity is not warranted. WSA recommends that the Leland Reservoir is not eligible for listing in the CRHR.

WSA recommends the following actions in case of unanticipated discoveries.

- In accordance with CEQA Guideline §15064.5 (f), WSA recommends that should any previously unknown historic or prehistoric resources, including but not limited to charcoal, obsidian or chert flakes, grinding bowls, shell fragments, bone, pockets of dark, friable soils, glass, metal, ceramics, wood, privies, trash deposits or similar debris, be discovered during ground disturbing activities, work within 25 feet of these materials should be stopped until a qualified professional archaeologist has an opportunity to evaluate the potential significance of the find and to consult with EBMUD about what mitigation would be appropriate to protect the resource.

- In the event that Native American human remains or funerary objects are discovered, the provisions of the California Health and Safety Code should be followed. Section 7050.5(b) of the California Health and Safety Code states:

> In the event of discovery or recognition of any human remains in any location other than a dedicated cemetery, there shall be no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent remains until the coroner of the county in which the human remains are discovered has determined, in accordance with Chapter 10 (commencing with Section 27460) of Part 3 of Division 2 of Title 3 of the Government Code, that the remains are not subject to the provisions of Section 27492 of the Government Code or any other related provisions of law concerning investigation of the circumstances, manner and cause of death, and the recommendations concerning treatment and disposition of the human remains have been made to the person responsible for the excavation, or to his or her authorized representative, in the manner provided in Section 5097.98 of the Public Resources Code.

The County Coroner, upon recognizing the remains as being of Native American origin, is responsible to contact the Native American Heritage Commission within 24 hours. The Commission has various powers and duties to provide for the ultimate disposition of any Native American remains, as does the assigned Most Likely Descendant. Sections 5097.98 and 5097.99 of the Public Resources Code also call for "protection to Native American human burials and skeletal remains from vandalism and inadvertent destruction."

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Appendix A

NAHC Correspondence

Additional Information

- California Native Americans
- Cultural Resources
- Strategic Plan
- Commissioners
- Federal Laws and Codes
- State Laws and Codes
- Local Ordinances and Codes
- Additional Information
- Return to CNAHC Home Page

Sacred Lands File & Native American Contacts List Request

NATIVE AMERICAN HERITAGE COMMISSION
915 Capitol Mall, RM 364
Sacramento, CA 95814
(916) 653-4082
(916) 657-5390 – Fax
nahc@pacbell.net

Information Below is Required for a Sacred Lands File Search

Project: RMC Leland Reservoir

County Contra Costa

USGS Quadrangle

Name 7.5' Walnut Creek 1980

Township 1N Range 2W Section(s) 33

Company/Firm/Agency:
William Self Associates, Inc.

Contact Person: Allen Estes

Street Address: 61d Avenida de Orinda

City: Orinda, CA Zip: 94563

Phone: (925) 253-9070

Fax: (925) 254-3553

Email: aestes@williamself.com

Project Description:

NATIVE AMERICAN HERITAGE COMMISSION
1550 Harbor Blvd., Suite 100
West Sacramento, CA 95691
(916) 373-3710
(916) 373-5471 FAX

June 7, 2016

Allen Estes
WSA

Sent by Email: aestes@williamself.com
Number of Pages: 3

RE: RMC Leland Reservoir, Contra Costa County

Dear Mr. Estes:

Attached is a consultation list of tribes with traditional lands or cultural places located within the boundaries of the above referenced counties. Please note that the intent above reference codes is to mitigate impacts to tribal cultural resources, as defined, for California Environmental Quality Act (CEQA) projects.

As of July 1, 2015, Public Resources Code Sections 21080.3.1 and 21080.3.2 require public agencies to consult with California Native American tribes identified by the Native American Heritage Commission (NAHC) for the purpose mitigating impacts to tribal cultural resources:

> Within 14 days of determining that an application for a project is complete or a decision by a public agency to undertake a project, the lead agency shall provide formal notification to the designated contact of, or a tribal representative of, traditionally and culturally affiliated California Native American tribes that have requested notice, which shall be accomplished by means of at least one written notification that includes a brief description of the proposed project and its location, the lead agency contact information, and a notification that the California Native American tribe has 30 days to request consultation pursuant to this section. (Public Resources Code Section 21080.3.1(d))

The law does not preclude agencies from initiating consultation with the tribes that are culturally and traditionally affiliated with their jurisdictions. The NAHC believes that in fact that this is the best practice to ensure that tribes are consulted commensurate with the intent of the law.

In accordance with Public Resources Code Section 21080.3.1(d), formal notification must include a brief description of the proposed project and its location, the lead agency contact information, and a notification that the California Native American tribe has 30 days to request consultation. The NAHC believes that agencies should also include with their notification letters information regarding any cultural resources assessment that has been completed on the APE, such as:

1. The results of any record search that may have been conducted at an Information Center of the California Historical Resources Information System (CHRIS), including, but not limited to:

    - A listing of any and all known cultural resources have already been recorded on or adjacent to the APE;
    - Copies of any and all cultural resource records and study reports that may have been provided by the Information Center as part of the records search response;
    - If the probability is low, moderate, or high that cultural resources are located in the APE.
    - Whether the records search indicates a low, moderate or high probability that unrecorded cultural resources are located in the potential APE; and
    - If a survey is recommended by the Information Center to determine whether previously unrecorded cultural resources are present.

2. The results of any archaeological inventory survey that was conducted, including:

   - Any report that may contain site forms, site significance, and suggested mitigation measurers.

     All information regarding site locations, Native American human remains, and associated funerary objects should be in a separate confidential addendum, and not be made available for pubic disclosure in accordance with Government Code Section 6254.10.

3. The results of any Sacred Lands File (SFL) check conducted through Native American Heritage Commission. A search of the SFL was completed for the USGS quadrangle information provided with negative results.

4. Any ethnographic studies conducted for any area including all or part of the potential APE; and

5. Any geotechnical reports regarding all or part of the potential APE.

Lead agencies should be aware that records maintained by the NAHC and CHRIS is not exhaustive, and a negative response to these searches does not preclude the existence of a cultural place. A tribe may be the only source of information regarding the existence of a tribal cultural resource.

This information will aid tribes in determining whether to request formal consultation. In the case that they do, having the information beforehand well help to facilitate the consultation process.

If you receive notification of change of addresses and phone numbers from tribes, please notify me. With your assistance we are able to assure that our consultation list contains current information.

If you have any questions, please contact me at my email address: Sharaya.souza@nahc.ca.gov

Sincerely,

Sharaya Souza
Staff Services Analyst

Native American Heritage Commission
Tribal Consultation List
Contra Costa County
June 3, 2016

Amah MutsunTribal Band of Mission San Juan Bautista
Irenne Zwierlein, Chairperson
789 Canada Road — Ohlone/Costanoan
Woodside , CA 94062
amahmutsuntribal@gmail.com
(650) 400-4806 Cell

Indian Canyon Mutsun Band of Costanoan
Ann Marie Sayers, Chairperson
P.O. Box 28 — Ohlone/Costanoan
Hollister , CA 95024
ams@indiancanyon.org
(831) 637-4238

Muwekma Ohlone Indian Tribe of the SF Bay Area
Rosemary Cambra, Chairperson
P.O. Box 360791 — Ohlone / Costanoan
Milpitas , CA 95036
muwekma@muwekma.org
(408) 314-1898
(510) 581-5194

North Valley Yokuts Tribe
Katherine Erolinda Perez, Chairperson
P.O. Box 717 — Ohlone/Costanoan
Linden , CA 95236 — Northern Valley Yokuts
canutes@verizon.net — Bay Miwok
(209) 887-3415

The Ohlone Indian Tribe
Andrew Galvan
P.O. Box 3152 — Ohlone/Costanoan
Fremont , CA 94539 — Bay Miwok
chochenyo@AOL.com — Plains Miwok
(510) 882-0527 Cell — Patwin

Wilton Rancheria
Raymond Hitchcock, Chairperson
9728 Kent Street — Miwok
Elk Grove , CA 95624
rhitchcock@wiltonrancheria-nsn.gov
(916) 683-6000 Office

This list is current only as of the date of this document and is based on the information available to the Commission on the date it was produced.

Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

This list is applicable only for consultation with Native American tribes under Public Resources Code Sections 21080.3.1 for the proposed RMC Leland Reservoir, Contra Costa County.

WSA

Consultants in Archaeology and Historic Preservation

June 14, 2016

Ms. Irene Zwierlein, Chairperson
Amah/Mutsun Tribal Band
789 Canada Road
Woodside, CA 94062

RE: Leland Reservoir, City of Lafayette, Contra Costa County, California

Dear Ms. Zwierlein,

WSA, Inc. has been contracted to prepare a cultural resources assessment report for the RMC Leland Reservoir Project (project), located in the City of Lafayette in Contra Costa County. The proposed project will include the replacement of portions of the Leland Reservoir. This includes the replacement of two pre-stressed concrete tanks with an open-cut basin, the replacement of portions of a 36 inch transmission pipeline with new pipeline, and the addition of a new access road. It is located within Township 1 North, Range 2 South of the Walnut Creek 7.5' Topographic Map (USGS 1980).

We would appreciate receiving any comments you may have regarding cultural resources or sacred sites issues within the immediate project area. If you could provide your comments in writing to the address below, or call me, we will make sure the comments are provided to our client as part of this project. We would appreciate a response, at your earliest convenience, should you have information relative to this request. Should you have any questions, I can be reached at (925) 253-9070.

Sincerely,

James M Allen

James Allen
President

Leland Reservoir - Record of Native American Consultation

Name/Affiliation	Date Letter Sent	Date Green Card Received	Date of Follow-up Phone Call (CA)	Comments	Date of 2nd Follow-up Phone Call (CSA)	Comments
Raymond Hitchcock, Chairperson Wilton Rancheria 9728 Kent Street Elk Grove, CA 95624 916-683-6000	6/14/2016		6/24/16	Spoke with the operator he is sending an email to Raymond and he will ask him to call us. Left a message on his phone as well	6/29/16	Spoke with Robin at the front desk, she will give him a message to call us
Katherine Erolinda Perez P.O. Box 717 Linden, CA 95236 209-887-3415	6/14/2016		6/24/16	No answer left message	6/29/16	No answer left message
Ms. Irene Zwierlein, Chairperson Amah/Mutsun Tribal Band 789 Canada Road Woodside, CA 94062 650-400-4806	6/14/2016		6/24/16	No answer left message	6/29/16	Spoke with Irene, she wants the construction crew to be given cultural resource and sensitivity training
Ms. Ann Marie Sayers, Chairperson Indian Canyon Mutsun Band of Costanoan P.O. Box 28 Hollister, CA 95024 831-637-4238	6/14/2016		6/24/16	Spoke with Ann Marie she wants both a Native American and archaeological monitor during earth moving, they have osha 10 certified monitors from Indian canyon	-----------	------------

Name/Affiliation	Date Letter Sent	Date Green Card Received	Date of Follow-up Phone Call (CA)	Comments	Date of 2nd Follow-up Phone Call (CSA)	Comments
Rosemary Cambra, Chairperson Muwekma Ohlone Indian Tribe of the SF Bay Area P.O. Box 360791 Milpitas, CA 95036 408-314-1898 510-581-5194	6/14/2016		6/24/16	No answer left message	6/29/16	No answer left message
The Ohlone Indian Tribe Andrew Galvan P.O. Box 3152 Fremont , CA 94539 chochenyo@ AOL.com (51 0) 882-0527 Cell	6/14/2016 - sent email per his request		6/24/16	Sent follow up email	6/29/16	Sent follow up email

Appendix B

Survey Photographs

Photo 1: View of rodent burrow spoils on the northern slope that provide only ground visibility.

Photo 2: View S along the northern slope of the project area, showing ground surface.

Photo 3: View NE from high plateau area in the northeastern portion of the project area.

Photo 4: View of possible chert core (just above trowel) observed during pedestrian survey.

Photo 5: View S from central portion of survey area toward south end.

Photo 6: View S, along east side of central portion of survey area, showing creek and trail.

Photo 7: View NE, looking over the reservoir roof.

Appendix C

DPR Forms

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary #
HRI #
Trinomial
NRHP Status Code

Other Listings
Review Code   Reviewer   Date

Page 1 of 5   *Resource Name or #:

P1. Other Identifier: Leland Reservoir

***P2. Location:** ☐ Not for Publication ☑ Unrestricted   ***a. County:** Contra Costa County
and (P2b and P2c or P2d. Attach a Location Map as necessary.)
***b. USGS 7.5' Quad:** Walnut Creek **Date:** 1995 **T** 1N; **R** 2W; NE **¼ of SW ¼ of Sec** 33; **M.D.B.M.**
c. Address: opposite 1050 Leland Dr. Lafayette CA 94549   City: Lafayette   Zip: 94549
d. UTM: Zone: 10;   mE/   mN (G.P.S.)
e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate) Elevation:

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

Leland Reservoir is located on a 14.5 acre site opposite 1050 Leland Drive in Lafayette, CA. The existing reservoir basin is a concrete-lined reservoir, with pre-cast concrete girders, columns, and a pre-cast concrete panel roof that was constructed circa 1955. The reservoir basin is trapezoidal in plan, and is wider on the northern edge (approximately 328 ft. at the roof) than the southern edge (approximately 244 ft. at the roof).The reservoir is approximately 557 ft. long at the roof and then slopes down to form a basin. It holds approximately 18 million gallons (MG). The reservoir is cut into the natural hilltop to a depth of approximately 30 ft. The roof, constructed of precast concrete panels laid into wood frames, is supported by pre-cast concrete girders held in place by concrete columns. The reservoir has a 36-inch diameter transmission pipeline that enters it on the northeast and leaves the reservoir on the southwest.
(see continuation sheet).

***P3b. Resource Attributes:** (List attributes and codes)
***P4. Resources Present:** ☐Building ☑Structure ☐Object ☐Site ☐District ☐Element of District ☐Other (Isolates, etc.)

P5a. Photo or Drawing (Photo required for buildings, structures, and objects.)

P5b. Description of Photo: (View, date, accession #) NE view, roof of reservoir, 6/17/2016.

***P6. Date Constructed/Age and Sources:** ☑Historic ☐Prehistoric ☐Both

***P7. Owner and Address:**
EBMUD -
375 11th Street
Oakland CA 94607

***P8. Recorded by:** (Name, affiliation, and address)
Brenna Wheelis
WSA
61d Avenida De Orinda
Orinda CA 94563

***P9. Date Recorded:** June 17, 2016
***P10. Survey Type:** (Describe)

***P11. Report Citation:** (Cite survey report and other sources, or enter "none.")

***Attachments:** ☐NONE ☒Location Map ☒Sketch Map ☒Continuation Sheet ☐Building, Structure, and Object Record ☐Archaeological Record ☐District Record ☐Linear Feature Record ☐Milling Station Record ☐Rock Art Record ☐Artifact Record ☐Photograph Record ☐ Other (List):

State of California - The Resources Agency | Primary #
DEPARTMENT OF PARKS AND RECREATION | HRI #
LOCATION MAP
Trinomial:

Resource Name or # (Assigned by Recorder): Leland Reservoir

*Map Name: Walnut Creek
*Scale: 1:24000
*Date of MAP: 1995

State of California - The Resources Agency | **Primary #**

DEPARTMENT OF PARKS AND RECREATION | **HRI #**

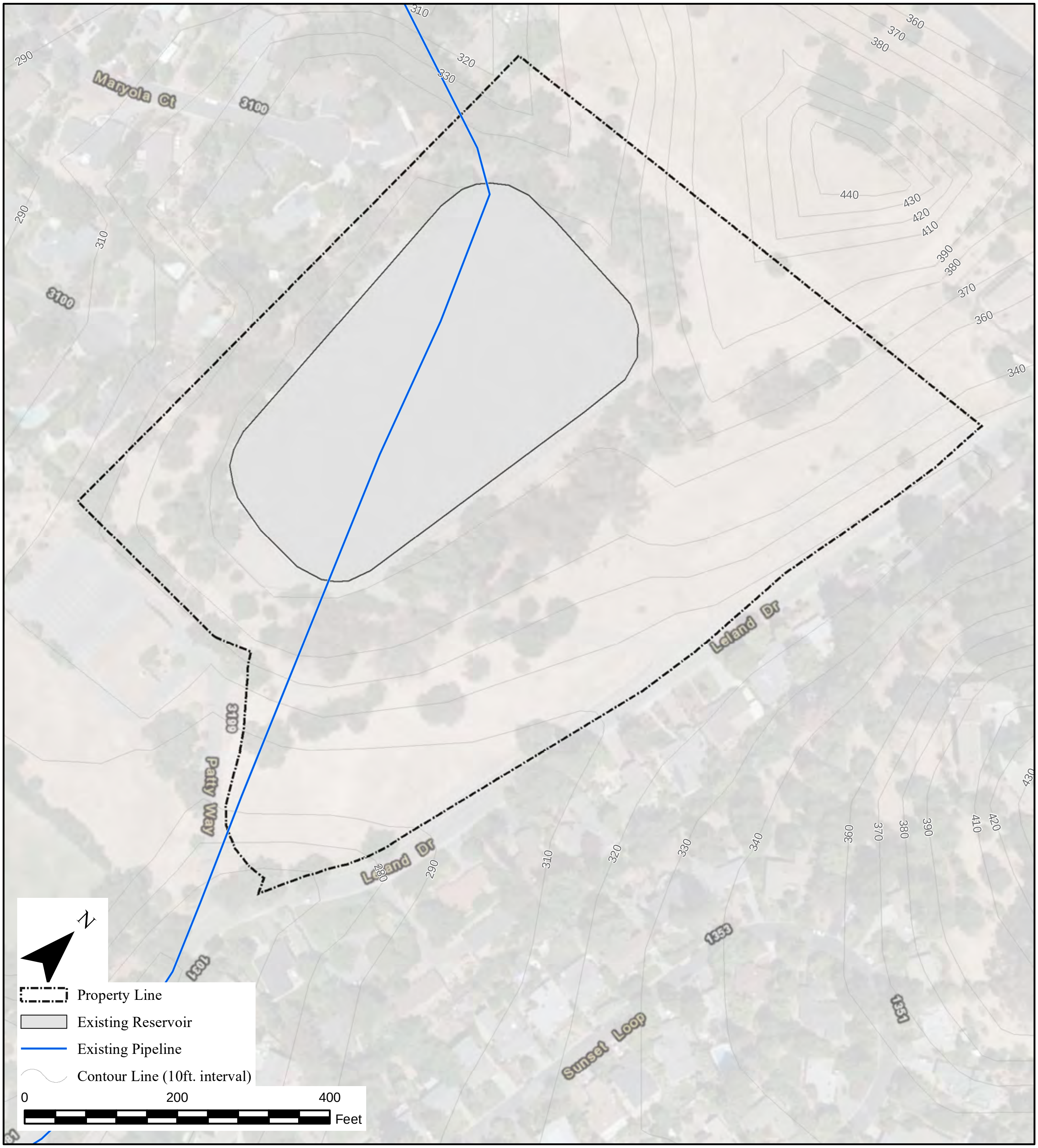
SKETCH MAP

Trinomial:

Resource Name or # (Assigned by Recorder): Leland Reservoir

*Drawn By: N.Fino

*Date: 6/29/2016



***Required Information**

BUILDING, STRUCTURE, AND OBJECT RECORD

 ***NRHP Status Code**

***Resource Name or #** (Assigned by recorder)

B1. Historic Name: Leland Reservoir
B2. Common Name: Same
B3. Original Use: Water Storage B4. Present Use: Water Storage
***B5. Architectural Style:** NA
***B6. Construction History:** (Construction date, alterations, and date of alterations)
Constructed ca. 1955 as part of East Bay Municipal Utilities District's (EBMUD) expansion of its water distribution system in the East Bay.

***B7. Moved?** ☒**No** ☐**Yes** ☐**Unknown** **Date:** **Original Location:**
***B8. Related Features:**
The existing reservoir basin is a concrete-lined reservoir, with pre-cast concrete girders, columns, and a pre-cast concrete panel roof that was constructed circa 1955. The reservoir basin is trapezoidal in plan, and is wider on the northern edge (approximately 328 ft. at the roof) than the southern edge (approximately 244 ft. at the roof).The reservoir is approximately 557 ft. long at the roof and then slopes down to form a basin. It holds approximately 18 million gallons (MG). The reservoir is cut into the natural hilltop to a depth of approximately 30 ft. The roof, constructed of precast concrete panels laid into wood frames, is supported by pre-cast concrete girders held in place by concrete columns. A 36-inch diameter distribution pipeline and system monitoring paraphenalia (e.g., meters, etc.)

B9a. Architect: b. Builder: EBMUD
***B10. Significance: Theme:** Water Storage and Distribution **Area:** East Bay, CA
Period of Significance: 1955 to present **Property Type:** Reservoir **Applicable Criteria:**
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

EBMUD was formed in 1923 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... (see continuation sheet)

B11. Additional Resource Attributes: (List attributes and codes)

***B12. References:**
East Bay Municipal Utility District (EBMUD). 2003. Water Treatment and Transmission Master Plan.
EBMUD..2005. EBMUD District History. Electronic document: http://www.ebmud.com/ about_ebmud/overview/district_history/default.htm. Accessed on May 23, 2015.
EBMUD.2015. Leland Reservoir Replacement. Electronic document: http://www.ebmud.com /files/5514/3172/0869/021015_planning_presentations. pdf. Accessed June 23, 2016.
Noble, John Wesley. 1970 *Its Name was M.U.D.* East Bay Municipal Utility District, Oakland, CA.

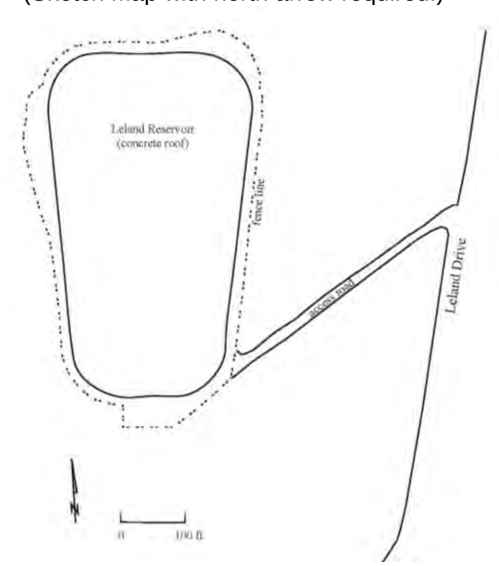
B13. Remarks:

***B14. Evaluator:** Allen Estes, WSA

***Date of Evaluation:** June 17, 2016

(This space reserved for official comments.)

(Sketch Map with north arrow required.)



***B10. Significance** (continued):

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).

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 (i.e., the Orinda Water Treatment Plant) in 1936, which continues to be the largest of the District's six water treatment plants.

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 1955, the Leland Reservoir was built (EBMUD 2015). In 1958, Pardee Reservoir was opened for public recreation. In 1964, EBMUD constructed the Sobrante Water Treatment Plant. In 1966, the Lafayette and Chabot Reservoirs were opened for public recreation; the Upper San Leandro Water Treatment Plant 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 Water Treatment Plant. By 1970, EBMUD was serving 220 mgd to an East Bay population of 1,100,000 (Noble 1970; EBMUD 2005).

Assessment of Leland Reservoir

Criterion 1. The reservoir is not associated with events that have made a significant contribution to the broad patterns of California's history. It represents a later expansion of an already existing system of water storage in the mid-20th century development of Contra Costa County. As a result, WSA recommends that the Leland Reservoir is not eligible for listing in the CRHR under Criterion 1, as it is not associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage.

Criterion 2. The Leland Reservoir is not associated with the lives of people considered important to California's past. As a result, WSA recommends that the reservoir is not eligible for listing in the CRHR under Criterion 2.

Criterion 3. The reservoir does not embody the distinctive characteristics of a type, period, region, or method of construction, nor does it represent the work of an important creative individual or possess high artistic values. The reservoir is functional in design and does not reflect a specific aesthetic and the builder used available building materials. As a result, WSA recommends that neither the residence nor barn are eligible for listing in the CRHR under Criterion 3.

Criterion 4. Criterion 4 is not typically applied to built resources, and is not considered in relation to the potential eligibility of the Leland Reservoir.

Integrity

Since, the Leland Reservoir does not meet any of the criteria discussed above and any further discussion of integrity is not warranted. WSA recommends that the Leland Reservoir is not eligible for listing in the CRHR.

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Appendix I: CEQA Level Geotechnical Feasibility Assessment

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EAST BAY MUNICIPAL UTILITY DISTRICT

DATE:	October 31, 2016
MEMO TO:	Oscar A. Herrera, Associate Civil Engineer, Water Distribution Planning
THROUGH:	Atta B. Yiadom, Senior Civil Engineer, Geotechnical Engineering
FROM:	B. Tom Boardman, Associate Civil Engineer, Geotechnical Engineering BTB 10/31/16
SUBJECT:	Leland Reservoir Replacement Project – CEQA Level Geotechnical Feasibility Assessment

INTRODUCTION

The Water Distribution Planning Division (Planning) recently started the formal California Environmental Quality Act (CEQA) environmental review for the Leland Reservoir Replacement Project located in Lafayette, California. Based on the complexity of the project, anticipated environmental impacts, and the results of the Initial Study, Planning is proceeding with the preparation of an Environmental Impact Report (EIR) with the assistance of a consulting team. Planning requested that the Geotechnical Engineering Section (GES) prepare this memo to provide input into the "Geology and Soils" section of the upcoming administrative draft EIR. Following Board certification of the EIR and approval of the project, the Design Division (Design) will be responsible for preparing the reservoir replacement design and developing the project plans and specifications per the requirements of the EIR.

RECOMMENDATION

Based on this CEQA level geotechnical review, the proposed project is feasible from a geotechnical and geologic perspective. While there are potentially significant "geology and soils" impacts, these impacts can be reduced to a level of less than significant with the incorporation of mitigations in the design and construction phases of the project. Design should request a formal geotechnical design report from GES prior to initiating the earthwork, retaining wall, and foundation designs for the project. In addition, Design should consult with the Regulatory Compliance Office (RCO) for a formal evaluation of potentially contaminated soils (i.e., lead based paint and/or polychlorinated biphenyls (PCBs) in caulking) around the site resulting from the on-going operation and maintenance of the facility, which is typical EBMUD practice.

PROJECT BACKGROUND

The existing 19.5-million gallon (MG), concrete lined open-cut reservoir is located off Leland Drive in Lafayette, California. The relatively large distribution reservoir provides a significant portion of the storage within the Leland Pressure Zone. The District originally constructed the reservoir in 1955 by excavating into the arch-like folds of sedimentary rock within the Briones Formation, and using the earthen materials to construct two main dams on the south and eastern sides of the reservoir, and to construct a smaller dam in the northwest corner of the reservoir. All three dams are approximately 40 feet high. Based on the size of the reservoir, the site is under the regulatory jurisdiction of the State of California Division of Safety of Dams (DSOD). The DSOD requires the District to operate the reservoir at a reduced storage capacity of approximately 18 MG in order to provide a minimum of 3 feet of operational freeboard (water elevation of 357 feet maximum).

As part of the on-going Leland Pressure Zone Improvement Project, Planning prepared the Leland Reservoir Replacement Facilities Plan (March 2014) which recommended demolishing the 60-year old open-cut reservoir, breaching the eastern dam, and building two new 8.0 MG, partially buried, concrete storage tanks within the re-graded basin. The GES prepared a preliminary geotechnical evaluation in July 2011 to support this initial planning level study. The new tanks and site grading would provide the required water storage, bring the site up to current District standards, and remove the site from DSOD jurisdiction. The Project would construct two new approximately 220-foot diameter, pre-stressed concrete tanks at approximately the same foundation elevation as the existing open-cut reservoir in order to maintain the same hydraulic gradient within the Leland Pressure Zone. Thus, the new tanks will be founded on weathered rock, similar to the existing reservoir. The District’s civil, geotechnical and structural design for the two new partially buried, concrete tanks will be similar to the recently completed (and on-going) Schapiro, Highland, Estates, Summit, and South Reservoir Replacement Projects.

DISCUSSION

Site Geology and Subgrade Conditions

Per the “Seismic Stability Evaluation, Leland Reservoir Embankments” prepared by Geomatrix (December 1998), Leland Reservoir is located on the southwest flank of the Pinole anticline within the East Bay Hills structural block. The flank of the anticline is expressed as a series of low rounded hills in the area south of Highway 24, east of Pleasant Hill Road, and north of Las Trampas Creek. The anticline axis lies approximately 1,200 feet northeast of the reservoir near Highway 24; it trends north-northwest to northwest in the vicinity of Walnut Creek and Lafayette. Geologic mapping by Dibblee (1980) shows that the hills in the vicinity of the reservoir site are underlain by northwest-striking, southwest-dipping (25 to 50 degrees) beds of the Miocene Briones Formation. The hills are bounded to the east, south, and west by alluvial valleys along Las Trampas Creek and its tributaries.

The Briones Formation includes both massive sandstone and interbedded sandstone, siltstone, and shale that dip 30 to 40 degrees southwest. The low swales at the northwest corner and along the east side of the reservoir (filled after construction of the reservoir) correspond to a zone of thin- bedded sandstone and shale which is more easily eroded than the massive sandstone that forms the resistant hills north and south of the swales. The southwest part of the reservoir (south of the hill exposed along the west side of the reservoir) also is underlain by thin-bedded sandstone and shale. The massive sandstone is dark gray, moderately fractured with no open fractures, moderately hard, and strong. The thin-bedded sandstone is yellowish brown, moderately hard, and moderately strong; the shale is dark gray, closely to moderately fractured, moderately hard, and moderately strong which are relatively sound and competent as foundation materials, although the massive sandstone is prone to slaking when exposed at the surface. Sandstone beds dip approximately 35° to the southwest; this orientation is generally downslope at the southwest comer of the reservoir embankment, but is steeper than both natural and embankment slopes (Figure 1).

Geomatrix (1998) reviewed available geotechnical information, and performed additional soil borings, cone penetration tests (CPTs), and geologic test pits to further define the subsurface conditions at the site (Figure 1). Geomatrix (1998) noted the presence of colluvial materials in the swales at the northwest and northeast corners of the reservoir. The colluvium is very stiff to stiff, very dark gray to black, medium-plasticity clay with fine to medium sand. The colluvium contains highly weathered rock fragments derived from the surrounding slopes. The subsurface data show that the colluvial materials underlie part of the embankment fill. The extent and thickness of the colluvial materials is not well known; however, the available data indicate that the colluvium occurs only under the downstream slope of the northwest embankment and does not extend beneath the crest of the embankment.

The base of the existing concrete lined, open-cut reservoir is founded on weathered sedimentary rock of the Briones Formation at an elevation of approximately 331 feet. Per Planning, the bottom elevation of the new tanks will be 329 feet, so the concrete foundations for the new tanks will be excavated into and founded on weathered rock. The District monitors the groundwater elevations with standpipe piezometers adjacent to the Leland Reservoir as part of its on-going dam safety program as required by the DSOD. With the exception of piezometer XM5 (which is screened within the earthen embankment on the east side of the reservoir), the measured groundwater elevations are typically lower than the base of the existing reservoir (i.e. lower than 331 feet).

Surface Fault Rupture

Leland Reservoir is located in close proximity to multiple known earthquake faults (Figure 2); however, the United States Geologic Survey (USGS) has not mapped the site as being underlain by an active fault capable of rupturing to the ground surface (USGS, 2014). The closest known active fault is the Franklin fault, located approximately 1.5 km east of the site. In addition, the site is not mapped within an active earthquake fault zone per the State of California, Alquist-

Priolo Special Studies Zone Act (Walnut Creek Quadrangle, July 1993). Geomatrix (1998) noted that there is a short, inferred north-northeast trending, inactive fault located east of the reservoir along Leland Drive and that no other faults are mapped at or immediately near the reservoir site. In addition, no faults were recorded at the site during or since its construction, and no faults were encountered in the test pits excavated for Geomatrix (1998) study.

The fault names, types, distances, and expected maximum magnitude earthquake for the known, major active faults in the vicinity of the site are summarized in Table 1. While Lafayette (and the Leland Reservoir site) could potentially be underlain by a blind thrust fault, as is any site within the transpressional San Francisco (SF) Bay Area seismic region, it is highly unlikely that a typical moment magnitude (Mw) 6 to 6.5 earthquake on such a buried, dipping thrust fault would result in surface fault rupture. Thus, the likelihood of surface fault rupture occurring at the Leland Reservoir site is relatively low.

Table 1
Summary of Information for Major Active Faults in Vicinity of Site

Fault Name	Fault Type	Closest Distance (km)	M_{max} [1]
Franklin	Strike-Slip	1.5	6.8
Contra Costa Shear Zone	Strike-Slip	2	6.5
Mt Diablo Thrust	Reverse	5	6.5
Calaveras	Strike-Slip	7	7.0
Concord-Green Valley	Strike-Slip	8	7.0
Hayward-Rodgers Creek	Strike-Slip	13	7.3
Clayton	Strike-Slip	15	6.3
Greenville	Strike-Slip	20	7.1
San Andreas	Strike-Slip	43	7.9

Notes
1) M_{max} is the expected maximum magnitude earthquake (moment magnitude) based on estimated fault dimensions (UCERF3, 2013) and fault rupture area and earthquake magnitude relationships (Stirling et al., 2013).

Strong Ground Motions

As the site is located in the highly active SF Bay Area seismic region, it is likely that the Leland Reservoir will be subjected to strong ground motions resulting from a large earthquake at some point during its service lifetime. However, these strong ground motions can be mitigated to a less than significant level by designing the new structures per the applicable seismic design standards found in the latest editions of the California Building Code, ASCE-7 (Minimum Design Loads for Buildings and Other Structures), and AWWA-D110 (Wire- and Strand-wound, Circular, Prestressed Concrete Water Tanks). In addition, any new retaining walls, earth slopes, and utility structures should also be designed to withstand applicable strong ground motions.

Based on a probabilistic seismic hazard analysis performed by the District, the peak ground acceleration (PGA) at the site can be expected to range from approximately 0.55g to 0.9g for mean annual return periods ranging from 500 to 2,500 years (Figure 3). As shown on Figure 3, the fault systems contributing the most to the total PGA hazard are the Concord-Green Valley, Hayward-Rodgers Creek, Calaveras, and Mt Diablo Thrust systems. While the Franklin Fault and Contra Costa Shear Zones are closer to the Leland Reservoir site, the average annual slip rates for these fault systems are very low (i.e., long recurrence intervals), resulting in a relatively low mean annual hazard for PGA.

Liquefaction

Liquefaction is defined as a temporary reduction of strength and stiffness in sandy, cohesionless soils due to cyclic pore pressure generation. Sandy soils are generally considered "liquefied" when the temporary excess pore pressure ratios (r_u) approach 100%, or laboratory based cyclic shear strains exceed 3 to 6%. Strain softening with lower cyclic pore pressure build-up of say r_u = 70 to 80%, as occurs in more cohesive soils, is not considered liquefaction. The stress-strain behavior for a "liquefied" sand can be very similar to the "cyclic failure" of a soft clay; however the mechanics by which these different soil types reach these final states are completely different. Generally the term *liquefaction* is reserved for soils that exhibit "sand like" behavior during cyclic loading, and the term *cyclic failure* is used for soils that exhibit "clay like" behavior.

A soil's liquefaction potential is generally evaluated with field data from standard penetration test (SPT) blow counts, cone penetrometer test (CPT) tip pressures and sleeve frictions, or shear wave velocity measurements (V_s). Soil exploration is typically carried out to a minimum depth of 50 feet below ground surface for structures supported with shallow foundations. However, deeper depths may be considered for dams and pile supported structures. Youd et al. (2001) present analytical procedures to evaluate the liquefaction susceptibility for level ground sites using all three data options (SPT, CPT, and V_s).

As the Leland Reservoir site is immediately underlain by hard, sedimentary bedrock, the subgrade materials below the future water storage tanks will not be susceptible to earthquake induced liquefaction or cyclic failure. Previous studies by Geomatrix (1998) indicated that the embankment materials are not susceptible to liquefaction and/or seismic induced strength loss. In addition, the State of California Geological Survey (CGS) has not mapped the site as being located in an area with historical evidence of liquefaction, or with local geologic and ground water conditions conducive to liquefaction, per the CGS Seismic Hazard Zone Mapping Act (Walnut Creek Quadrangle). Thus, the likelihood of liquefaction or seismic-related ground failure occurring at the Leland Reservoir site during strong-ground shaking is relatively low.

Landslides

No landslides are mapped on the site per the USGS Map of Landslide and Other Surficial Deposits of the Walnut Creek 7 ½' Quadrangle, Contra Costa County, California (Nilsen, 1975). Geomatrix (1998) noted that no landslides have been observed or mapped immediately adjacent to the project site, and that the existing compacted embankment slopes are expected to deform less than 1 foot during the strong-shaking resulting from the design earthquake. In addition, the CGS has not mapped the site as being located in an area with historical evidence of landslides, or with local geologic and topographic conditions conducive to earthquake-induced landslides, per the CGS Seismic Hazard Zone Mapping Act (Walnut Creek Quadrangle). Thus, the likelihood of seismic-related landslides or slope failures occurring at the *existing* Leland Reservoir site during strong-ground shaking is relatively low.

The *proposed* site layouts include earth grading, cut slopes, and retaining walls which could all be susceptible to permanent slope displacements (i.e., landslides) under both static and seismic loads. However, the landslide potential for any new earth slopes and retaining walls can be mitigated to a less than significant level by utilizing reasonable permanent slopes of no steeper than 3H:1V, building mid-slope benches with drainage collection ditches, avoiding new cut slopes that dip southwest (the local geology dips to the southwest), and designing the new earth structures per the applicable standards found in the latest editions of the California Building Code and ASCE-7.

Soil Erosion

The weathered sedimentary rock at the site is susceptible to soil erosion. Geomatrix (1998) noted that the zones of thin-bedded sandstone and shale are more susceptible to erosion than the massive sandstone that forms the majority of the site. There is evidence of on-going erosion within a shale layer on the northeast rock slope facing Leland Drive, immediately north of the main access road. The erosion is relatively minor, not within the embankment, and not a threat to the stability of the open-cut reservoir. However, District staff should continue to monitor the slope erosion as part of the Dam Safety Program.

For the *proposed* Leland Reservoir Project, the potential for problematic soil erosion can be mitigated to a less than significant level by utilizing reasonable permanent slopes of no steeper than 3H:1V, building mid-slope benches with drainage collection ditches, avoiding new cut slopes that dip southwest (the local geology dips to the southwest), incorporating landscaping measures that promote erosion control, and developing a drainage collection plan that does not significantly concentrate storm water runoff in any one location.

Unstable Strata or Soils

As the Leland Reservoir site is immediately underlain by hard, sedimentary bedrock, the subgrade materials below the future water storage tanks are not unstable, or would become unstable, as a result of the project. In addition, the weathered rock foundation will not be susceptible to earthquake induced liquefaction or cyclic failure. Geomatrix (1998) noted that no landslides have been observed or mapped immediately adjacent to the project site, and that the existing compacted embankment slopes are expected to deform less than 1 foot during the strong-shaking resulting from the design earthquake. Thus, the likelihood of off-site landslides, lateral spreading, subsidence, or collapse at the Leland Reservoir site is relatively low. As noted previously, the local geology dips to the southwest, thus any new permanent site grading for the new site layout should avoid new cut slopes that dip southwest in order to reduce the potential for on-site landslides.

Expansive Soils

High plasticity soils, claystones, or shales can be susceptible to expansion/contraction during annual wetting and drying cycles leading to subgrade movements beneath structures. The Leland Reservoir site is generally underlain by sandstone materials that are not expansive. While there are localized shale seams that could potentially be expansive if exposed to wetting and drying cycles, these layers are relatively minor as compared to the sandstone across the site. Thus, the potential for expansive soils creating substantial risks to life or property is not considered a significant impact to the project.

Septic System Drainage Capacity

While the sandstone bedrock materials underlying the site would generally be expected to provide adequate drainage capacity for a typical District bathroom, this project does not incorporate a bathroom or a need for a septic system. In addition, the Central Sanitary District sewage collection system is located directly adjacent to the site on Leland Drive, so any future sewer improvements at the site should be connected to this existing sewer system as appropriate.

ABY:BTB:gh

cc: D. Rehnstrom
J. McGregor
E. Bialek
A. Yiadom
S. Terentieff
P. Franceschi
Files: Leland Reservoir

REFERENCES

Dibblee, T.W., Preliminary Geologic Map of the Walnut Creek Quadrangle, Contra Costa County, California: USGS Open File Report 80-351 (1980)

Leland Reservoir Replacement Facilities Plan, prepared by EBMUD Water Distribution Planning Division, March 2014

Leland Reservoir Replacement Tanks, Planning Phase Geotechnical Evaluation, prepared by EBMUD Materials Engineering Section, July 2011

Seismic Stability Evaluation, *Leland Reservoir Embankments*, prepared by Geomatrix, December 1998

USGS Map of Landslide and Other Surficial Deposits of the Walnut Creek 7 ½' Quadrangle, *Contra Costa County, California*, prepared by Nilsen, (1975)

Liquefaction Resistance of Soils: Report From 1996 and 1998 NCEER Workshops on Eval. of Liquef. Resist. of Soils, ASCE J.Geotech.Eng., 127(10), p. 817-833, prepared by Youd et al., October 2001

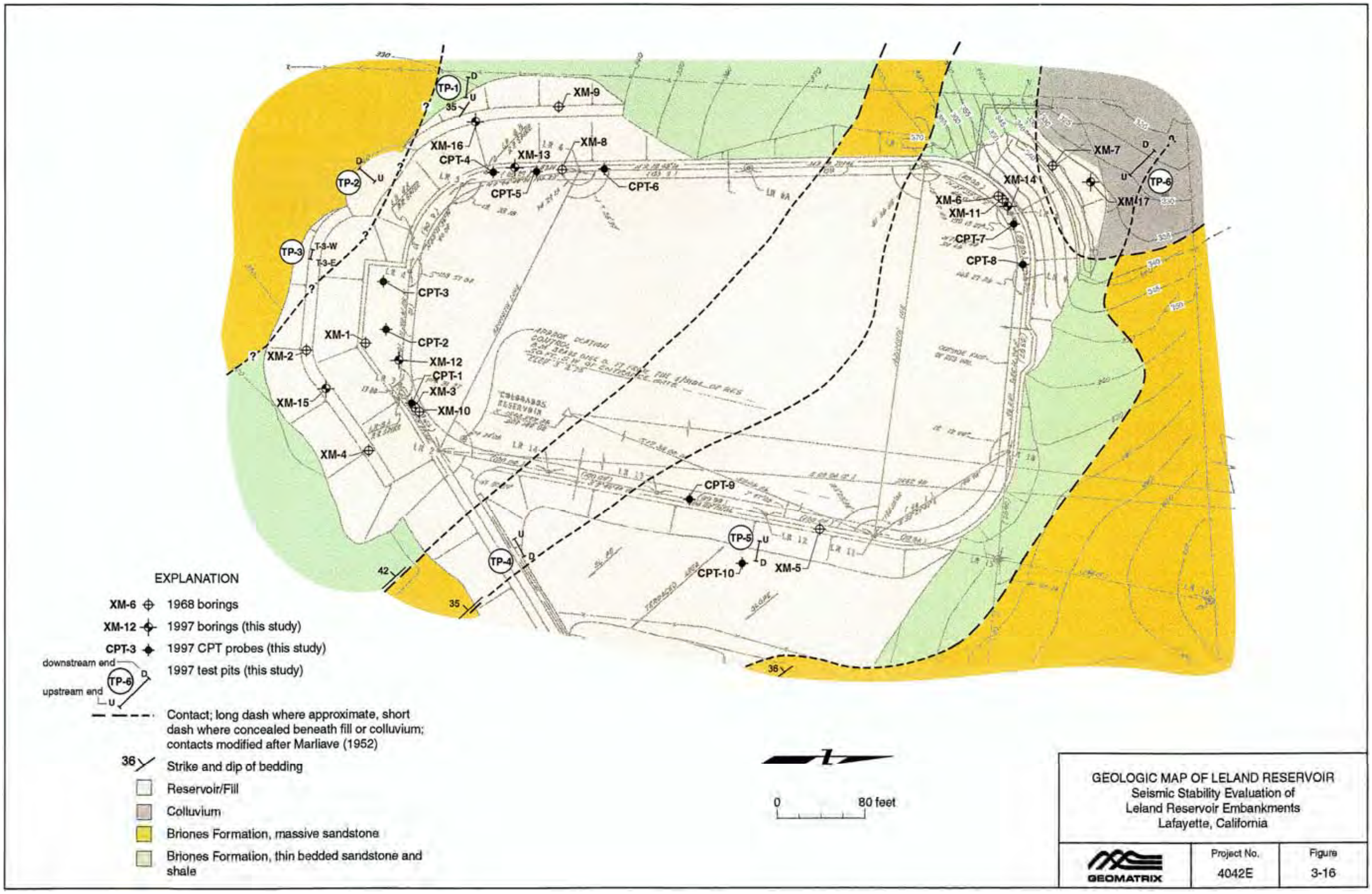
Selection of Earthquake Scaling Relationships for Seismic-Hazard Analysis, Bulletin Seismology Society of America (BSSA), prepared by Stirling et al, October 2013

State of California, Alquist-Priolo Special Studies Zone Act, Walnut Creek Quadrangle, July 1993

Uniform California Earthquake Rupture Forecast 3 (UCERF3) (2013)

USGS Seismic Hazard Map (2014)

FIGURES

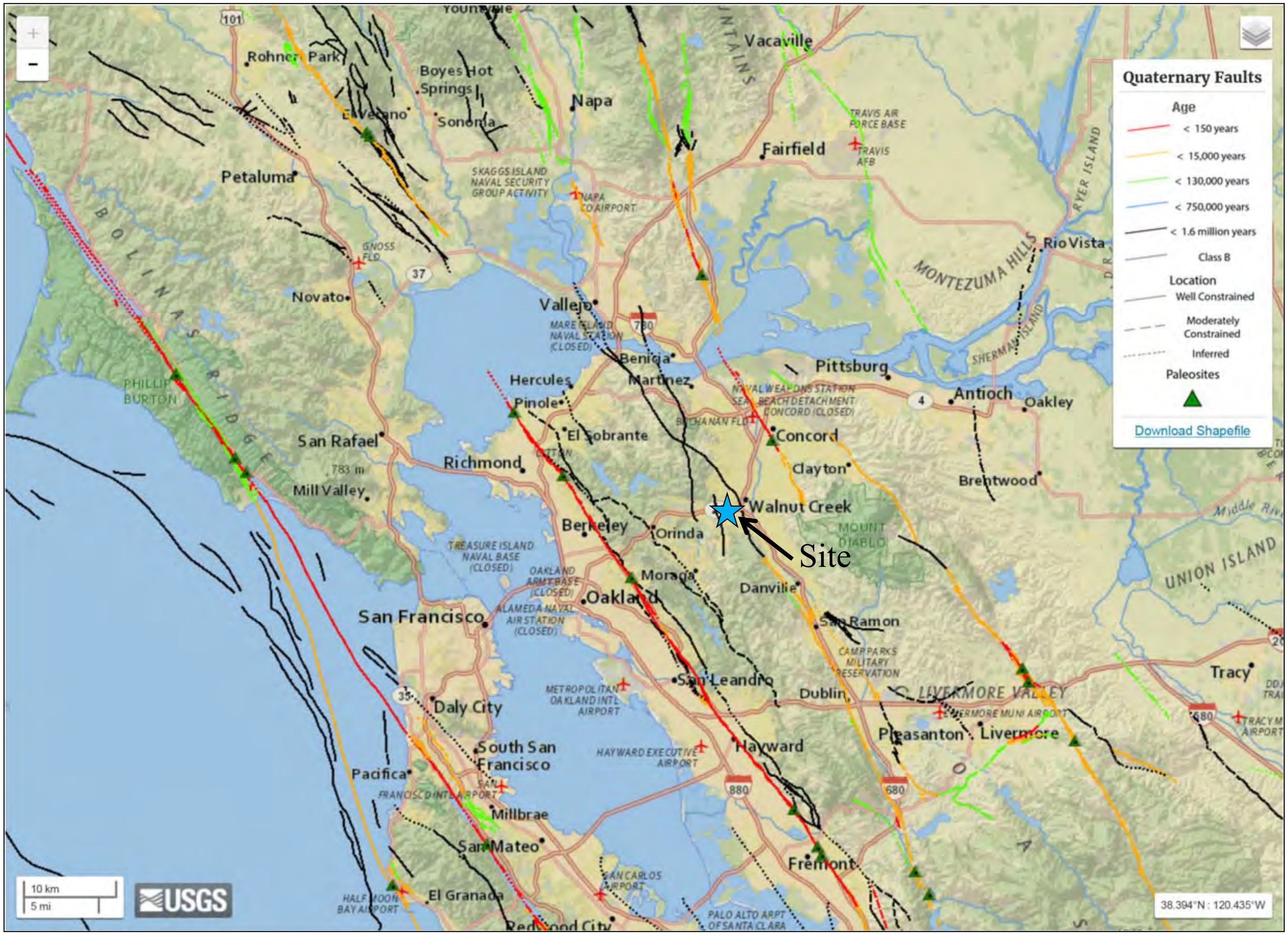


Leland Reservoir EIR – Geology & Soils

Site Geology and Geotechnical Exploration Locations

October 2016

Figure 1

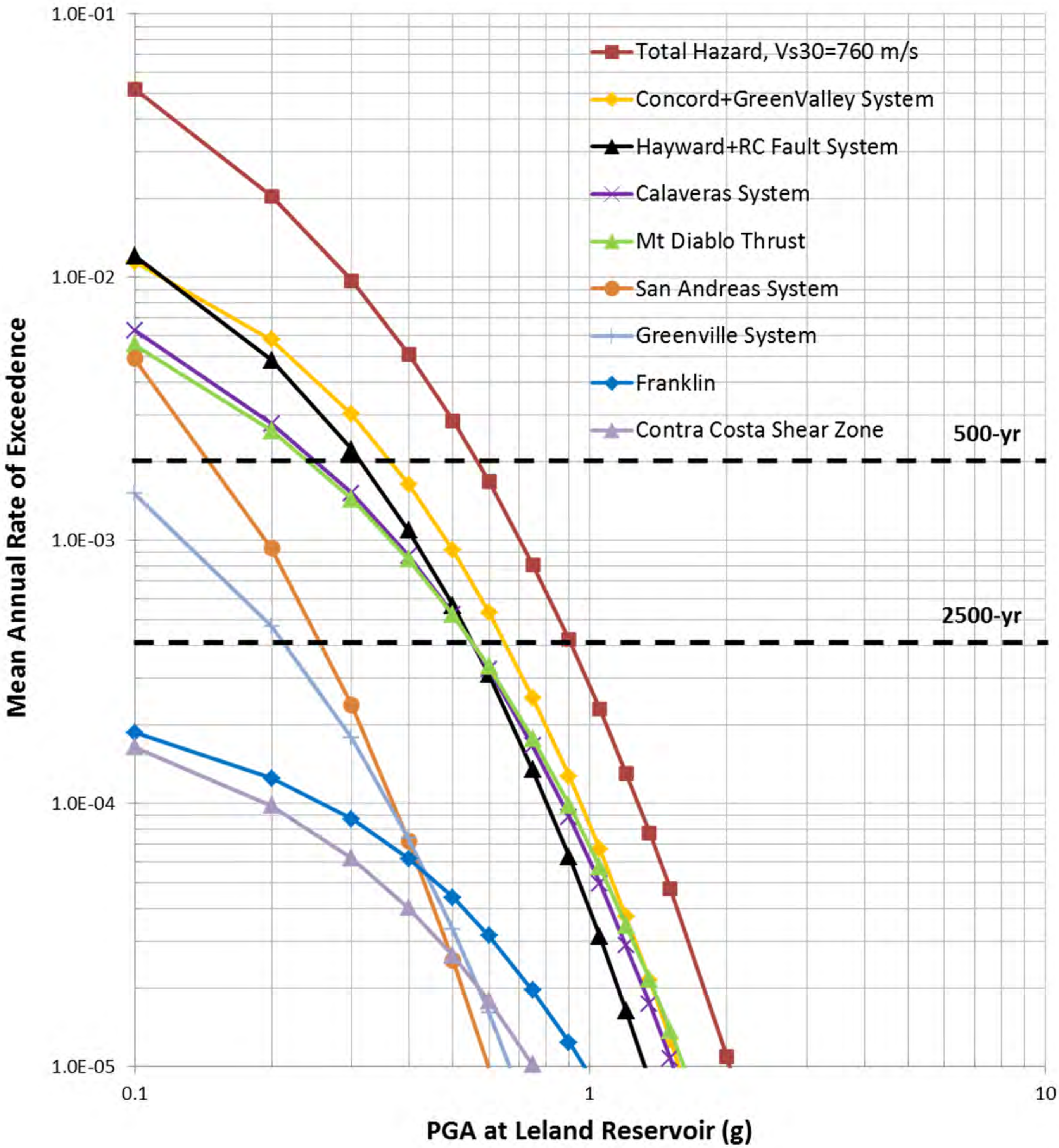


Leland Reservoir EIR – Geology & Soils

Regional Earthquake Faults (USGS 2014)

October 2016

Figure 2



EBMUD

Leland Reservoir EIR – Geology & Soils

PGA Hazard Curve & Source Contributions

October 2016

FIGURE 3

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Appendix J: Technical Memorandum – Hazards and Hazardous Materials

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Appendix J - Technical Memorandum
Hazards and Hazardous Materials

Leland Reservoir Replacement Project

Subject:	Hazards and Hazardous Materials
Prepared For:	East Bay Municipal Utility District
Prepared by:	George Valenzuela, RMC Water and Environment
Reviewed by:	Robin Cort, RMC Water and Environment
Date:	November 17, 2017
Reference:	0061-009.00

Table of Contents

List of Terms and Acronyms

BMPs	Best Management Practices
CalEPA	California Environmental Protection Agency
Cal/OSHA	California Department of Occupational Safety and Health Administration
CCR	California Code of Regulations
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CUPA	Certified Unified Program Agency
DOT	U.S. Department of Transportation
DTSC	Department of Toxic Substances and Control
EBMUD	East Bay Municipal Utility District
EIR	Environmental Impact Report
EPCRA	Emergency Planning and Community Right-to-Know Act
MG	Million gallons
mg/kg	Milligrams per kilogram; same unit of measurement as ppm
OSHA	Federal Occupational Safety and Health Administration
PCBs	Polychlorinated biphenyls
PPM	Parts per million
PRC	Public Resources Code (California)
RSL's	Regional Screening Levels
RCRA	Resource Conservation and Recovery Act
SFBRWQCB	San Francisco Bay Regional (Region 2) Water Quality Control Board
STLC	Soluble Threshold Limit Concentration
SWRCB	State Water Resources Control Board
SWPP	Storm Water Pollution Prevention Plan
TCLP	Toxicity Characteristic Leaching Procedure
TTLC	Total Threshold Limit Concentration
TM	Technical memorandum
USEPA	United States Environmental Protection Agency
WET	Whole Effluent Toxicity

1 Introduction

This Technical Memorandum (TM) provides information on hazards and hazardous materials that will be used in the evaluation of environmental impacts associated with the Leland Reservoir Replacement Project (Project), which is proposed by the East Bay Municipal Utility District (EBMUD).

2 Project Background

The existing 18-million-gallon (MG), open-cut Leland Reservoir, constructed in 1955, is a critical drinking water facility for the Leland Pressure Zone, which serves the southwest portion of the City of Pleasant Hill, most of the City of Walnut Creek, and a small area of the City of Lafayette. The reservoir is at the end of its useful service life, and its replacement is necessary due to the deteriorated condition of the pre-cast concrete roof (including rainwater ponding), mature trees growing in the earthen embankment, obsolete mechanical and electrical equipment, and the reservoir's criticality in serving the Leland Pressure Zone.

The Project includes replacement of the existing open cut reservoir with two new 8-MG prestressed concrete tanks within the existing reservoir basin. The Project would also include replacing approximately 1,700 linear feet of existing 30-inch and 36-inch critical transmission pipeline with approximately 2,700 linear feet of 36-inch pipeline to be constructed within the public right-of-way (ROW) in Windsor Drive, Condit Road and Leland Drive and about 950 linear feet of 36-inch pipeline within the Leland Reservoir site. A portion of the 36-inch pipeline is located beneath the existing reservoir basin and would be removed as part of the reservoir demolition. The 36-inch pipeline that extends beyond the reservoir basin would be abandoned in place along with a 30-inch pipeline in an unimproved right-of-way, west of the property boundary. The abandoned pipeline would be capped and filled with cellular concrete. The access road from Leland Drive to the reservoir would also be improved. Approximately 1,000 linear feet of new 30-inch storm drain pipeline would also be installed on site and connect to the City of Lafayette's existing storm drain system at the intersection of Leland Drive and Patty Way.

2.1 Approach

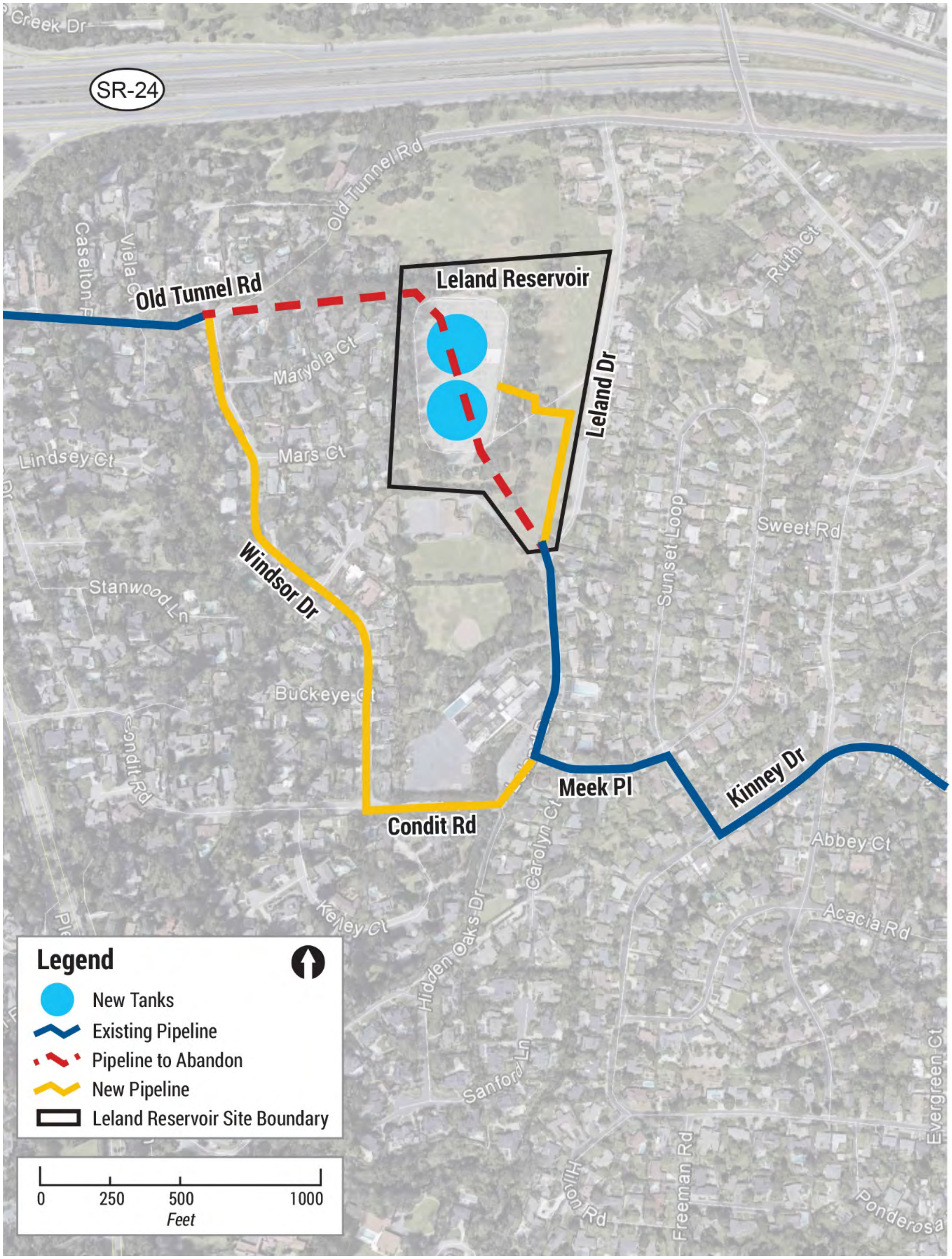
This TM provides an evaluation of the hazards and hazardous materials effects based on criteria specified in Appendix G, Environmental Checklist of the California Environmental Quality Act (CEQA) Guidelines.

3 Environmental Setting, Impacts and Mitigation

3.1 Environmental Setting

The following sections describe the existing environmental conditions regarding hazards and hazardous materials and the potential effects the Project may have on the site and its surrounding area (Figure 1).

Figure 1: Leland Reservoir Replacement Project Site



Source: Compiled by RMC, a Woodard and Currant Company, 2017

3.1.1 Regional Setting

The Leland Reservoir site is surrounded to the east and west by single family residential homes. A church is adjacent to the southern property boundary of the reservoir site. The land between the northern property boundary and Old Tunnel Road is vacant land, zoned for single family residential use, with the exception of three single family residential homes, south of Old Tunnel Road on the west side of Leland Drive. The proposed pipeline route is under streets in single-family residential neighborhoods, and also passes a private elementary school, and a community swim center.

Even though land around the Project site is primarily residential, there is the potential for hazards in the area, such as high voltage power lines and gas and sewer lines. Also located further south along Olympic Boulevard is a main gas transmission pipeline installed by Pacific Gas and Electric (Figure 2); this is the closest large gas line in the area and is far enough from the Project construction area that it is not expected to affect the Project.

Figure 2: PG&E Gas Transmission Pipeline Location

Source: PG&E 2016

3.1.2 Leland Reservoir Site

As part of the Facilities Plan completed for the Leland Reservoir Replacement (EBMUD 2014), EBMUD evaluated the Leland Reservoir site for the presence of hazardous materials. The following description of the Leland Reservoir site is excerpted from the Facilities Plan.

No EBMUD reservoirs contain construction materials that produce a health risk to the potable water. In 1994, lead was detected at high concentrations in a Leland Reservoir roof caulking material sample and in a soil sample. Samples collected at Leland Reservoir as part of a reservoir materials assessment of all EBMUD reservoirs (1995, CH2MHill) did not exceed concentrations of contaminants that would require special Occupational Safety and Health Administration (OSHA) health and safety requirements or hazardous materials disposal. However, follow-up testing of Leland Reservoir in 2017 concluded roofing materials contain sufficient lead that demolition of the roof would need to be conducted in compliance with regulations pertaining to disturbing lead based construction materials (EBMUD 2017). Past hazardous material surveys at the Leland Reservoir are summarized below:

- PES Environmental. November 4, 1994, Results of Preliminary Field Screening Investigations, EBMUD Reservoir, Pump, and Filter Facilities, Alameda and Contra Costa Counties, California.
  - The objective of this field screening was to evaluate the potential presence of lead and polychlorinated biphenyls (PCBs) in soils and sandblast material to identify sites that require no future investigation or remedial action, and to generate preliminary information on site that may require further action. No PCBs were found in the testing performed at Leland Reservoir. Lead was detected at a concentration of 220 milligrams per kilogram (mg/kg) in a sample taken from the ground surface adjacent to the southern side of the reservoir. Lead was detected at a concentration of 13,000 mg/kg in a roof caulking sample taken from the north-east side of the roof. The Total Threshold Limit Concentration (TTLC)[1] for lead is 1,000 mg/kg, and the Regional Screening Level (RSL)[2] is 400 mg/kg for residential soil and 800 mg/kg for soil in industrial areas.
- CH2M Hill. February 1995. Final Report: EBMUD Reservoir Materials Assessment.
  - The purpose of this investigation was to evaluate potential impacts of reservoir construction material on drinking water, and to identify construction materials of concern for future reservoir rehabilitation projects. Samples from Leland Reservoir did not exceed TTLCs for PCBs or metals.
- PES Environmental. November 18, 1996. Remedial Closure Report, EBMUD Reservoir, Pump, and Filter Facilities, Alameda and Contra Costa Counties, California. Volume II, Appendices A-1 and B-1.
  - Because of elevated lead concentration found in the roof caulking sample in 1994, additional soil sampling was performed to determine if maintenance activities had resulted in soil contamination. Nineteen soil samples were taken in 1995 and 1996 and analyzed for total lead. A risk-based remedial goal of 250 mg/kg was established because portions of the site adjacent to the reservoir are not enclosed by fencing and are accessible to the public. This level is lower than the 400 mg/kg residential RSL. Levels of lead in soil ranged from 10.8 to

[1] The Total Threshold Limit Concentration (TTLC) is the concentration above which a waste is considered hazardous.

[2] Regional Screening Level (RSL) is the concentration of a chemical in the soil or groundwater above which there is a potential health risk to an exposed individual.

291 mg/kg. Based on the analytical results of the soil samples and the statistical analysis of the data it was determined that the 90 percent upper confidence limit of the mean concentration of lead was 135 mg/kg, which was well below the remedial goal of 250 mg/kg. PES concluded that no significant health or ecological risks exist at the site, and no remedial action or further investigation was required.

- EBMUD. March 20, 2017. Lead Containing Roof Sealant, Leland Reservoir.
  - Because elevated lead levels were detected in the 1994 evaluation of Leland Reservoir, EBMUD collected and analyzed ten samples of sealant from the reservoir roof in March 2017. Samples were analyzed and four of the samples were determined to be above the TTLC for lead. EBMUD has thus determined that when the reservoir roof is demolished all of the roof sealant would be presumed to contain lead and would be handled in accordance with all applicable regulations that pertain to disturbing lead based construction materials.

3.1.3 Known Contamination Sites

CalEPA maintains a list of hazardous substances sites (commonly referred to as the Cortese List) where soil and/or groundwater contamination is known or suspected to have occurred, typically as a result of leaking storage tanks or other spills. Since construction activities that encounter contaminated sites could create a potentially significant hazard, this list was consulted to identify any potential sites within the Project area. The Cortese List was consulted on June 20, 2016, and it was found that no contaminated sites or facilities have been identified within the Project area (Table 1).

3.1.4 Airports

Safety hazards associated with airports and airstrips are generally related to construction of tall structures that could interfere with airplane flight paths. The closest airport is Buchanan Field Airport, located in Concord, approximately 8 miles from the Project site.

3.1.5 Schools within ¼ Mile of Project Site

Maps of the Project area were reviewed (including Google Maps, Google Earth and Bing Maps) and the only school within ¼ mile of the site is the Meher School and its preschool program, White Pony School, which are about 700 feet south of the Project site and immediately adjacent to the pipeline alignment. Figure 3 shows the portion of the Project site that is within ¼ mile of the Meher Schools.

Table 1: Cortese List Findings

Agency	Name of Database	Description of Database	Are any contaminated sites identified within the Project area?
Department of Toxic Substances Control (DTSC)	EnviroStor	List of hazardous waste and substances sites	No
State Water Resources Control Board (SWRCB)	Geotracker	List of authorized or unauthorized discharges of waste to land, or unauthorized releases of hazardous substances from leaking underground storage tanks	No
State Water Resources Control Board (SWRCB)		Solid Waste Disposal Sites with waste constituents above hazardous waste levels outside the waste management unit, which is a contiguous area of land on or in which hazardous waste is placed, or the largest area in which there is significant likelihood of mixing hazardous waste constituents in the same area	No
State Water Resources Control Board (SWRCB)	"Active" CDO and CAO	Cease-and-desist orders (CDO) and cleanup and abatement orders (CAO) (nonhazardous materials)	No
Department of Toxic Substances Control (DTSC)		Hazardous Waste Facilities subject to corrective action (pursuant to Section 25187.5 of the Health and Safety Code) to abate an imminent or substantial endangerment. Also includes sites where DTSC has taken or contracted for corrective action because a facility owner or operator has failed to comply with a corrective action order	No

Sources: DTSC 2016a, b; SWRCB 2016a, b

Figure 3: Schools Located within One-quarter Miles of the Project Area

Source: Compiled by RMC, a Woodard & Curran company, 2016

3.2 Regulatory Framework

Hazardous materials and wastes can result in public health hazards if released to soil, groundwater, or air. Hazardous materials as defined in Section 25501(o) of the California Health and Safety Code are materials that, because of their "quantity, concentration, or physical or chemical characteristics, pose a significant present or potential hazard to human health and safety or to the environment if released to the workplace or environment." Hazardous materials have been and are commonly used in commercial, agricultural, and industrial applications, as well as to a limited extent in residential areas.

A waste is any material that is relinquished, recycled, or inherently waste-like. California Code of Regulations (CCR) Title 22, Division 4.5, Chapter 11, Articles 1 through 5 contain regulations regarding the Identification and Listing of Hazardous Waste. Article 2, Section 66261.1, contains regulations for the classification of hazardous wastes. Article 3 criteria classify waste as hazardous 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). Article 4 also lists specific hazardous wastes, while 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. If improperly handled and released to soil, groundwater, or air (in the form of vapors, fumes, or dust), hazardous materials and wastes can result in public health hazards.

The following sections describe laws and regulations that may apply to the Project.

3.2.1 Federal Policies and Regulations

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)

CERCLA, also referred to as the Superfund law, regulates the potential for liability for cleanup of hazardous substances, provides for defense against liability, identification of contaminated sites, defines hazardous substances, petroleum products, and petroleum exclusions. The Superfund Amendments and Reauthorization Act (SARA), includes emergency planning and community right-to-know. Under CERCLA, facilities must report where toxic chemicals are transferred, chemical-specific information, and supplemental information, along with identification information for their facility to the U.S. Environmental Protection Agency (USEPA). Hazardous substances must be reported, and releases to the environment accounted for. As part of CERCLA, USEPA has developed "Regional Screening Levels", which establish levels of contamination that are used when a potential site is initially investigated to determine if potentially significant levels of contamination are present to warrant further investigation (USEPA 2016).

Resource Conservation and Recovery Act (RCRA)

RCRA regulates potential health and environmental problems associated with solid waste hazards and nonhazardous waste. RCRA defines solid waste as garbage or refuse, sludge from wastewater treatment plant, water supply treatment plant, or air pollution control facility, and other discarded materials. Solid waste can be either hazardous or non-hazardous. Hazardous waste is waste that burns readily, is corrosive, or reactive, or if it contains certain amounts of toxic chemicals, or has been included on the USEPA's list of hazardous wastes. RCRA regulates the disposal of waste and aims to reduce waste generation and restricts which facilities can receive hazardous wastes and regulates facilities to ensure proper handling of materials.

Emergency Planning and Community Right-To-Know Act (EPCRA)

EPCRA was passed in 1986 and requires federal, state, and local governments to create chemical emergency response plans for releases of hazardous substances. EPCRA also requires reporting on hazardous and toxic chemicals to increase awareness and access to information on chemical and individual facilities and requires that facilities report accidental releases of certain chemicals and hazardous substances, and provide such information to the public. Owners of facilities must create and make available Material Safety Data Sheets (MSDS) that describe the chemicals in question and health effects associated with them. Chemical inventories must also be reported if they require an MSDS.

Hazardous Materials Worker Safety Requirements

The federal OSHA is the federal agency responsible for ensuring worker safety. The federal regulations for worker safety are contained in Code of Federal Regulations (CFR) Title 29, as authorized in the

Occupational Safety and Health Act of 1970; these regulations provide standards for safe workplaces and work practices, including those relating to hazardous materials handling.

Preliminary Remediation Goals/Regional Screening Levels

USEPA has published screening levels, referred to as RSLs, for the evaluation of chemicals commonly found in soil or groundwater where a release of hazardous materials has occurred (USEPA 2016). For an industrial worker, the RSLs are conservative estimates of safe levels of a chemical that a worker could be exposed to in soil and groundwater. If the concentration of a chemical in the soil or groundwater is below the RSL, then it can be assumed that the chemical would not pose a health risk to the worker. Screening levels would generally be lower for industrial workers than construction workers because the industrial worker would be exposed to the hazard over a lifetime while the construction worker would only be exposed for the duration of construction. Therefore, safe levels of chemicals in soil and groundwater would generally be higher for construction workers than industrial workers.

3.2.2 State Policies and Regulations

California Health and Safety Code

The California Health and Safety Code contains statewide regulations designed to protect public health and safety. Sections of the state code relevant to the Project include the Hazardous Materials and the Hazardous Waste and Substances Site List (Cortese List), which is developed under Section 65962.5 of the California Government Code. The list is compiled and maintained by the DTSC under CalEPA. The Cortese List is a list of all sites identified as having hazardous waste releases.

Owners of facilities that handle, store, use, treat, dispose of, or generate hazardous materials are required to create hazardous-waste management programs under Division 20, Chapter 6.5, section 25100 et seq. Owners of facilities that generate hazardous wastes in excess of 26,400 pounds per year, or extremely hazardous wastes in excess of 26.4 pounds per year, must adhere to California Health and Safety Code Section 25244.12 et seq. which requires facilities to determine the types and amounts of wastes generated, identify procedures to reduce waste generation, develop written documentation that addresses waste reduction, develop a source-reduction evaluation review and plan, prepare a plan summary and hazardous waste management report, and a report summary. Hazardous materials handling, reporting requirements, and local agency surveillance programs are regulated under the California Health and Safety Code, Section 25500 et seq.

Transportation of Hazardous Wastes

Regulatory requirements for the transport of hazardous wastes in California are specified in 22 CCR Division 4.5 Chapters 13 and 29. In accordance with these regulatory requirements, all hazardous waste transporters must have identification numbers, which are used to identify the hazardous waste handler and to track the waste from its point of origin to its final disposal disposition (DTSC 2007). The identification number, issued by either USEPA or DTSC, depends on whether the waste is classified as hazardous by federal regulations or only under California regulations. Hazardous waste transporters must comply with the California Vehicle Code, California Highway Patrol regulations (CCR Title 13); the California State Fire Marshal regulations (CCR Title 19); and U.S. Department of Transportation (DOT) regulations (CFR Title 49); and USEPA regulations (CFR Title 40). A hazardous waste manifest is required for transport of hazardous wastes and documents the legal transport and disposal of the waste, which is signed by the generator and transporter(s) of the waste as well as the disposal facility. California regulations specify specific cleanup actions that must be taken by a hazardous waste transporter in the event of a discharge or spill, and for the safe packaging and transport of hazardous wastes.

Waste Classification Criteria

In accordance with CCR Title 22 Section 66261.20, et seq., excavated soil would be classified as a hazardous waste if it exhibits the characteristics of ignitability, corrosivity, reactivity, or toxicity. A waste is considered toxic in accordance with CCR Title 22 Section 66261.24 if it contains:

- Total concentrations of certain substances at concentrations greater than the Total Threshold Limit Concentration (TTLC);
- Soluble concentrations greater than the Soluble Threshold Limit Concentration STLC;
- Soluble concentrations of certain substances greater than federal toxicity regulatory levels using the Toxicity Characteristic Leaching Procedure TCLP; or
- Specified carcinogenic substances at a single or combined concentration of 0.001 percent.

A waste is considered hazardous by state and federal regulations if the soluble concentration exceeds the federal regulatory level as determined by the TCLP. 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 exceed the regulatory level in the extract. A waste is also considered hazardous under state regulations if the soluble contaminant concentration exceeds the STLC as determined by the Whole Effluent Toxicity WET method. Because the WET is performed using a 10-to-1 dilution of the sample, 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. A waste may also be classified as toxic if testing indicates toxicity greater than the specified criteria.

Environmental Screening Levels

The San Francisco Bay Regional Water Quality Control Board RWQCB has published Environmental Screening Levels for the evaluation of chemicals commonly found in soil or groundwater where a release of hazardous materials has occurred (San Francisco Bay RWQCB 2008). Similar to USEPA Preliminary Remediation Goals, these screening levels are conservative estimates of safe levels of a chemical that a worker could be exposed to in soil and groundwater. If the concentration of a chemical in the soil or groundwater is below the Environmental Screening Level, then it can be assumed that the chemical would not pose a health risk to the worker. However, these screening levels are based on conservative exposure assumptions, and it is possible to conduct a more detailed risk assessment using project-specific exposure assumptions to develop a higher concentration that would be considered safe.

Hazardous Materials Worker Safety Requirements

California state regulations concerning the use of hazardous materials in the workplace are included in CCR Title 8, and include requirements for safety training, availability of safety equipment, accident and illness prevention programs, hazardous substance exposure warnings, and emergency action and fire prevention plan preparation and is enforced by Cal/OSHA. Cal/OSHA also enforces hazard communication program regulations, which contain worker safety training and hazard information requirements, such as procedures for identifying and labeling hazardous substances, communicating hazard information relating to hazardous substances and their handling, and preparation of health and safety plans to protect workers. Cal/OSHA standards are generally more stringent than federal OSHA regulations.

California Fire Code

The California 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 chemicals, and specify the following design features to reduce the potential for a release of hazardous materials that could affect public health or the environment:

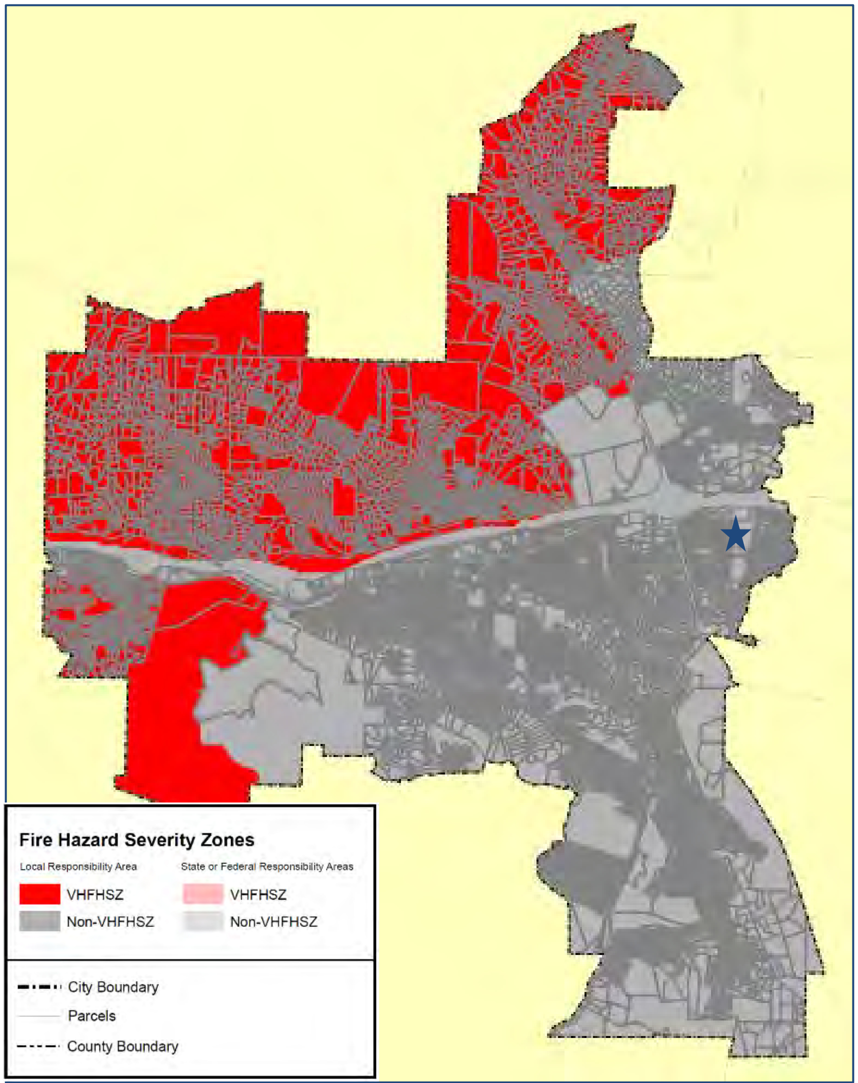
- Separation of incompatible materials with a noncombustible partition;
- Spill control in all storage, handling, and dispensing areas; and
- Separate secondary containment for each chemical storage system. The secondary containment must hold the entire contents of the tank, plus the volume of water needed to supply the fire suppression system for a period of 20 minutes in the event of a catastrophic spill.

The California Fire Code, Article 79, includes specific requirements for the safe storage and handling of flammable and combustible liquids. Specific requirements address fire protection; prevention and assessment of unauthorized discharges; labeling and signage; protection from sources of ignition; specifications for piping, valving, and fittings; maintenance of above ground tanks; requirements for storage vessels, vaults, and overfill protection; and requirements for dispensing, using, mixing, and handling of flammable and combustible liquids.

Fire Hazard Severity Zone Maps

California law requires the California Department of Forestry and Fire Protection (CALFIRE) to identify areas based on the expected severity of fire hazard. The areas, or “zones,” are based on factors such as fuel (material that can burn), slope and fire weather. There are three zones, based on increasing fire hazard, classified as medium, high and very high. Pursuant to Government Code Section 51175, CALFIRE has provided recommended maps for Very High Fire Hazard Severity Zones in Local Responsibility and include incorporated cities, cultivated agriculture lands, and portions of the desert. Local responsibility area fire protection is typically provided by city fire departments, fire protection districts, counties, and by CALFIRE under contract to local government. As shown in Figure 4, the Project site is not in a Very High Fire Hazard Severity Zone.

Figure 4: Very High Fire Hazard Severity Zones in Lafayette As Recommended by CAL FIRE



Source: Calfire 2009

3.2.3 Local Policies and Regulations

DTSC-Certified Unified Program Agency (CUPA)

The Certified Unified Program Agency (CUPA) addresses impacts from hazardous wastes to meet the requirements identified by the DTSC-Unified Program. The DTSC-Unified Program consolidates, coordinates, and makes consistent the administrative requirements, permits, inspections, and enforcement activities of six environmental and emergency response programs: *Hazardous Materials Release Response Plans and Inventories; California Accidental Release Prevention Program; Underground Storage Tank Program; Above Ground Petroleum Storage Act Program; Hazardous Waste Generator and Onsite Hazardous Waste Treatment Programs; and California Uniform Fire Code: Hazardous Material Management Plans and Hazardous Material Inventory Statements.* The CUPA responsible for the Project area is the Contra Costa County Health Services Department.

City of Lafayette General Plan Safety Element

The Safety Element, Chapter VI, of the City of Lafayette's General Plan (City of Lafayette 2009) addresses the protection of the community from unreasonable risks associated with natural and manmade hazards and contains goals and policies that relate to hazardous materials and emergency response. The following goals/polices in the General Plan relating to hazards and hazardous materials would apply to the Project:

> *Goal LU-5: Reduce the hazards of the storage, transportation, and disposal of hazardous materials*
>
> Policy S-5.3: Transportation, Storage and Disposal Facilities: Provide measures to protect the public from the hazards associated with the Transportation, Storage and Disposal ("TSD") of hazardous wastes.
>
> *Goal S-8: Provide adequate response and support services in the event of a major emergency or natural disaster*
>
> Policy S-8.5: Identify and publicize evacuation routes to be used in emergencies.
>
> *Goal S-9: Maintain an effective medical emergency response system.*
>
> Policy S-9.1: Work to improve emergency medical response service in Lafayette.

EBMUD Practices and Procedures

EBMUD Standard Construction Specifications

EBMUD Standard Construction Specifications set forth the contract requirements for environmental compliance to which construction crews must adhere. Construction Specifications applicable to hazards and hazardous materials include the following:

- Standard Construction Specification 01 35 44 (Environmental Requirements)
- Standard Construction Specification 01 35 24 (Project Safety Requirements)
- Standard Construction Specification 02 83 13 (Lead Hazard Control Activities)

The Standard Construction Specifications stipulate that the construction crew shall be responsible for maintaining compliance with applicable federal, State and local requirements. The requirements include preparation of plans that outline procedures to be followed to ensure the safe and lawful handling of hazardous materials, implementation of plans, and documentation of compliance. EBMUD reviews submittals for conformance with the requirements of the contract document and specified laws and regulations. Specific planning documents and procedures related to hazards and hazardous materials that are required by EBMUD for construction are described below:

- **Controls on Site Activities.** EBMUD requires that activities on the construction site are controlled to prevent discharge of contaminated stormwater. Applicable requirements include:
  - No debris including, but not limited to, demolition material, treated wood waste, stockpile leachate, soil, silt, sand, bark, slash, sawdust, asphalt, rubbish, paint, oil, cement, concrete or washings thereof, oil or petroleum products, or other organic or earthen materials from construction activities shall be allowed to enter into storm drains or surface waters or be placed where it may be washed by rainfall or runoff outside the construction limits. When operations are completed, excess materials or debris shall be removed from the work area as specified in the Construction and Demolition Waste Disposal Plan.

- Excess material shall be disposed of in locations approved by the Engineer consistent with all applicable legal requirements and disposal facility permits.
- Do not create a nuisance or pollution as defined in the California Water Code. Do not cause a violation of any applicable water quality standards for receiving waters adopted by the Regional Board or the State Water Resources Control Board, as required by the Clean Water Act.
- Clean up all spills and immediately notify EBMUD in the event of a spill.
- Stationary equipment such as motors, pumps, and generators, shall be equipped with drip pans.
- Divert or otherwise control surface water and waters flowing from existing projects, structures, or surrounding areas from coming onto the work and staging areas. The method of diversions or control shall be adequate to ensure the safety of stored materials and of personnel using these areas. Following completion of work, ditches, dikes, or other ground alterations made by the Contractor shall be removed and the ground surfaces shall be returned to their former condition, or as near as practicable.
- Maintain construction sites to ensure that drainage from these sites will minimize erosion of stockpiled or stored materials and the adjacent native soil material.
- Construction staging areas shall be graded, or otherwise protected with Best Management Practices (BMPs), to contain surface runoff so that contaminants such as oil, grease, and fuel products do not drain towards receiving waters including wetlands, drainages, and creeks.
- Any chemical or hazardous material used in the performance of the Work shall be handled, stored, applied, and disposed of in a manner consistent with all applicable federal, state, and local laws and regulations.
- Contaminated materials excavated and/or removed from the construction area shall be disposed of in a manner consistent with all applicable local, state, and federal laws and regulations.

- **Stormwater Pollution Prevention Plan (SWPPP)**. Before the start of construction, the contractor must submit a SWPPP that describes measures that shall be implemented to prevent the discharge of contaminated storm water runoff from the jobsite. Contaminants to be addressed include, but are not limited to, soil, sediment, concrete residue, pH less than 6.5 or greater than 8.5, and chlorine residual and all other contaminants known to exist at the jobsite location.
- **Water Control and Disposal Plan.** The Contractor shall submit a detailed Water Control and Disposal Plan for the EBMUD's acceptance prior to any work at the jobsite. The plan shall comply with requirements of all applicable discharge permits, including SWRCB Order WQ 2014-0194-DWQ/General Order No. CAG 140001 – NPDES Permit for Drinking Water System Discharges; SWRCB ORDER NO. 2012-0006-DWQ NPDES NO. CAS000002 – Construction General Permit; Sanitary Sewer Discharge Permit. Contractor shall maintain proper control of the discharge at the discharge point to prevent erosion, scouring of bank, nuisance, contamination, and excess sedimentation into receiving waters.
- **Construction and Demolition Waste Disposal Plan.** Prior to construction, the contractor must prepare a Construction and Demolition Waste Disposal Plan and submit a copy of the plan for the EBMUD's acceptance prior to disposing of any material (except for water wastes which shall be

addressed in the Water Control and Disposal Plan). The plan shall identify how the contractor will remove, handle, transport, and dispose of all materials required to be removed in a safe, appropriate, and lawful manner in compliance with all applicable regulations of local, state, and federal agencies having jurisdiction over the disposal of removed materials. The contractor shall procure the necessary permits required by the local, state, and federal agencies having jurisdiction over the handling, transportation, and disposal of construction and demolition waste and include a list of reuse facilities, recycling facilities and processing facilities that will be receiving recovered materials. The plan must identify materials that are not recyclable or not recovered which will be disposed of in a landfill (or other means acceptable by the State of California and local ordinance and regulations) and list the permitted landfill, or other permitted disposal facilities, that will be accepting the disposed waste materials. The plan must also identify each type of waste material to be reused, recycled or disposed of, and estimate the amount, by weight and shall include the sampling and analytical program for characterization of any waste material, as needed, prior to reuse, recycle or disposal. Materials or wastes shall only be disposed of at facilities approved of by EBMUD. Prior to disposition of wastes, contractor must submit permission to reuse, recycle, reclaim, or dispose of material from reuse, recycling, reclamation, or disposal site owner along with any other information needed by the EBMUD to evaluate the acceptability of the proposed reuse, recycling, or disposal site. Contractor shall disclose all information pertinent to the characterization of the material or waste to the EBMUD.

- **Spill Prevention and Response Plan.** Prior to construction contractor shall submit plan detailing the means and methods for preventing and controlling the spilling of known hazardous substances used on the jobsite or staging areas. The plan shall include a list of the hazardous substances proposed for use or generated by the contractor on site, including petroleum products, and measures that will be taken to prevent spills, monitor hazardous substances, and provide immediate response to spills. Spill response measures shall address notification of the EBMUD and appropriate agencies including phone numbers; spill-related worker, public health, and safety issues; spill control, and spill cleanup.
- **Project Safety and Health Plan.** Before the start of construction, the contractor shall prepare a Project Safety and Health Plan approved by EBMUD that addresses anticipated hazards related to hazardous substances, fall protection, confined spaces, and trenches or excavations. The plan must designate a Project Health and Safety Representative and a qualified person to take air samples and measurements of known or suspected hazardous materials. All personnel who will likely be exposed to hazardous substances must have appropriate training. The plan shall include an Emergency Action Plan in the event of an accident or serious unplanned event that requires notifying any responsive agencies (e.g., fire department, PG&E, rescue teams).
- **Excavation Safety Plan.** Before the start of excavation, the contractor shall prepare an Excavation Safety Plan, approved by EBMUD, which describes measures for worker protection and control of ground movement. The plan must include drawings and details of system(s) to be used, the area in which each type of system will be used, de-watering, means of access and egress, storage of materials, and equipment restrictions.
- **Lead Hazard Control Activities.** Before the start of demolition, the contractor shall prepare a Lead Demolition Plan detailing handling, engineering control, removal and disposal procedures for lead-containing materials. All workers performing work shall meet the requirements of the California Department of Health Services lead-related construction interim certification. The lead work area will be isolated using caution tape, and the job site shall be secured at all times. Transportation equipment for removal of lead-containing materials shall be suitable for loading,

temporary storage, transit and unloading of waste without exposure to persons or property. Contractor shall removal all evidence of lead-containing materials from the jobsite that are related to project demolition.

EBMUD Environmental Compliance Manual

EBMUD's Environmental Compliance Manual requires implementation of procedures during construction to protect workers and the environment. The Trench Spoil Best Management Practices Program is applicable to the Project and would require proper disposal of spoil, which is excess material removed from the pipeline trench. The program requires site investigation, collection and analysis of soil, slurry and groundwater samples if needed, and depending on the results of the investigation, advanced soil, slurry and groundwater disposal arrangements.

3.3 Impact Analysis

3.3.1 Methodology for Analysis

This section evaluates whether construction and operation of the facilities associated with the Project would result in significant hazards and hazardous materials impacts. Impacts are evaluated based on the known potentially hazardous materials that would be used or stored on site during construction and operation, potential for accidental hazardous substance release, and presence of other health-threatening factors in the Project vicinity. Each potential impact is assessed in terms of the applicable regulatory measures and EBMUD construction specifications, and mitigation measures are identified for significant impacts.

3.3.2 Thresholds of Significance

Consistent with Appendix G of the *CEQA Guidelines* an impact on hazards and hazardous materials would be considered significant if the Project 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 reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment;
- Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school;
- Be located on a site which is included on a list of hazardous materials site compiled pursuant to Government Code Section 65962.5 and, as a result, create a significant hazard to the public or the environment;
- For a project located within 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, result in a safety hazard for people residing or working in the project area;
- For a project within the vicinity of a private airstrip, 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;
- 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.

3.3.3 Criteria Requiring No Further Evaluation

Criteria listed above that are not applicable to actions associated with the Project are identified below along with a supporting rationale as to why further consideration is unnecessary and a no-impact determination is appropriate.

- *Located within 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, result in a safety hazard for people residing or working in the project area* — The Project is not located within an airport land use plan or within two miles of a public airport. In addition, none of the activities would create any significant hazards for people residing or working in or near an airport. Due to the distance of the closest airport from the Project area and the nature of construction, the Project would not result in any safety hazards surrounding the airport and therefore no further evaluation is required.
- *For a project within the vicinity of a private airstrip, result in a safety hazard for people residing or working in the project area* — The Project is not located the vicinity of a private airstrip. Therefore the Project would not result in any safety hazards surrounding the airport and no further evaluation is required.
- *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 wildland* — The Project is located in a highly-urbanized area with no adjacent wildlands and is not located within a mapped area of high fire risk (Figure 4). Therefore, the Project would have no impact related to wildland fire hazards.

3.3.4 Impacts and Mitigation Measures

Impact HAZ-1 Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?

Construction activities are expected to involve the transport, use, and disposal of hazardous materials, including but not limited to motor fuels, paints, oils, and grease. The transport, use, and disposal of hazardous materials listed above could pose a significant threat to human health or the environment if not properly managed. Relatively small amounts of the listed materials, which are not considered acutely hazardous, would be transported, used, and disposed of during construction. Workers handling hazardous materials are required to adhere to OSHA and CAL OSHA health and safety requirements. Hazardous materials must be transported to and from the proposed Project area in accordance with RCRA and United States Department of Transportation (US DOT) regulations, managed in accordance with the Contra County Department of Environmental Health's regulations, and disposed of in accordance with RCRA and the CCR at a facility that is permitted to accept the waste. Since compliance with existing regulations and programs are mandatory, proposed Project construction activities are not expected to create a potentially significant hazard to the public or the environment. Therefore, impacts related to the routine transport, use, or disposal of hazardous materials during proposed Project construction would be less than significant.

Operation of the Project would not result in the routine use or transport of hazardous materials within the Project area, or the release of hazardous materials into the environment. The Project consists of constructing two 8-MG water tanks and 3,650 lineal feet of 36-inch pipeline, and once constructed operation of the water storage facilities and pipeline would not require use of hazardous materials and would not generate hazardous waste. Therefore the impact from Project operation is less than significant and no mitigation is required.

Significance Determination before Mitigation

Less than significant.

Mitigation Measures

No mitigation measures are required.

Impact HAZ-2 Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the likely release of hazardous materials into the environment?

Construction of the Project would involve transporting and using hazardous materials such as paints, solvents, cements, lubricants, and fuels that must be properly handled and disposed of to minimize potential effects to human health and the environment. These materials would be contained in equipment and stored at the construction site. Demolition of the existing reservoir would include removal of the roof, which has been determined to include sealant materials containing elevated levels of lead. Although there is no indication that there is contaminated soil or groundwater at the Leland Reservoir site, there is a possibility that contamination could be uncovered during construction of the reservoir or pipeline. Accidental release or improper disposal of hazardous substances present in soils or groundwater could pose a potentially significant impact to human health and the environment. In addition, although no gas transmission lines are present in the Project area, rupture of a subsurface smaller gas pipeline during construction trenching could result in bodily injury or building structure hazard in the Project area.

As described in the Project Description, through implementation of EBMUD Standard Construction Specification 01 35 44, Environmental Requirements, Section 1.3, activities on the construction site would be controlled to prevent discharge of contaminated stormwater. Prior to construction, the contractor would prepare a Construction and Demolition Waste Disposal Plan and submit a copy of the plan for EBMUD’s acceptance prior to disposing of any material (except for water wastes, which shall be addressed in the Water Control and Disposal Plan). The plan would identify how the contractor would remove, handle, transport, and dispose of all materials, which must be removed in a safe, appropriate, and lawful manner in compliance with all applicable regulations of local, state, and federal agencies having jurisdiction over the disposal of removed materials. In addition, prior to construction the contractor would submit a plan detailing the means and methods for preventing and controlling spills of known hazardous substances used on the job site or staging areas.

Through implementation of EBMUD Standard Construction Specification 01 35 24, Project Safety Requirements, Section 1.3, before the start of construction, the contractor would prepare a Project Safety and Health Plan approved by EBMUD that addresses anticipated hazards related to hazardous substances, fall protection, confined spaces, and trenches or excavations. The contractor would also prepare an Excavation Safety Plan, approved by EBMUD, which describes measures for worker protection and control of ground movement.

Through implementation of EBMUD Standard Construction Specification 02 83 13, Lead Hazard Control Activities, before the start of demolition, the contractor would prepare a Lead Demolition Plan detailing handling, engineering control, removal and disposal procedures for lead-containing materials.

Implementation of EBMUD Procedure 711, Hazardous Waste Removal, would carry out specific steps and responsibilities for characterizing waste and determining what analyses are needed to classify the waste; coordinating waste disposal, reuse or recycling issues; labeling, storing, inspecting, and maintaining inventory records for the waste; and reviewing, signing, and tracking any hazardous waste handling and disposal requirements and hazardous waste manifests.

Implementation of the above EBMUD Standard Construction Specifications and Procedures during Project construction would ensure that the Project's impacts related to the release of hazardous materials into the environment would be less than significant.

Significance Determination before Mitigation

Less than significant.

Mitigation Measures

No mitigation measures are required.

Impact HAZ-3 Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?

Although construction would occur within one-quarter mile of The Meher and White Pony Schools (Figure 3), construction would not require the use of acutely hazardous materials and all use of hazardous materials during construction would be subject to compliance with federal, State and local hazardous materials regulations. It is thus expected that construction in accordance with these laws and regulations would not result in adverse effects on the school. Impacts would be less than significant.

Significance Determination before Mitigation

Less than significant.

Mitigation Measures

No mitigation measures are required.

Impact HAZ-4 Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?

The Project site is not included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5.

Significance Determination before Mitigation

No impact.

Mitigation Measures

No mitigation measures are required.

Impact HAZ-5 Impair implementation of or physically interfere with and adopted emergency response plan or emergency evacuation plan?

Construction of the pipelines would require temporary lane and roadway closures during laydown of the pipelines and trenching. Although there are alternative vehicle routes in the Project vicinity, impacts to emergency access could occur during the Project's construction period. As described in the Project Description, through implementation of EBMUD Standard Construction Specification 01 55 26, the construction contractor would comply with specific requirements pertaining to traffic regulation. The Specifications outline what should be included in a Traffic Control Plan and how that Plan shall be implemented during construction activities. Where specific requirements are not detailed in the Specification or in applicable permits, the contractor shall comply with the Caltrans Manual of Traffic Controls for Construction and Maintenance Work Zones. Implementation of traffic regulation controls outlined in EBMUD Standard Construction Specification 01 55 26 would ensure that the Project's interference with adopted emergency response plans or emergency evacuation plans would be less than significant. The EBMUD Practices and Procedures Monitoring and Reporting Plan (**Table 7-2** in Chapter 7) lists the applicable standard specifications language.

Significance Determination before Mitigation

Less than significant.

Mitigation Measures

No mitigation measures are required.

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Appendix K: Technical Memorandum – Hydrology and Water Quality

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Appendix K - Technical Memorandum Hydrology and Water Quality

Leland Reservoir Replacement Project

Subject:	Hydrology and Water Quality
Prepared For:	East Bay Municipal Utility District
Prepared by:	George Valenzuela
Reviewed by:	Robin Cort and Susan Yogi, RMC Water and Environment
Date:	November 29, 2017
Reference:	0061-009.00

Table of Contents

List of Terms and Acronyms

Basin Plan	San Francisco Bay Basin (Region 2) Water Quality Control Plan
BMPs	Best Management Practices
CEQA	California Environmental Quality Act
CCCSD	Central Contra Costa Sanitary District
CCCWP	Contra Costa Clean Water Program
CWA	Federal Clean Water Act
CWP	County Watershed Program
DWR	California Department of Water Resources
EBMUD	East Bay Municipal Utility District
FEMA	Federal Emergency Management Agency
MG	Million gallons
NFIP	National Flood Insurance Program
NPDES	National Pollutant Discharge Elimination System
Regional Water Board	San Francisco Bay Regional Water Quality Control Board (Region 2)
RWQCB	Regional Water Quality Control Board
SFBRWQCB	San Francisco Bay Regional Water Quality Control Board
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TM	Technical Memorandum
TMDL	Total Maximum Daily Load
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency

1 Introduction

This Technical Memorandum (TM) provides information that will be used in the evaluation of hydrology and water quality environmental impacts associated with the Leland Reservoir Replacement Project (Project), which is proposed by the East Bay Municipal Utility District (EBMUD).

2 Project Background

The existing 18-million-gallon (MG), open-cut Leland Reservoir, constructed in 1955, is a critical drinking water facility for the Leland Pressure Zone, which serves the southwest portion of the City of Pleasant Hill, most of the City of Walnut Creek, and a small area of the City of Lafayette. The reservoir is at the end of its useful service life, and its replacement is necessary due to the deteriorated condition of the pre-cast concrete roof (including rainwater ponding), mature trees growing in the earthen embankment, obsolete mechanical and electrical equipment, and the reservoir's criticality in serving the Leland Pressure Zone.

The Project includes replacement of the existing open cut reservoir with two new 8-MG prestressed concrete tanks within the existing reservoir basin. The Project would also include replacing approximately 1,700 linear feet of existing 30-inch and 36-inch critical transmission pipeline with approximately 2,700 linear feet of 36-inch pipeline to be constructed within the public right-of-way (ROW) in Windsor Drive, Condit Road and Leland Drive and about 950 linear feet of 36-inch pipeline within the Leland Reservoir site. A portion of the 36-inch pipeline is located beneath the existing reservoir basin and would be removed as part of the reservoir demolition. The 36-inch pipeline that extends beyond the reservoir basin would be abandoned in place along with a 30-inch pipeline in an unimproved right-of-way, west of the property boundary. The abandoned pipeline would be capped and filled with cellular concrete. The access road from Leland Drive to the reservoir would also be improved. Approximately 1,000 linear feet of new 30-inch storm drain pipeline would also be installed on site and connect to the City of Lafayette's existing storm drain system at the intersection of Leland Drive and Patty Way.

2.1 Approach

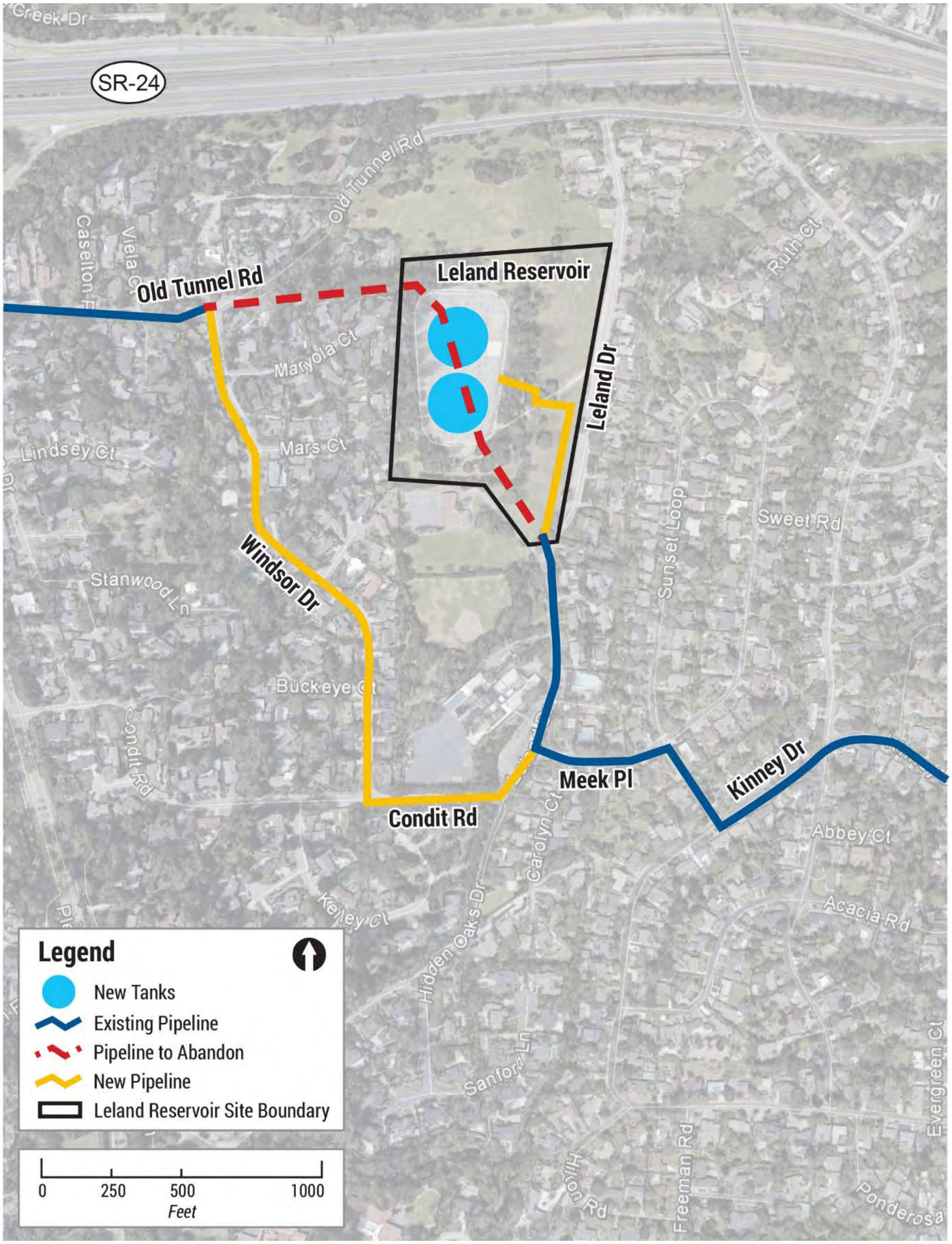
This TM provides an analysis of effects of the Project on hydrology and water quality based on criteria specified in Appendix G, Environmental Checklist of the CEQA Guidelines. The Project involves replacement of an existing storage reservoir and associated pipelines, and once constructed the new storage facility would continue to be operated and maintained to conform to state and federal requirements for water treatment and discharge, thus there would be no operational impacts. Hydrology and water quality impacts would be limited to potential for water quality degradation during construction.

3 Environmental Setting, Impacts and Mitigation

3.1 Environmental Setting

The following sections describe the existing environmental conditions and regulatory setting regarding hydrology and water quality and the potential effects the Project may have groundwater and surface water resources. Figure 1 shows the Project site.

Figure 1: Proposed Leland Reservoir Replacement Project Site



Source: Compiled by RMC, a Woodard and Curran Company, 2017

3.1.1 Regional Setting

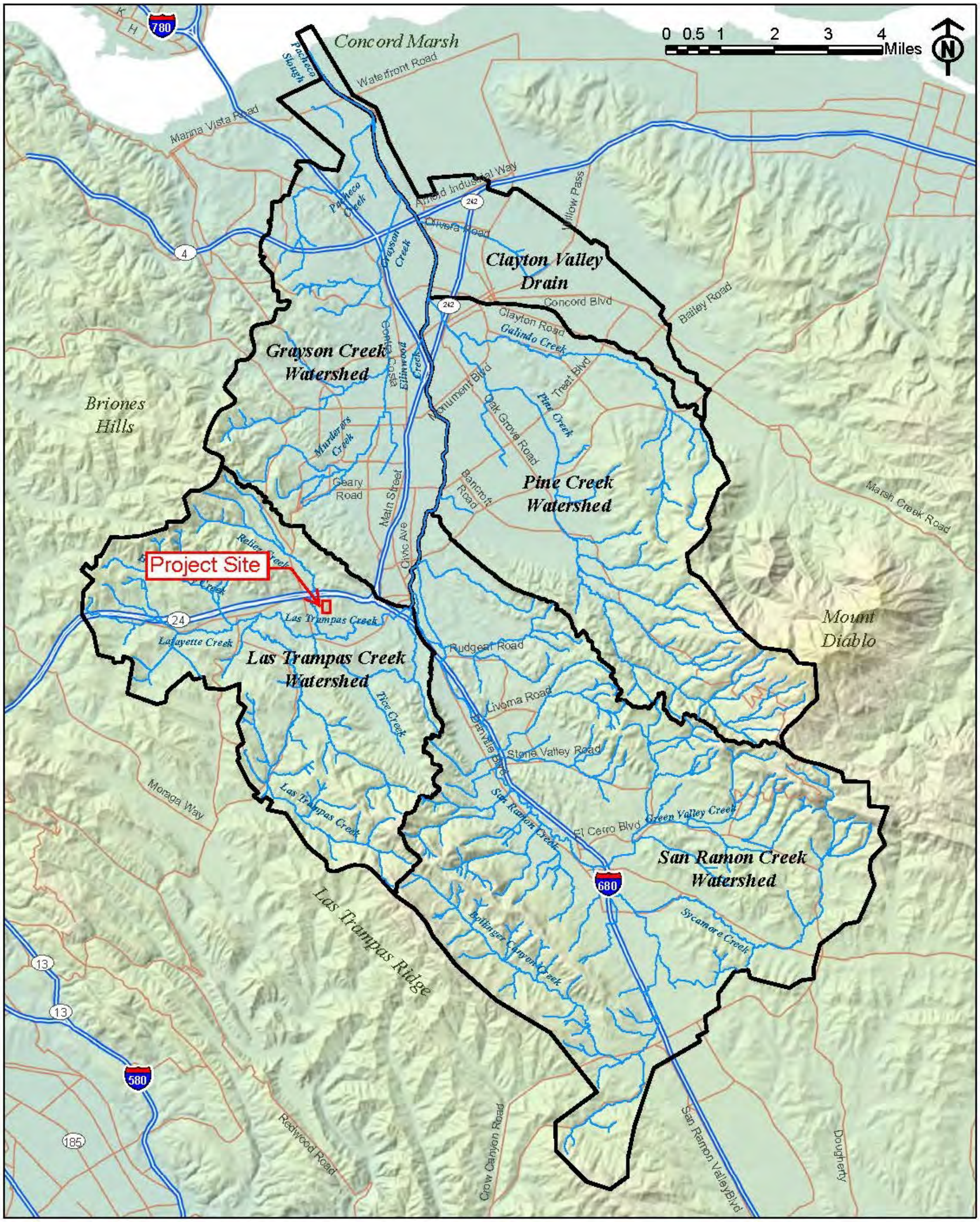
The Leland Reservoir site is surrounded to the east and west by single family residential homes. A church is adjacent to the southern property boundary of the reservoir site. The land between the northern property boundary and Old Tunnel Road is vacant land, zoned for single family residential use. The proposed pipeline route is under streets in single-family residential neighborhoods, and also passes a private elementary school, and a community swim center.

Hydrology

The Project site is in the western portion of Contra Costa County, which is in the San Francisco Bay Basin. The site is within the Las Trampas Creek Watershed, a sub-watershed of the Walnut Creek Watershed (Figure 2). The Project site is east of Reliez Creek, which flows into Las Trampas Creek southwest of the site. The Las Trampas Creek Watershed drains 27 square miles of Lafayette, Orinda, Moraga, and Walnut Creek. Las Trampas Creek converges with San Ramon Creek and Tice Creek, forming Walnut Creek (Walnut Creek Watershed Council 2013).

The Las Trampas Creek Watershed is located on the western side of the Walnut Creek Watershed and flows north into Suisun Bay and eventually the San Francisco Bay.

Figure 2: Walnut Creek Watershed and Associated Sub-Watersheds



Source: Walnut Creek Watershed Council 2013

At 146 square miles, the Walnut Creek Watershed is Contra Costa County's largest watershed. Covering over 20 percent of the county, the watershed contains 23 percent of the county's channels with over 309 mapped creeks and 35 percent of its population with 340,000 inhabitants. Similar to the surrounding region, the Walnut Creek Watershed exhibits a Mediterranean climate of warm dry summers and mild, wet winters. (Walnut Creek Watershed Council 2013)

Flooding

In 2011 the City of Lafayette conducted a hazards assessment and, after reviewing eight other local hazards, ranked flooding as the second biggest hazard based on past disasters and expected future impacts. While it was noted that localized creek flooding was a factor, the majority of risk was associated with the Lafayette Reservoir. In the unlikely event of a dam failure, a large portion of the downtown (City of Lafayette 2011) may be in the inundation zone. The Project site would not be affected by a failure of the Lafayette Reservoir and the Leland Reservoir is not identified as posing a risk of flooding.

In addition to a local assessment, flood hazard risks were conducted by the Federal Emergency Management Agency (FEMA) by defining special flood hazard areas within the City of Lafayette for use by the National Flood Insurance Program (NFIP), in which the City of Lafayette participates in order to provide its residents with federally-backed flood insurance. The City of Lafayette is identified as having a moderate to low flood risk, and no area within the Project site is located within the 100-year flood plain (Figure 3).

Storm Drainage

In an urban setting, flooding risk is dependent of several factors, such as duration and intensity of rainfall, the ratio of impervious to pervious land use surfaces, and the location/capacity of the City's storm drain system. It is the function of the storm drain system (which includes catch basins, open channels and ditches, and subsurface drains) to drain surface runoff into gutters, storm drain inlets, channels, creeks, and eventually the San Francisco Bay. There is an existing storm drain on the west side of Leland Drive, adjacent to the Project site, which flows into a larger storm drain on the east side of Leland Drive via a connection that crosses under Leland Drive at Patty Way. Site plans of the existing storm drains in Leland Drive are included in Appendix A (City of Lafayette 2007).

Storm drain maintenance within the City of Lafayette is provided by the City's Department of Public Works, whose services include maintenance and repair of the City's storm drainage system, removal of drainage impediments, minor storm drain repairs, cleaning of storm drains and roadside ditches, storm damage cleanup, and minor mud slide cleanup (City of Lafayette 2016).

Figure 3: FEMA Identified Special Flood Risk Zones

Source: FEMA 2016

Surface Water Quality

As defined in the San Francisco Bay Regional Water Quality Control Board’s (SFBRWQCB) Watershed Management Initiative, significant water quality issues in watersheds in Contra Costa County include stream and wetland impacts from proposed new development and existing development; water quality impairment from pesticides, fertilizers, animal waste, automobiles, and other typical urban runoff pollutants; changes to the hydrograph of watersheds due to development and increase of impervious surfaces; and water quality impacts from industrial and commercial site development (SFBRWQCB 2004).

In addition to the SFBRWQCB Watershed Management Initiative, the SFBRWQCB addresses Region-wide water quality concerns through the creation and triennial update of a Water Quality Control Plan (Basin Plan). Serving as the SFBRWQCB’s master water quality control planning document, the Basin Plan designates beneficial uses and water quality objectives for waters of the State, including surface waters and groundwater. The beneficial uses are recognized by the SFBRWQCB as the resources, services, and qualities of the State’s aquatic systems that are the ultimate goals of protecting and achieving high water quality. Six beneficial uses were identified for Las Trampas Creek (SFBRWQCB 2015), and are listed below. Reliez Creek, which is a tributary of Las Trampas Creek, is located about 160 feet west of Windsor Drive and approximately 700 feet of the reservoir site. Neither Reliez Creek nor Las Trampas Creek is considered to be water-quality impaired.

Las Trampas Creek beneficial uses are:

- Cold Freshwater Habitat: *Uses of water that support cold water ecosystems, including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates.*
- Preservation of Rare and Endangered Species: *Uses of waters that support habitats necessary for the survival and successful maintenance of plant or animal species established under state and/or federal law as rare, threatened, or endangered.*
- Warm Freshwater Habitat: *Uses of water that support warm water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates.*
- Wildlife Habitat: *Uses of waters that support wildlife habitats, including, but not limited to, the preservation and enhancement of vegetation and prey species used by wildlife, such as waterfowl.*
- Water Contact Recreation: *Uses of water for recreational activities involving body contact with water where ingestion of water is reasonably possible. These uses include, but are not limited to, swimming, wading, water-skiing, skin and scuba diving, surfing, whitewater activities, fishing, and uses of natural hot springs.*
- Non-contact Water Recreation: *Uses of water for recreational activities involving proximity to water, but not normally involving contact with water where water ingestion is reasonably possible. These uses include, but are not limited to, picnicking, sunbathing, hiking, beachcombing, camping, boating, tide pool and marine life study, hunting, sightseeing, or aesthetic enjoyment in conjunction with the above activities.*

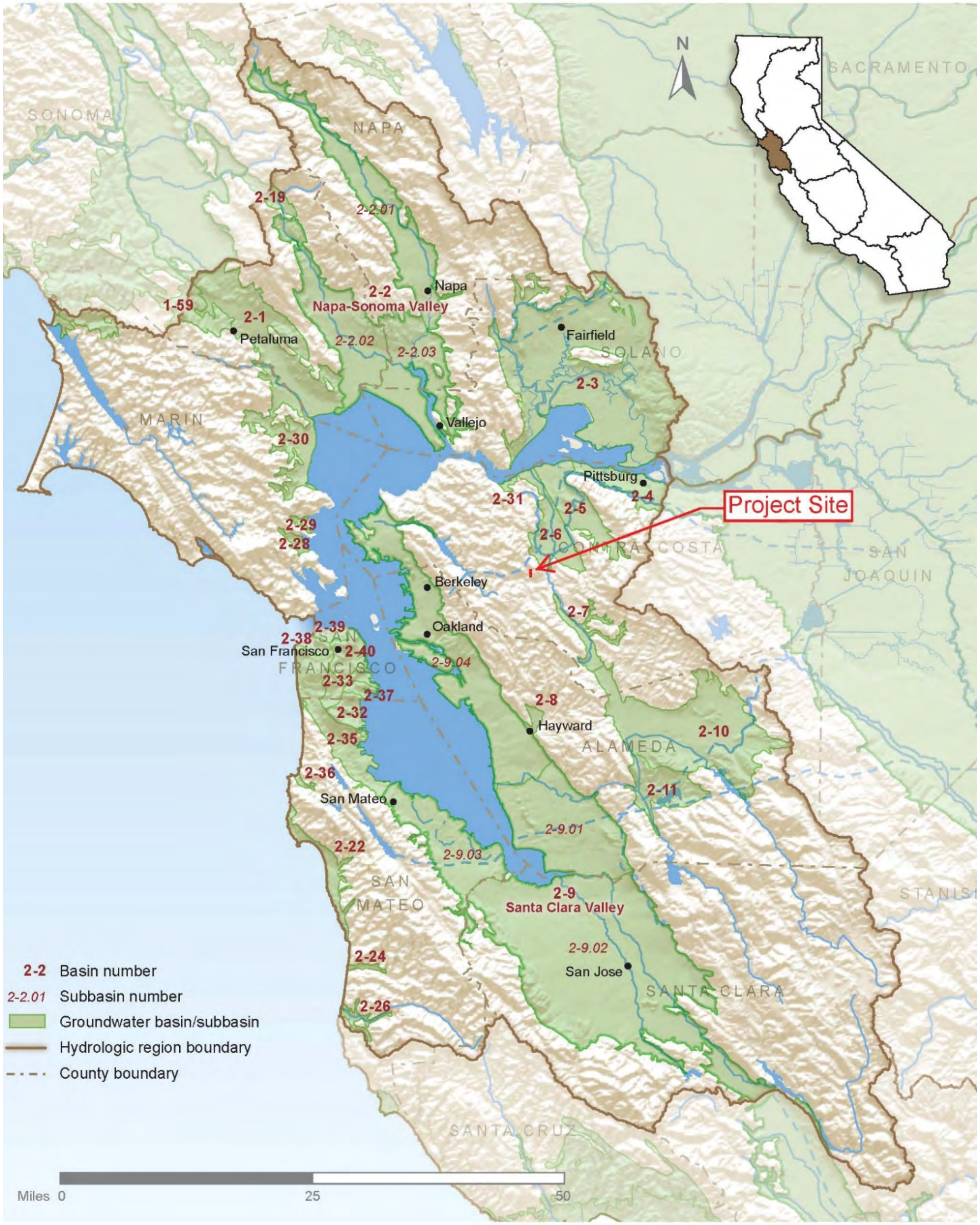
Groundwater

The California Department of Water Resources (DWR) has long recognized the need for collection, summary, and evaluation of groundwater data as tools in planning optimal use of the groundwater resource. DWR's Bulletin 118 compiles information including geology, groundwater quantity and quality, and current groundwater management practices for each groundwater basin (California Department of Water Resources 2015). As shown in Figure 4, no groundwater basins underlie the Project site.

Seiche/Tsunami

Tsunamis are sea waves or tidal waves caused by offshore earthquakes, landslides, or volcanic eruptions. Seiches are waves in an enclosed or semi-enclosed body of water such as a lake, reservoir, or harbor resulting from seismic activity. Because the Project site is located over 12 miles inland from the nearest ocean body of water (San Francisco Bay), it is not in an area subject to tsunami. The Project site is not located not near any other large water bodies that would be capable of generating a seiche.

Figure 4: Alluvial Groundwater Basins and Subbasins - San Francisco Bay Hydrologic Region



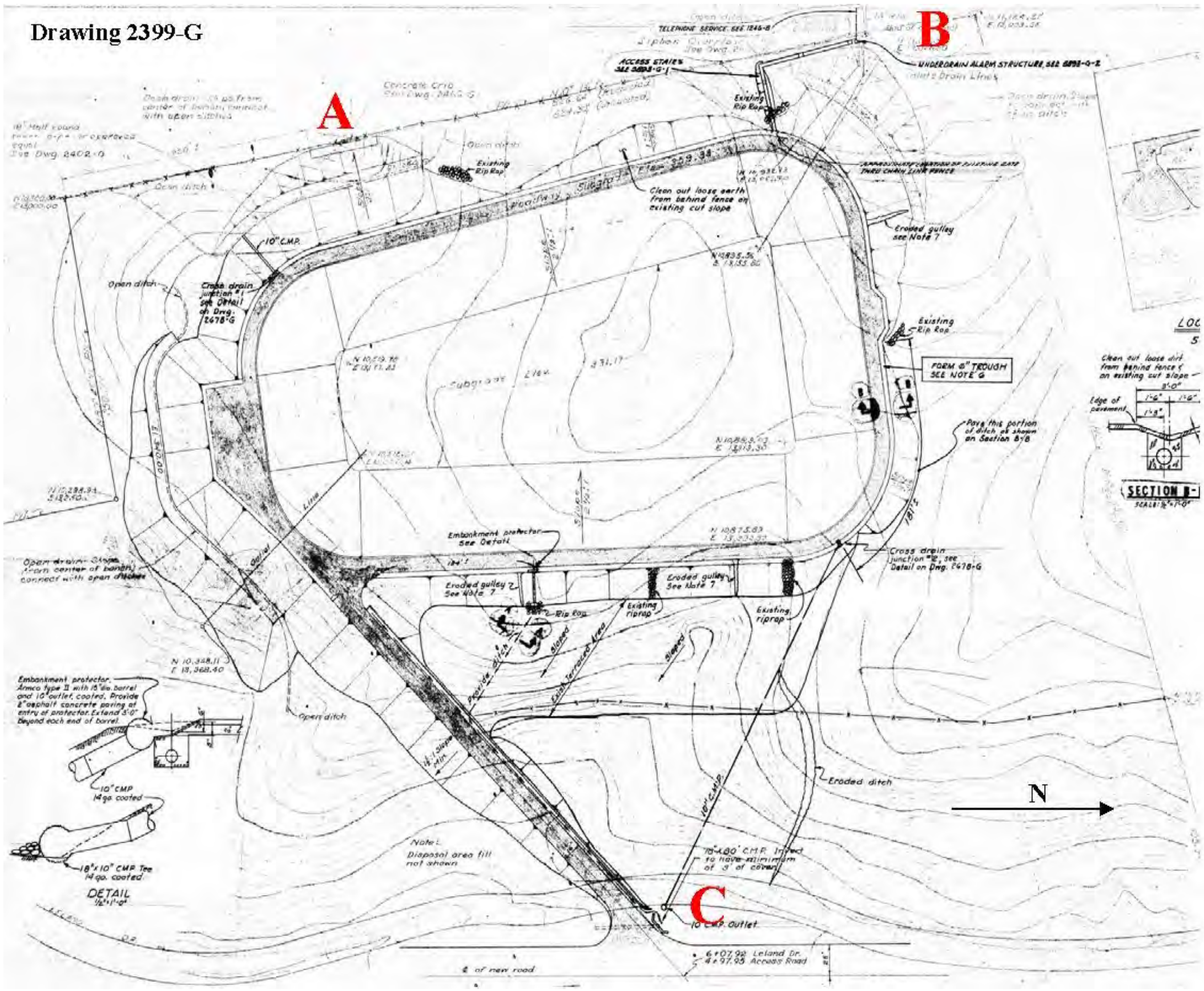
Source: California Department of Water Resources. 2015.

3.1.2 Leland Reservoir Site

Surface drainage features of the reservoir site are described in the Leland Reservoir Replacement Facilities Plan (EBMUD 2014). Existing drawings (Figure 5) and field observations conducted for the Facilities Plan identified three primary locations to which existing surface runoff from the site is directed: A) an open concrete v-ditch that extends from the southwest corner of the reservoir between 3131 and 3132 Mars Court and drains to a gutter in the street, which flows into a drainage inlet at the intersection of Mars Court and Windsor Drive; B) an underground corrugated metal pipe of unknown diameter extending from the northwest property corner and apparently running under 3143 Old Tunnel Road, connecting to a drainage inlet on the south side of Old Tunnel Road and discharging to Reliez Creek; and C) a 10-inch corrugated metal pipe extending from the northeast corner of the reservoir to a drainage inlet located on the west side of Leland Drive at the north side of the reservoir access road (EBMUD 2014). No streams, springs, or seeps occur on the Project site.

Surface drainage is also captured by the City's storm drain system components located between the Project site's eastern property boundary and the west side of Leland Drive, north and south of the reservoir access road. North of the reservoir access road are two curb inlet catch basins that connect to the City's storm drain system. South of the reservoir access road is a concrete V-ditch that connects to the storm drain system via a catch basin at the north side of Patty Way.

Figure 5: Site Drainage



Source: EBMUD 2014

3.2 Regulatory Framework

3.2.1 Federal Policies and Regulations

Clean Water Act

Originally titled the Federal Water Pollution Control Act of 1972, the Clean Water Act (CWA) is administered by USEPA and the Regional Water Quality Control Boards (RWQCBs). The CWA serves as the primary federal law protecting the quality of the nation's surface waters, including lakes, rivers, and coastal wetlands. The CWA allowed USEPA to delegate the National Pollutant Discharge Elimination System (NPDES) Permit Program to state governments, enabling states to perform many of the permitting, administrative, and enforcement aspects of the NPDES Program. In California, the NPDES Permit Program is managed by the State Water Resources Control Board (SWRCB) and nine RWQCBs. The SFBRWQCB has jurisdiction over the Project area as well as over the entire lengths of both Las Trampas Creek and the Walnut Creek Watershed.

Section 303(d)

CWA Section 303(d) requires states to develop lists of water bodies that will not attain water quality standards after implementation of technology-based effluent limitations by point-source dischargers. Section 303(d) further requires states to develop a Total Maximum Daily Load (TMDL) for each of the listed pollutants and water bodies. A TMDL is the amount of pollutant loading that the water body can receive and still meet water quality standards. In 2011, the EPA gave final approval to a revised list of impaired water bodies (the 303(d) list) prepared by the State. There are no streams in the vicinity of the Project site that are on the 303(d) list. In the Walnut Creek Watershed, only Grayson Creek, which runs through the City of Pleasant Hill several miles north of the Project area, is on the 303(d) list, which designates the creek as impaired for trash.

Section 402

CWA Section 402 regulates stormwater discharges to surface waters through the NPDES program. In California, USEPA authorizes the SWRCB to oversee the NPDES program through the RWQCBs, which regulate stormwater discharges associated with construction and require a permit for any construction project that would cause more than one acre of land disturbance. Construction activities are regulated under a statewide General Permit for Discharges of Storm Water Associated with Construction Activity, which was adopted by the SWRCB in 2009 as NPDES Order No. CAS000002, Order No. 2009-0009-DWQ (Construction General Permit) as amended by 2010-0014-DWQ and 2012-006-DWQ. Effective July 1, 2010, the amended General Construction Permit requires the development and implementation of a Storm Water Pollution Prevention Plan (SWPPP). The SWPPP must include 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 list Best Management Practices (BMPs) the discharger will use to protect stormwater runoff; a visual monitoring program; a chemical monitoring program for "non-visible" 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 on the 303(d) list for sediment.

Section 404

CWA Section 404 regulates the discharge of dredged and fill materials into waters of the United States. Areas meeting the regulatory definition of waters of the U.S. are subject to the jurisdiction of the U.S. Army Corps of Engineers (USACE) under provisions of CWA Section 404. Construction activities involving placement of fill into jurisdictional waters of the U.S. are regulated by the USACE through permit requirements.

National Flood Insurance Program

NFIP was created to promote flood awareness and reduce flood losses of properties within Special Flood Hazard Areas. Drainage and related flooding hazards are managed in response to requirements established by the National Flood Insurance Act of 1986 and the Flood Disaster Protection Act of 1973, as amended. Requirements of the NFIP are included in the Building Code and through overall City and interagency programs for flood management. In implementing NFIP, FEMA requires that new construction in a flood hazard area meet minimum design standards to place occupied structures above flood hazard areas. As noted above, the Project site is not located within a flood hazard area.

3.2.2 State Policies and Regulations

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act, also known as the California Water Code, is California's statutory authority for the protection of water quality. Under this act, the State must adopt water quality policies, plans, and objectives that protect the State's waters. The act sets forth the obligations of the

SWRCB and RWQCBs pertaining to the adoption of Basin Plans and establishment of water quality objectives. Unlike the federal CWA, which regulates only surface water, the Porter-Cologne Act regulates both surface water and groundwater.

San Francisco Bay Regional Water Quality Control Board (Region 2)

The California Water Code established the RWQCBs as the primary State agencies for protecting the quality of waters. Nine Regional Boards were established, whose boundaries and watershed/water quality requirements are based on the unique differences in climate, topography, geology and hydrology for each watershed. Each Regional Board makes critical water quality decisions for its region, including setting standards, issuing permits (waste discharge requirements), determining compliance with those requirements, and taking appropriate enforcement actions. The Regional Board with jurisdiction over the Project site is the SFBRWQCB (Region 2). In addition to enforcing the rules and regulations established by the State Water Board, the SFBRWQCB preparing and updating the Water Quality Control Plan for the region.

Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan)

The Basin Plan is designed to preserve and enhance water quality and protect the beneficial uses of all regional waters. Specifically, the Basin Plan:

1) Designates beneficial uses for surface and ground waters;
2) Sets narrative and numerical objectives that must be attained or maintained to protect the designated beneficial uses and conform to the state's antidegradation policy;
3) Describes implementation programs to protect the beneficial uses of all waters in the Region; and
4) Describes surveillance and monitoring activities to evaluate the effectiveness of the Basin Plan [California Water Code Sections 13240 thru 13244, Section 13050(j)].

The Basin Plan is used as the regulatory authority for water quality standards established in local NPDES permits and other RWQCB decisions.

3.2.3 Local Policies and Regulations

Contra Costa Clean Water Program

In order to comply with the Federal CWA regulations, Contra Costa County, nineteen of its incorporated cities, and the Contra Costa Flood Control & Water Conservation District have joined together to form the Contra Costa Clean Water Program (CCCWP) (Contra Costa County 2016). The CWA requires municipalities to obtain permits that outline programs and activities to control surface stormwater pollution. The CCCWP is responsible for ensuring that the County complies with its municipal stormwater NPDES permit. Contra Costa County is included in the San Francisco Bay Region Municipal Regional Stormwater NPDES Permit, Order No. R2-2015-0049, NPDES Permit No. CAS612008. Provision C.3 of the municipal stormwater permit governs both new development and redevelopment of existing facilities such as the Leland Reservoir.

The CCWP's Stormwater C.3 Guidebook establishes requirements to prevent increases in runoff flows and to address runoff pollutant discharges (CCCWP 2012). Projects on previously developed sites need to retrofit drainage to provide treatment of runoff from all impervious areas on the entire site, if the project results in an alteration of more than 50 percent of the impervious surface of a previously existing facility, and the existing facility was not subject to stormwater treatment measures.

The CCCWP acts on behalf and under the direction of the Program's Management Committee. The program coordinates, administers, and implements activities its municipal members decide to conduct as a group. In particular, the Program provides guidance and training on the following:

- Adopting legal ordinances
- Conducting public education programs such as stenciling informational signs like "No Dumping Drains to Bay" on storm drain covers
- Instituting or enhancing programs such as street sweeping, storm drain maintenance
- Performing erosion control practices
- Identifying illicit pollutant discharges to the storm drain system, and requiring new development and industrial discharge controls. Typical storm water protection measures are described below
    - BMPs - Contributors to non-point source pollution may establish BMPs to minimize the potential for pollution. A BMP program document may be prepared. Typical elements of such a program may include addressing the possibility of substituting less toxic compounds in various manufacturing or other operations, proper handling of those toxic compounds used, and proper storage of toxic compounds.
    - Source Control - Industrial and commercial land uses may be required to demonstrate that various pollutants used on their sites cannot be easily mobilized and carried off by storm water runoff. This involves confining some operations to roofed/covered areas and preventing on-site runoff from flowing through the areas where hazardous materials are used. Hazardous material storage in uncovered areas requires the capability for full containment of the material during periods of rain. Uncovered parking areas are required to conduct street sweeping periodically to remove pollutants, oils and greases before they are mobilized.

City of Lafayette

The City of Lafayette General Plan, Open Space and Conservation Chapter, identifies the following and policy and programs to improve water quality in water courses:

Policy OS-6.1: Reduce Watercourse Pollution: Minimize pollutants in storm water runoff.

Program OS-6.1.1: Enforce the Municipal Code prohibiting: (1) the discharge of any substances other than storm water into storm drains and creeks, (2) illicit dumping of wastes into storm drains and creeks, and (3) the dumping of debris and refuse in and near waterways and their riparian areas.

Program OS-6.1.2: Consider adopting the erosion and sedimentation controls described in ABAG's Manual of Standards for Erosion and Sediment Control, published in June 1995.

EBMUD Environmental Compliance Manual, Section 3.0 Water Quality Protection

Potable Water Discharges

EBMUD complies with the NPDES permit issued by the SFBRWQCB for planned, unplanned, and emergency discharges from the potable water transmission, storage, and distribution system. For planned discharges, EBMUD must submit a site-specific Discharge Plan to the SFBRWQCB at least one week in advance of the discharge with copies to interested parties such as flood control agencies and downstream jurisdictions. The Discharge Plan must include the proposed project name and reason for the discharge; a description of the discharge; a map showing the discharge location(s) and receiving water(s); the estimated time, duration, volume, and flowrate of the discharge; and a monitoring plan for the chlorine residual, pH, and turbidity of the discharge. The maximum monitoring schedule for residual chlorine is every 15 minutes for the first 2 hours and daily thereafter. Once the Discharge Plan is approved, the SFBRWQCB will issue a non-action letter specifying approval of the discharge.

For unplanned discharges, BMP's must be implemented to alleviate the discharge as soon as practicable. Certain discharges must be reported to the California Emergency Management Agency and SFBRWQCB within 24 hours, followed by a written report within 5 days. EBMUD must also submit an annual report to the SFBRWQCB summarizing the date, address, estimated flow rate, and BMPs implemented for each unplanned discharge.

EBMUD employs Source Control BMPs whenever practical to reduce pollutants at their source rather than applying Treatment Control BMPs. Typical source controls include: isolating a system for several days and/or reducing or eliminating chemical dosages to allow the chlorine residual and pH levels to naturally comply with regulatory limits; transferring the contents via a truck to a wastewater treatment plant; and minimizing the flow rate and/or volume to reduce potential sedimentation and erosion effects. Typical treatment BMPs include dechlorinating the discharge with sodium sulfite tablets or liquid calcium thiosulfate.

For discharges of superchlorinated water such as that which is used for pipeline disinfection (typically with chlorine concentrations of 100 to 300 milligrams per liter [mg/L]), the EBMUD Environmental Compliance Manual requires: placement of BMPs at all affected storm drains, even if there are no planned discharges; photo documentation of all BMP installations; documented calculation of the amount of dechlorination agent necessary to dechlorinate the planned discharge; measurement and recording of the amount of dechlorination agent used; provision of creek maps to all dechlorination vans to ensure awareness of sensitive creeks; and documentation of the amount of water discharged to the sanitary sewer under a permit or trucked off site. All superchlorinated discharges, whether dechlorinated or not, must be discharged in one of several ways: discharge to a sanitary sewer or interceptor in compliance with a permit; to the EBMUD wastewater treatment plant; or other approved disposal methods such as dust control at a construction site with no discharge to storm drain. Superchlorinated water transported off-site for disposal must be dechlorinated prior to transport, and dechlorination may also be required for discharge to a sanitary sewer system. Under normal conditions, discharge to a storm drain or creek is not permitted, but emergency discharges of superchlorinated water may be dechlorinated and discharged to the storm sewer system.

EBMUD Standard Construction Specifications

EBMUD Standard Construction Specification 01 35 44 (Environmental Requirements) set forth the contract requirements for environmental compliance to which construction crews must adhere, including provisions for protection of water quality during construction.

The General Requirements of Standard Construction Specification 01 35 44 stipulate that the construction crew shall be responsible for maintaining compliance with applicable federal, state and local requirements. The requirements include preparation of plans that outline procedures to be followed to ensure effective stormwater/non-stormwater management and documentation of compliance. EBMUD reviews submittals for conformance with the requirements of the contract document and specified laws and regulations. Specific planning documents and procedures related to protection of water quality that are required by EBMUD for construction are described below.

- **Controls on Site Activities.** EBMUD requires that activities on the construction site are controlled to prevent discharge of contaminated stormwater. Applicable requirements include:
    - No debris including, but not limited to, demolition material, treated wood waste, stockpile leachate, soil, silt, sand, bark, slash, sawdust, asphalt, rubbish, paint, oil, cement, concrete or washings thereof, oil or petroleum products, or other organic or

earthen materials from construction activities shall be allowed to enter into storm drains or surface waters or be placed where it may be washed by rainfall or runoff outside the construction limits. When operations are completed, excess materials or debris shall be removed from the work area as specified in the Construction and Demolition Waste Disposal Plan.

- Do not create a nuisance or pollution as defined in the California Water Code. Do not cause a violation of any applicable water quality standards for receiving waters adopted by the Regional Board or the State Water Resources Control Board, as required by the Clean Water Act.
- Clean up all spills and immediately notify EBMUD in the event of a spill.
- Stationary equipment such as motors, pumps, and generators, shall be equipped with drip pans.
- Divert or otherwise control surface water and waters flowing from existing projects, structures, or surrounding areas from coming onto the work and staging areas. The method of diversions or control shall be adequate to ensure the safety of stored materials and of personnel using these areas. Following completion of work, ditches, dikes, or other ground alterations made by the Contractor shall be removed and the ground surfaces shall be returned to their former condition, or as near as practicable.
- Maintain construction sites to ensure that drainage from these sites will minimize erosion of stockpiled or stored materials and the adjacent native soil material.
- Conduct dust control measures in such a manner as to minimize waste and runoff from the site.
- Construction staging areas shall be graded, or otherwise protected with Best Management Practices (BMPs), to contain surface runoff so that contaminants such as oil, grease, and fuel products do not drain towards receiving waters including wetlands, drainages, and creeks.
- Any chemical or hazardous material used in the performance of the Work shall be handled, stored, applied, and disposed of in a manner consistent with all applicable federal, state, and local laws and regulations.

- **Stormwater Pollution Prevention Plan (SWPPP)**. The contractor shall be responsible for complying with the requirements of the Construction General Permit. Before the start of construction, the contractor must submit a SWPPP that describes measures that shall be implemented to prevent the discharge of contaminated storm water runoff from the jobsite. Contaminants to be addressed include, but are not limited to, soil, sediment, concrete residue, pH less than 6.5 or greater than 8.5, and chlorine residual and all other contaminants known to exist at the jobsite location.
- **Water Control and Disposal Plan.** The Contractor shall submit a detailed Water Control and Disposal Plan for the EBMUD's acceptance prior to any work at the jobsite. The plan shall comply with requirements of all applicable discharge permits, including SWRCB Order WQ 2014-0194-DWQ/General Order No. CAG 140001 – NPDES Permit for Drinking Water System Discharges; SWRCB ORDER NO. 2012-0006-DWQ NPDES NO. CAS000002 – Construction General Permit; and Sanitary Sewer Discharge Permit. Contractor shall maintain proper control of the discharge at the discharge point to prevent erosion, scouring of bank, nuisance, contamination, and excess sedimentation into receiving waters.

- **Drinking Water System Discharges.** Contractor shall submit a plan that includes estimated flow rate and volume of all proposed discharges to surface water, including discharges to storm drains. All receiving waters shall be clearly identified. Contractor shall track discharges and comply with applicable monitoring requirements. Drinking water system discharges shall be dechlorinated and shall have acceptable turbidity and pH.
- **Non-Stormwater Discharges**. Contractor shall develop plan for containment, handling, treatment (as necessary), and disposal of discharges such as groundwater (if encountered), runoff water used for dust control, stockpile leachate, tank heel water, wash water, saw cut slurry, test water, and construction water or any other liquid that has been in contact with any interior surface of District facilities. A containment, handling, treatment and disposal design and sampling and analysis plan shall be approved by EBMUD before the start of construction.
- **Sanitary Sewer Discharges**. District policy specifies that superchlorinated discharges from pipeline disinfection shall be sent to the sanitary sewer system. Discharge plan shall include sampling and analytical program in conformance with the Sanitary Sewer Discharge Permit. Contractor must provide documentation to EBMUD that discharge has been authorized by the applicable agency.

- **Spill Prevention and Response Plan.** Prior to construction contractor shall submit plan detailing the means and methods for preventing and controlling the spilling of known hazardous substances used on the jobsite or staging areas. The plan shall include a list of the hazardous substances proposed for use or generated by the contractor on site, including petroleum products, and measures that will be taken to prevent spills, monitor hazardous substances, and provide immediate response to spills. Spill response measures shall address notification of the EBMUD and appropriate agencies including phone numbers; spill-related worker, public health, and safety issues; spill control, and spill cleanup.

3.3 Impact Analysis

3.3.1 Methodology for Analysis

Potential impacts on hydrology and water quality are analyzed based on the potential for the Project to result in physical hydrologic or hydrogeologic changes (e.g., flooding, erosion and siltation, changes in groundwater recharge) during construction or operation. Existing site conditions prior to construction of the Project are compared to site conditions both during construction activities and after the Project facilities are operational.

3.3.2 Significance Criteria

For the purposes of this analysis, an impact to hydrology and water quality would be significant if the Project would:

- Violate any water quality standards or waste discharge requirements;
- Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted);

- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on or off site;
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on or off site;
- Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff;
- Otherwise substantially degrade water quality (erosion potential);
- Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map;
- Place within a 100-year flood hazard area structures which would impede or redirect flood flows;
- Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam; or
- Result in inundation by seiche, tsunami, or mudflow.

3.3.3 Criteria Requiring No Further Evaluation

Criteria listed above that are not applicable to actions associated with Project implementation are identified below along with a supporting rationale as to why further consideration is unnecessary and a no impact determination is appropriate.

- *Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map* – The Project site is not located within a 100-year flood plain, and does not include the construction of new housing; therefore, there would be no impact.
- *Place within a 100-year flood hazard area structures which would impede or redirect flood flows* – The Project site is not located within a 100-year flood plain; therefore, there would be no impact.
- *Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam* – Prior to construction activity on the Leland Reservoir site, the existing reservoir would be drained. The existing dam embankment would be removed following the dewatering of the reservoir. Therefore, the Project would not cause flooding due to the failure of a dam or levee because there would be no water impounded behind the dam prior to its removal. Potential for flooding associated with pipeline rupture is discussed below.
- *Result in inundation by seiche, tsunami, or mudflow* – The Project site is not located in an area susceptible to seiches, tsunamis, or mudflows; therefore, there would be no impact.

3.3.4 Impacts and Mitigation Measures

Impact HYD-1 Violate any water quality standards or waste discharge requirements or otherwise substantially degrade water quality

Construction

Activities involving soil disturbance, excavation, cutting/filling, stockpiling, dewatering and grading could result in increased erosion and sedimentation to surface waters during construction of the Project. If precautions are not taken to contain contaminants, construction could produce contaminated stormwater runoff (nonpoint source pollution), a major contributor to degradation of water quality. In addition, fuels, lubricants and other hazardous materials associated with construction equipment could adversely affect water quality if spilled or stored improperly. Because the Project would disturb more than one acre, coverage under the General Construction Permit and development of a SWPPP would be required, but because there are no impaired water bodies in the Project area, the SWPPP would not be subject to requirements for discharges to water bodies on the 303(d) list for sediment. The requirements of the General Construction Permit are strengthened and made more specific by EBMUD Standard Construction Specification 01 35 44, which is described above; per Section 1.3(A) of the specification, EBMUD requires qualified professionals as described in the permit to prepare and certify all permit-required document/submittals and to implement effective stormwater/non-stormwater management practices and conduct inspections and monitoring as required by the permit. The SWPPP must be reviewed and approved by EBMUD before the start of construction and must, and requires the contractor to control discharge of soil, sediment, and concrete residue and control pH and chlorine residual of any discharges. The EBMUD Practices and Procedures Monitoring Plan lists the applicable standard specification language. Construction impacts would be less than significant with implementation of EBMUD Standard Construction Specification 01 35 44.

During construction of the Project, dewatering would be conducted to drain the existing reservoir but dewatering is not expected to be required to remove excess groundwater from excavations created for installation of the pipeline because the pipeline route is 160 feet from Reliez Creek and the trench is not expected to intercept groundwater. Draining the existing reservoir would take several weeks. The reservoir would first be allowed to drain into the distribution system via system demand until the water level drops to a point where pressures would become too low to maintain customer level of service, after which the valves that connect the reservoir to the distribution system would be closed. The remaining reservoir water would be filtered, tested, dechlorinated, and discharged. EBMUD would decide if water from dewatering the reservoir would go to the sewer for treatment at Central Contra Costa Sanitary District (CCCSD) treatment plant in Martinez or to the storm drain. EBMUD discharges of potable water to storm drains or surface water bodies are covered under their statewide NPDES potable discharge permit[1], so if water is discharged to the storm drain, discharge would be done in a manner that meets EBMUD's requirements for potable discharge. If the contractor opts to discharge to the local sanitary sewer they would be required to obtain a discharge permit from CCCSD.

Once the pipeline is constructed, flushing, hydrostatic testing and pipeline disinfection would need to be conducted, and water from the testing would also need to be discharged. Potable water would be used for flushing and hydrostatic testing and after any leaks are repaired, superchlorinated water[2] would be used to disinfect the pipelines. Water from flushing and testing would be discharged in accordance with the Construction General Permit. If water from the reservoir or pipelines is discharged to the storm drain system there is a potential for water quality impacts to Reliez Creek, where the local storm drain discharges. However, EBMUD Standard Construction Specification 01 35 44 requires that all discharges be conducted in accordance with a Water Control and Disposal Plan, which would ensure that any discharges are controlled to prevent erosion, scouring, nuisance, contamination or sedimentation of receiving waters. Section 1.3(B) of EBMUD Standard Construction Specification 01 35 44 states that it is EBMUD policy to send superchlorinated discharges from pipeline disinfection to the sanitary sewer

[1] EBMUD has a Notice of Applicability confirming coverage for drinking water discharges under the Statewide NPDES Permit, Order No. WQ 2015-0194-DWQ.

[2] Superchlorinated water has chlorine levels of 100 to 300 mg/L, as compared to a chlorine residual of less than 4 mg/L in potable water.

system, and requires that the contractor obtain a sanitary sewer discharge permit and specifies that the plan for discharge shall include a sampling and analytical program to ensure conformance with the discharge permit. The EBMUD Practices and Procedures Monitoring Plan lists the applicable standard specification language. Impacts of discharges would be less than significant with implementation of EBMUD Standard Construction Specification 01 35 44.

Implementation of EBMUD Standard Construction Specification 01 35 44 would control erosion and planned discharges from the reservoir and pipelines to ensure that no water quality standards are exceeded and no additional sources of polluted runoff are created. BMPS would be implemented to ensure that sediment is controlled and that contaminants such as fuel and lubricants do not contaminate local storm drains. With implementation of EBMUD Standard Construction Specification 01 35 44, impacts would be less than significant.

Significance Determination before Mitigation

Less than Significant.

Mitigation Measures

No mitigation measures are required.

Impact HYD-2 Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level

Construction would not include significant groundwater withdrawals that would lower groundwater levels or substantially deplete groundwater resources. Dewatering is not expected to be required to remove excess groundwater from excavations created for installation of the pipeline because trenches would be less than seven feet deep and would not be close to any stream channels, and are thus not expected to intercept groundwater. If minor construction dewatering is necessary for either pipeline or reservoir construction, any groundwater depletion would be localized and less than significant, as there is no defined groundwater basin underlying the Project site.

Significance Determination before Mitigation

Less than Significant

Mitigation Measures

No mitigation measures are required.

Impact HYD-3 Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation or create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff

Construction of the Project, including the two 8-MG concrete water tanks and 3,650 linear feet of 36-inch pipeline, would involve temporary disturbance of the Project site. As detailed under Impact HYD-1, although erosion or siltation may occur during construction, the construction contractor would be required to implement control measures in accordance with EBMUD Standard Construction Specification 01 35 44, requiring controls on site activities to prevent discharge of contaminated stormwater, including control of construction materials, control of surface water flows and restoration of ground surfaces, and maintenance of construction sites to prevent erosion. With implementation of required Project controls, construction related alteration of local drainage patterns and associated erosion and siltation would be minor. Additionally, EBMUD Standard Construction Specification 01 35 44, Section 1.1(B) requires that no debris, soil, silt, sand, bark, slash, sawdust, asphalt, rubbish, paint, oil, cement, concrete or washings thereof, oil or petroleum products, or other organic or earthen materials from construction activities shall be allowed to enter storm drains or surface waters. The EBMUD Practices and Procedures Monitoring Plan lists the applicable standard specification language. Implementation of these requirements during construction would prevent any spills and prevent polluted runoff from being conveyed off site. Because construction sites would have to be managed to minimize erosion and siltation and to prevent polluted runoff from leaving the site, this impact would be less than significant.

Significance Determination before Mitigation

Less than Significant

Mitigation Measures

No mitigation measures are required

Impact HYD-4 Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on or off site

Construction of the Project, including the two 8-MG concrete water tanks and 3,650 linear feet of 36-inch pipeline, would involve temporary disturbance in the Project area. However, EBMUD Standard Construction Specification 01 35 44 requires control of site activities to manage surface water flows. Specifically, Section 1.1(B) specifies ground alterations made by the Contractor shall be removed and ground surfaces shall be restored to their former condition at the completion of construction activities. Trenched areas of roadways would be repaved and disturbed areas on the reservoir site would be repaved or revegetated. The EBMUD Practices and Procedures Monitoring Plan (**Table 7-2** in Chapter 7) lists the applicable standard specification language. With implementation of these required controls governing site activities, construction related alteration of local drainage patterns would not be expected to result in flooding, and impacts would be less than significant.

Additionally, to ensure adequate drainage within the reservoir site, a new 30-inch storm drain pipeline would be installed on site and connected to the City of Lafayette's existing storm drain system at the intersection of Leland Drive and Patty Way. The storm drain pipeline would be designed and constructed in accordance with EBMUD's current Reservoir Design Guide (EBMUD 2014). Because there would be no change in existing drainage patterns, the Project would not increase surface runoff in a manner that would result in flooding on or off site and would not result in off-site flooding or runoff from the site that would exceed the capacity of the City's storm drain system.

Significance Determination before Mitigation

Less than Significant

Mitigation Measures

No mitigation measures are required

Impact HYD-5 Expose People or Structures to a Significant Risk of Loss, Injury or Death Involving Flooding as a Result of Pipeline Rupture.

In the event that the new pipeline ruptured, adjacent and downhill residences and structures could be flooded, resulting in water damage. However, the risk of pipeline rupture of modern pipelines designed in accordance with current standards is extremely low. EBMUD Engineering Standard Practice 512.1 specifies criteria for design of pipelines including requirements for materials, valving, and joints to ensure the integrity of the pipeline. In addition, EBMUD Engineering Standard Practice 550.1 establishes seismic design requirements, which ensure that the pipeline would be designed to withstand substantial stress and pressures. The possibility of a rupture is thus considered remote. The pipelines would be designed with isolation valves that can be closed to interrupt the flow of water to a ruptured pipe. In the event of a pipeline break, an EBMUD inspector would respond on-site within one hour in accordance with EBMUD's Leak Response Program. EBMUD maintains a Dispatch Center and field crew 24 hours a day, 7 days a week to respond to emergencies. The inspector would be fully equipped and authorized to implement leak control BMPs immediately upon arrival, if safe to do so. Once immediate BMPs are implemented, the inspector would assign a leak repair priority based on factors such as safety, customer impacts, environmental impacts, property damage, discharge rate, and traffic impacts. With proper design of the pipelines, and implementation of EBMUD's Leak Response Program, the potential for pipeline rupture and associated flood damage is low. Due to the remote possibility of rupture and the level of protection inherent in the design of the pipeline, this impact is considered to be less than significant.

Significance Determination before Mitigation

Less than Significant

Mitigation Measures

No mitigation measures are required

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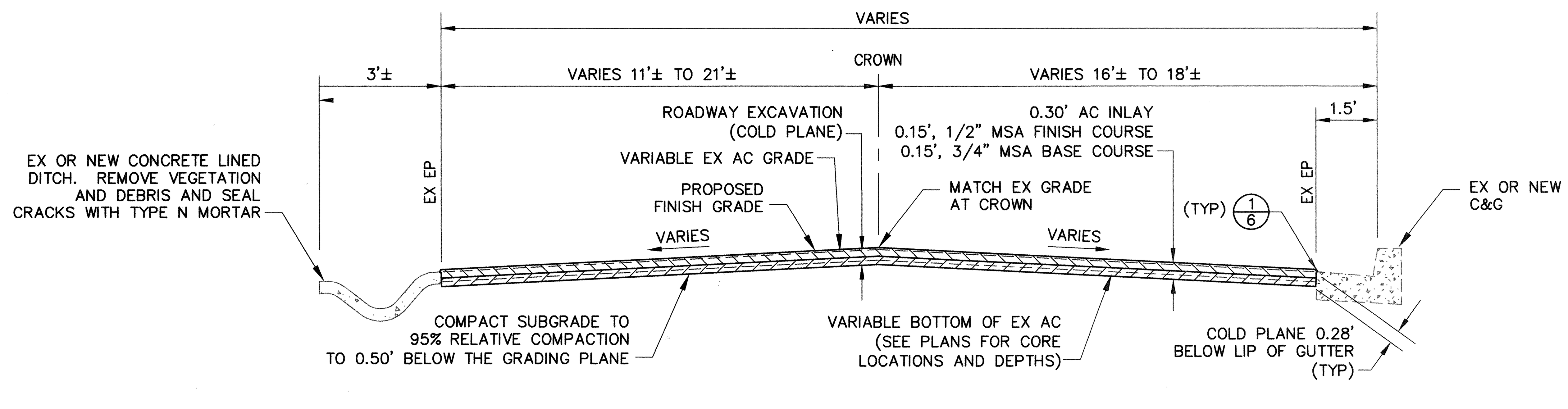
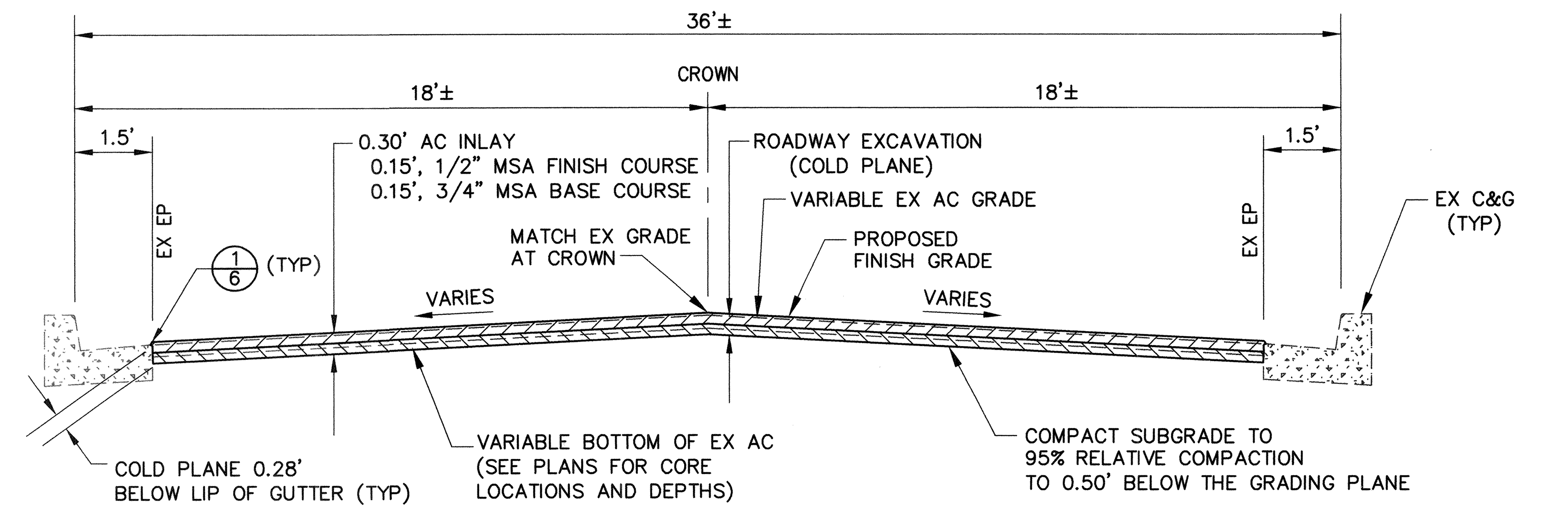
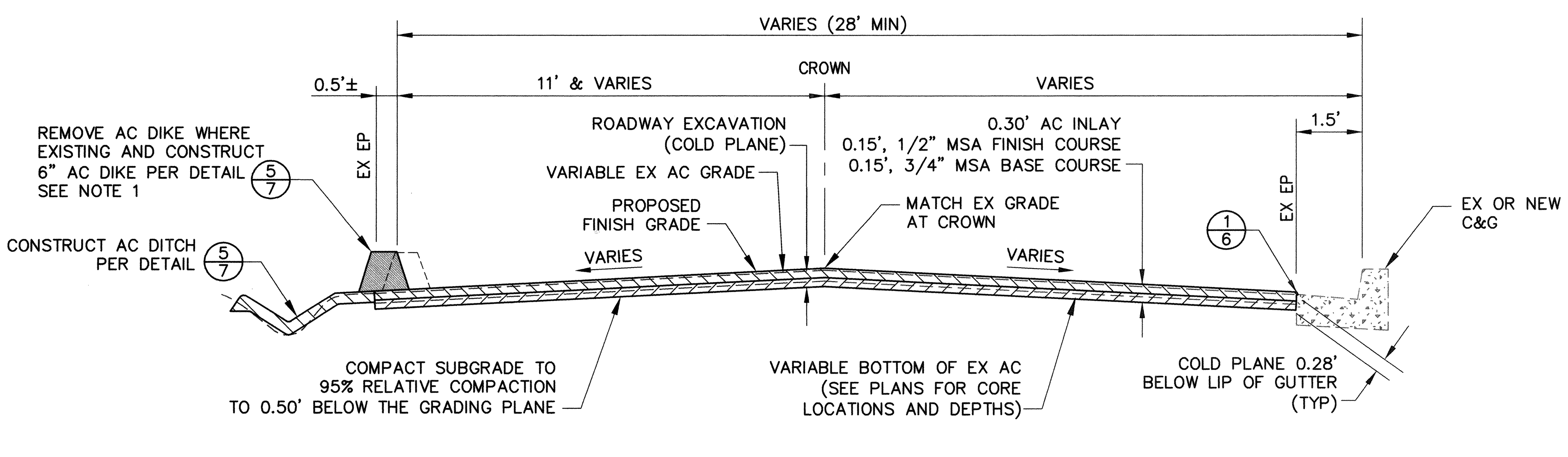
Appendix A – City of Lafayette Storm Drain Drawings



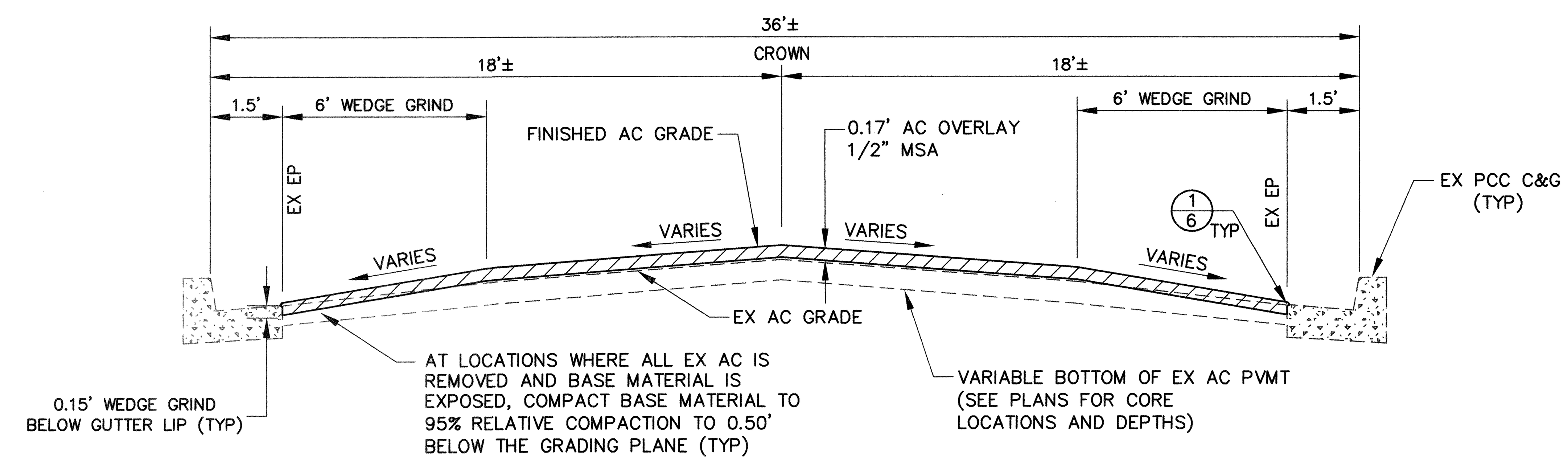
A / 30 NTS **TYPICAL AC INLAY SECTION**
LELAND DRIVE (STA 12+11 TO STA 24+32±)



C / 30 NTS **TYPICAL AC INLAY SECTION**
LELAND DRIVE (STA 28+63 TO STA 29+40)



B / 30 NTS **TYPICAL AC INLAY SECTION**
LELAND DRIVE (STA 24+32± TO STA 28+63)



D / 30 NTS **TYPICAL AC OVERLAY SECTION**
LELAND DRIVE (STA 29+40 TO OLD TUNNEL ROAD)

EXISTING PAVEMENT AND CORE DATA

STREET LOCATION	CORE NO	AC THICKNESS (IN)	AB THICKNESS (IN)	SUBGRADE CLASSIFICATION AND CONDITION
LELAND DRIVE	16	4	11	DARK GRAY SANDY CLAY (DRY)
LELAND DRIVE	17	2	7-1/2	BROWN SANDY CLAY (DRY)
LELAND DRIVE	18	2	9	BROWN SANDY CLAY (DRY)
LELAND DRIVE	19	2	7	OLIVE GRAY SANDY CLAY (DRY)

LELAND DRIVE SURVEY CONTROL POINT DATA

Point No.	Northing	Easting	Elev	Description
27	2151787.6292	6103722.1657	279.90	FOUND MONUMENT-5
28	2151647.4469	6103652.8273	262.50	FOUND MONUMENT-4
31	2152226.7812	6103784.1537	309.80	FOUND BENCHMARK EBMUD N/T
33	2151148.2941	6103640.7757	250.29	FOUND RB/CAP RE32067
35	2150956.1703	6103539.5063	243.16	SET "X" IN ISLAND

LELAND DRIVE STATION LINE (SL) ALIGNMENT DATA

Desc.	Station	Tangent/Curve Data	Northing	Easting
	9+18.10		2150783.134	6103465.232
RP			2151236.029	6102825.277
	Delta:	17-04-44		
	Radius:	784.00		
	Length:	233.70		
PT	11+51.80		2150991.053	6103570.020
	Length:	69.66	Course: N 19-28-55 E	
PC	12+21.46		2151056.726	6103593.253
RP			2151189.353	6103230.708
	Delta:	10-32-20		
	Radius:	386.04		
	Length:	71.01		
PCC	12+92.47		2151125.273	6103611.395
RP			2151227.366	6102821.308
	Delta:	19-11-18		
	Radius:	796.66		
	Length:	266.80		
PT	15+59.27		2151390.627	6103601.056
	Length:	43.02	Course: N 11-11-05 W	
PC	16+02.28		2151432.827	6103592.712
RP			2151483.595	6103849.467
	Delta:	48-30-45		
	Radius:	261.73		
	Length:	221.60		
PRC	18+23.89		2151642.299	6103641.347

Desc.	Station	Tangent/Curve Data	Northing	Easting
RP			2151860.451	6103383.042
	Delta:	26-44-51		
	Radius:	338.10		
	Length:	157.84		
PT	19+81.72		2151781.894	6103711.890
	Length:	45.95	Course: N 14-50-01 E	
PT	20+27.67		2151826.313	6103723.653
	Length:	778.51	Course: N 12-03-50 E	
PC	28+06.19		2152587.632	6103886.366
RP			2152861.527	6102612.873
	Delta:	04-58-38		
	Radius:	1302.61		
	Length:	113.16		
PCC	29+19.34		2152699.151	6103905.327
RP			2152752.243	6103454.918
	Delta:	18-18-12		
	Radius:	453.53		
	Length:	144.88		
PT	30+64.22		2152843.286	6103899.213
	Length:	125.88	Course: N 11-50-39 W	
PC	31+90.10		2152966.488	6103873.376
RP			2153104.531	6104550.175
	Delta:	09-49-59		
	Radius:	690.73		
	Length:	118.54		
PT	33+08.65		2153084.099	6103859.744
	Length:	19.66	Course: N 00-58-00 E	

NOTE:

1. ALL ENDS OF AC DIKE SHALL HAVE A 2' LONG TAPER. THE ENDS OF NEW DIKES SHALL BE PAINTED WHITE (TWO COATS) AND A TYPE "G" PAVEMENT MARKER SHALL BE SET ON TOP OF THE DIKE.

CONTRACTOR TO VERIFY EXISTING UTILITY LOCATIONS PRIOR TO ANY EXCAVATION CALL USA AT (800) 227-2600

AZARI ENGINEERING, INC.
4807 CLAYTON ROAD, SUITE 100
CONCORD, CA 94521
TEL: (925) 676-3700
FAX: (925) 676-4800

SUBMITTED JAN 10, 2007
PROJECT ENGINEER

REGISTERED PROFESSIONAL ENGINEER
MEHRDAD AZARI
No. C 41731
Exp. 03-31-08
CIVIL
STATE OF CALIFORNIA

APPROVED Jan. 11 2007
CITY ENGINEER

RECORD DRAWING
(NO WARRANTY AS TO ACCURACY)
DATE ACCEPTED
PROJECT ENGINEER

REVISIONS NO.	DESCRIPTION	BY	DATE

CITY OF LAFAYETTE

2007 PAVEMENT MANAGEMENT PROJECT VOLUME B

TYPICAL CROSS SECTIONS LELAND DRIVE

DESIGNED: MA/JDV	PROJECT NO.: 014-9663	SCALE: NO SCALE
DRAWN: LVG/JH/FM	ROLL FRAME	
CHECKED: MA	AEI NO: 2507	
DATE: JAN 10, 2007	DWG: 30-2507-XS	SHEET 30 OF 35

NOTES:

1. MAILBOXES AS NOTED SHALL BE RELOCATED TO THE LOCATION SHOWN ON THE PLAN. MAILBOXES SHALL BE INSTALLED ON A NEW POST AND CONFORM TO CCC STANDARD PLAN CA90i. FINAL LOCATION OF RELOCATED MAILBOXES SHALL BE APPROVED BY THE ENGINEER.
2. REMOVE TRIANGULAR MONUMENT FRAME AND COVER PRIOR TO EXCAVATION AND REPLACE WITH CIRCULAR MONUMENT FRAME AND COVER AND ADJUST TO GRADE.
3. FOR STATION LINE INFORMATION SEE SHEET 30.
4. REMOVE EXISTING AC PATHWAY AND UNDERLYING BASE MATERIAL WHERE SHOWN ON THE PLANS IN THE VICINITY OF PLANNED STORM DRAIN WORK. BACKFILL TOP 1' OF TRENCH AND OTHER RESULTING VOIDS TO GRADE WITH CLEAN TOPSOIL AND COVER WITH SHREDDED REDWOOD MULCH.

CONTRACTOR TO VERIFY EXISTING UTILITY LOCATIONS PRIOR TO ANY EXCAVATION CALL USA AT (800) 227-2600

LEGEND

- 0.30' AC INLAY
- CONFORM PAVING
- 4" DEEP LIFT AC
- REMOVE & REPLACE MISCELLANEOUS CONCRETE IMPROVEMENTS (CURB, GUTTER, SIDEWALK, ETC.)
- 16 TEST CORE LOCATION–SEE SHEET 30 FOR PAVEMENT DATA

AZARI ENGINEERING, INC.
4807 CLAYTON ROAD, SUITE 100
CONCORD, CA 94521
TEL: (925) 676-3700
FAX: (925) 676-4800

SUBMITTED JAN 10 2007 — PROJECT ENGINEER
APPROVED Jan. 11 2007 — CITY ENGINEER
RECORD DRAWING (NO WARRANTY AS TO ACCURACY)
DATE ACCEPTED ____
PROJECT ENGINEER

No. C 41731 Exp. 03-31-08 CIVIL STATE OF CALIFORNIA

REVISIONS NO.	DESCRIPTION	BY	DATE

CITY OF LAFAYETTE

2007 PAVEMENT MANAGEMENT PROJECT VOLUME B

LELAND DRIVE

DESIGNED: MA/JDV	PROJECT NO.: 014-9663	SCALE: 1"=20'
DRAWN: LVG/JH/FM	ROLL FRAME	
CHECKED: MA	AEI NO: 2507	
DATE: JAN 10, 2007	DWG: 31-2507-PL	SHEET 31 OF 35

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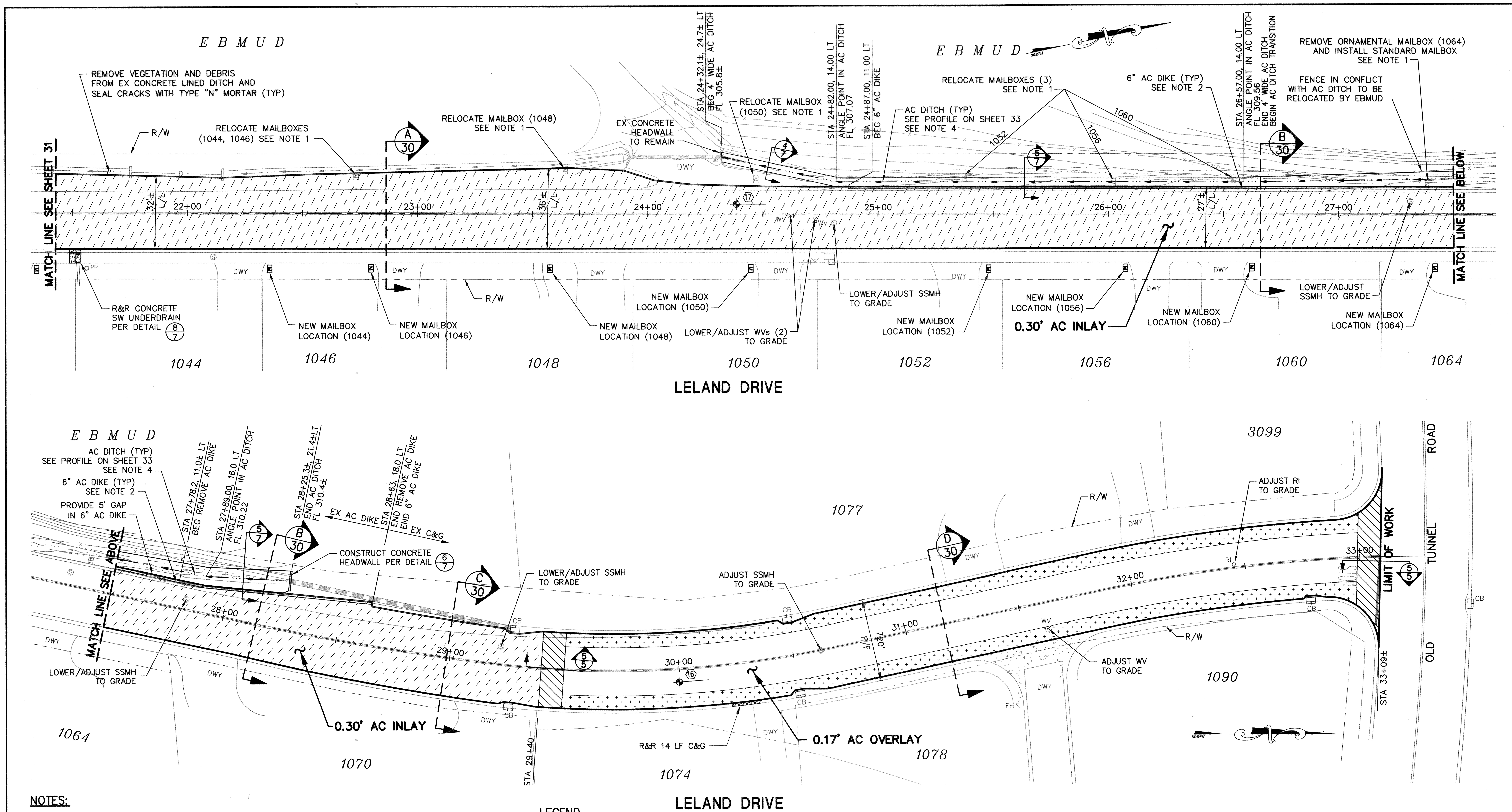

NOTES:

1. MAILBOXES AS NOTED SHALL BE RELOCATED TO THE LOCATION SHOWN ON THE PLANS. MAILBOXES SHALL BE INSTALLED ON A NEW POST AND CONFORM TO CCC STANDARD PLAN CA90i. FINAL LOCATION OF RELOCATED MAILBOXES SHALL BE APPROVED BY THE ENGINEER.
2. ALL ENDS OF 6" AC DIKE SHALL HAVE A 2' LONG TAPER WHICH SHALL BE PAINTED WHITE (TWO COATS). A TYPE "G" PAVEMENT MARKER SHALL BE PLACED ON TOP OF THE AC DIKE.
3. FOR STATION LINE INFORMATION SEE SHEET 30.
4. SEE SHEET 34 FOR ALTERNATE WORK.

CONTRACTOR TO VERIFY EXISTING UTILITY LOCATIONS PRIOR TO ANY EXCAVATION CALL USA AT (800) 227-2600

LEGEND

- 0.30' AC INLAY
- CONFORM PAVING
- 0.17' AC OVERLAY
- WEDGE GRIND AND AC OVERLAY
- REMOVE & REPLACE MISCELLANEOUS CONCRETE IMPROVEMENTS (CURB, GUTTER, SIDEWALK, ETC.)
- 16 TEST CORE LOCATION—SEE SHEET 30 FOR PAVEMENT DATA

AZARI ENGINEERING, INC.
4807 CLAYTON ROAD, SUITE 100
CONCORD, CA 94521
TEL: (925) 676-3700
FAX: (925) 676-4800

SUBMITTED JAN 10, 2007
PROJECT ENGINEER
APPROVED Jan. 11 2007
CITY ENGINEER
RECORD DRAWING
(NO WARRANTY AS TO ACCURACY)
DATE ACCEPTED
PROJECT ENGINEER

REGISTERED PROFESSIONAL ENGINEER MEHRDAD AZARI No. C 41731 Exp. 03-31-08 CIVIL STATE OF CALIFORNIA

REVISIONS NO.	DESCRIPTION	BY	DATE

CITY OF LAFAYETTE
2007 PAVEMENT MANAGEMENT PROJECT VOLUME B
LELAND DRIVE

DESIGNED: MA/JDV	PROJECT NO.: 014-9663	SCALE: 1"=20'
DRAWN: LVG/JH/FM	ROLL FRAME	
CHECKED: MA	AEI NO: 2507	SHEET 32 OF 35
DATE: JAN 10, 2007	DWG: 31-2507-PL	

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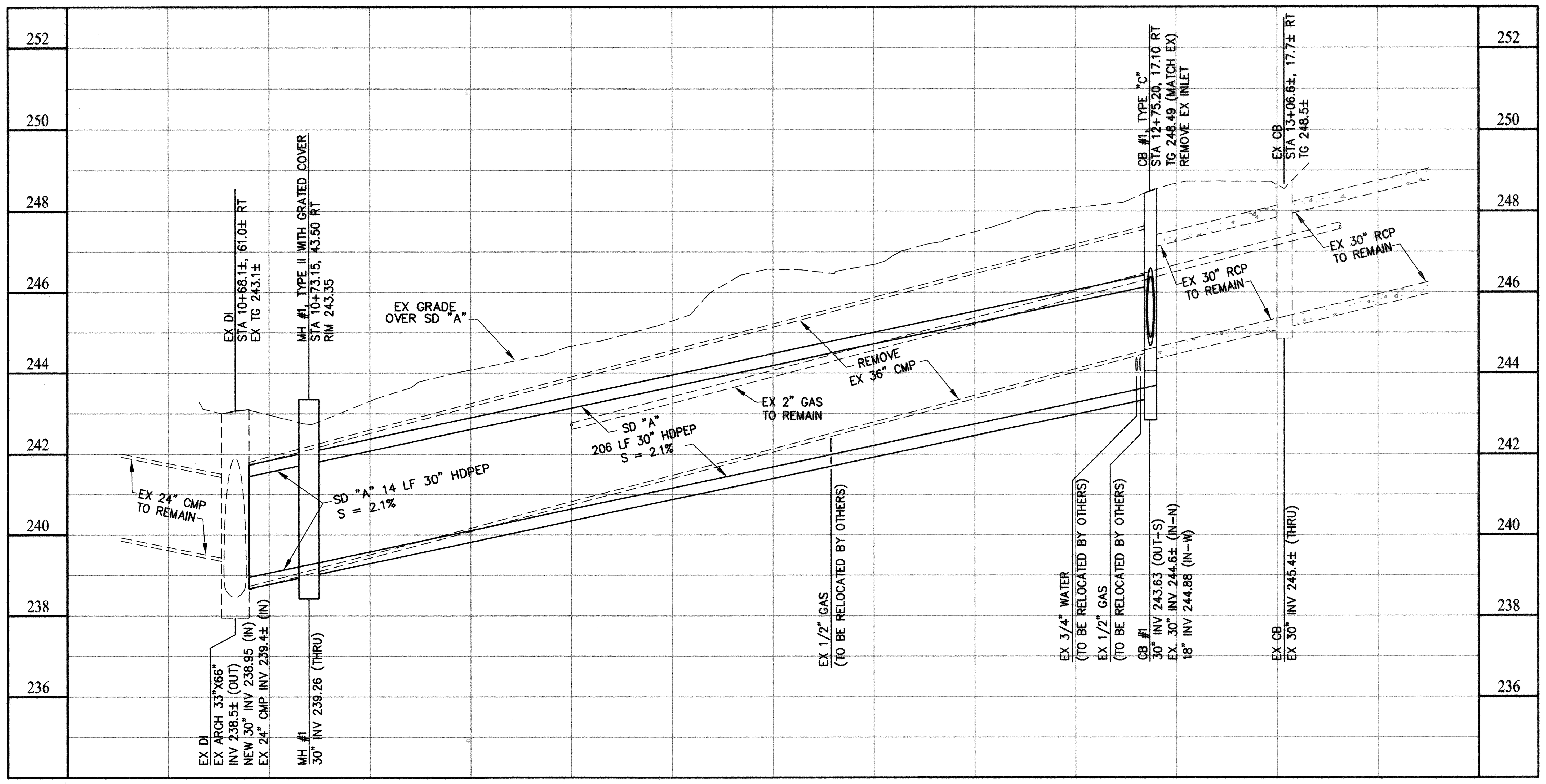
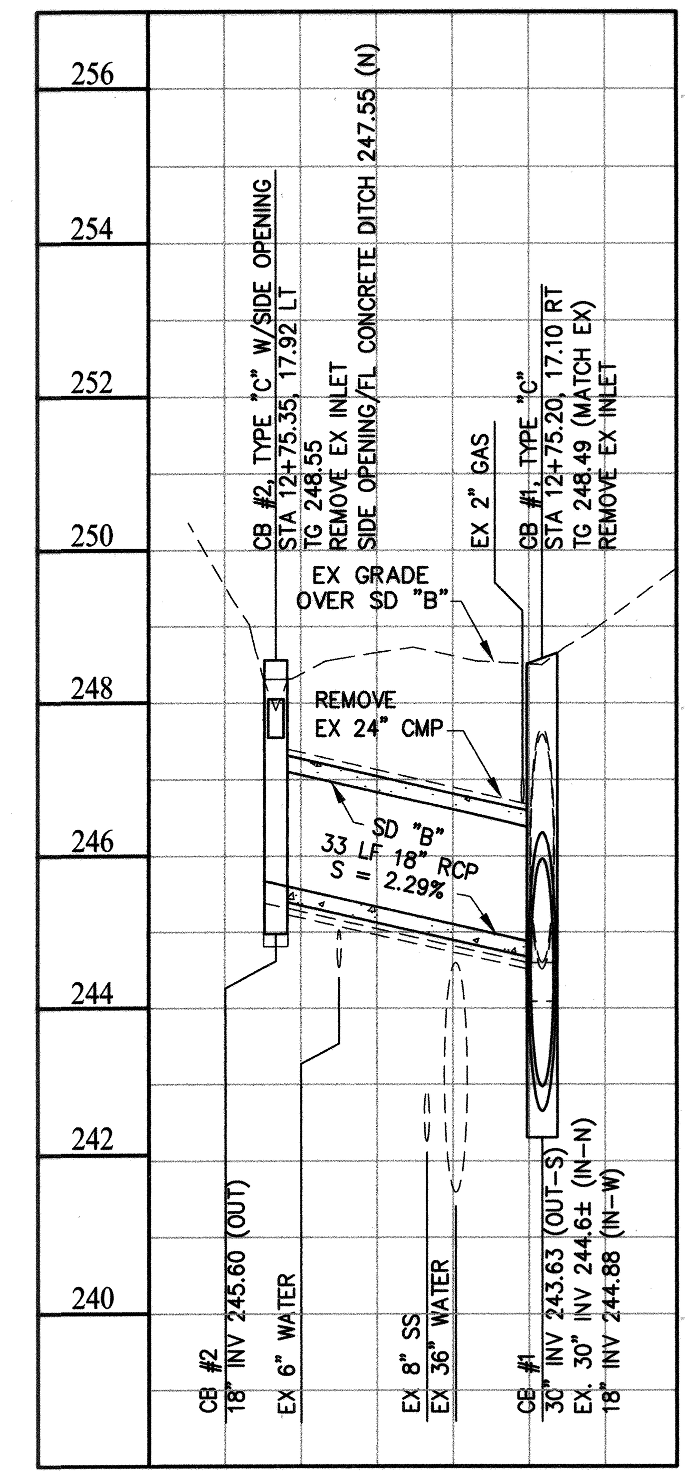
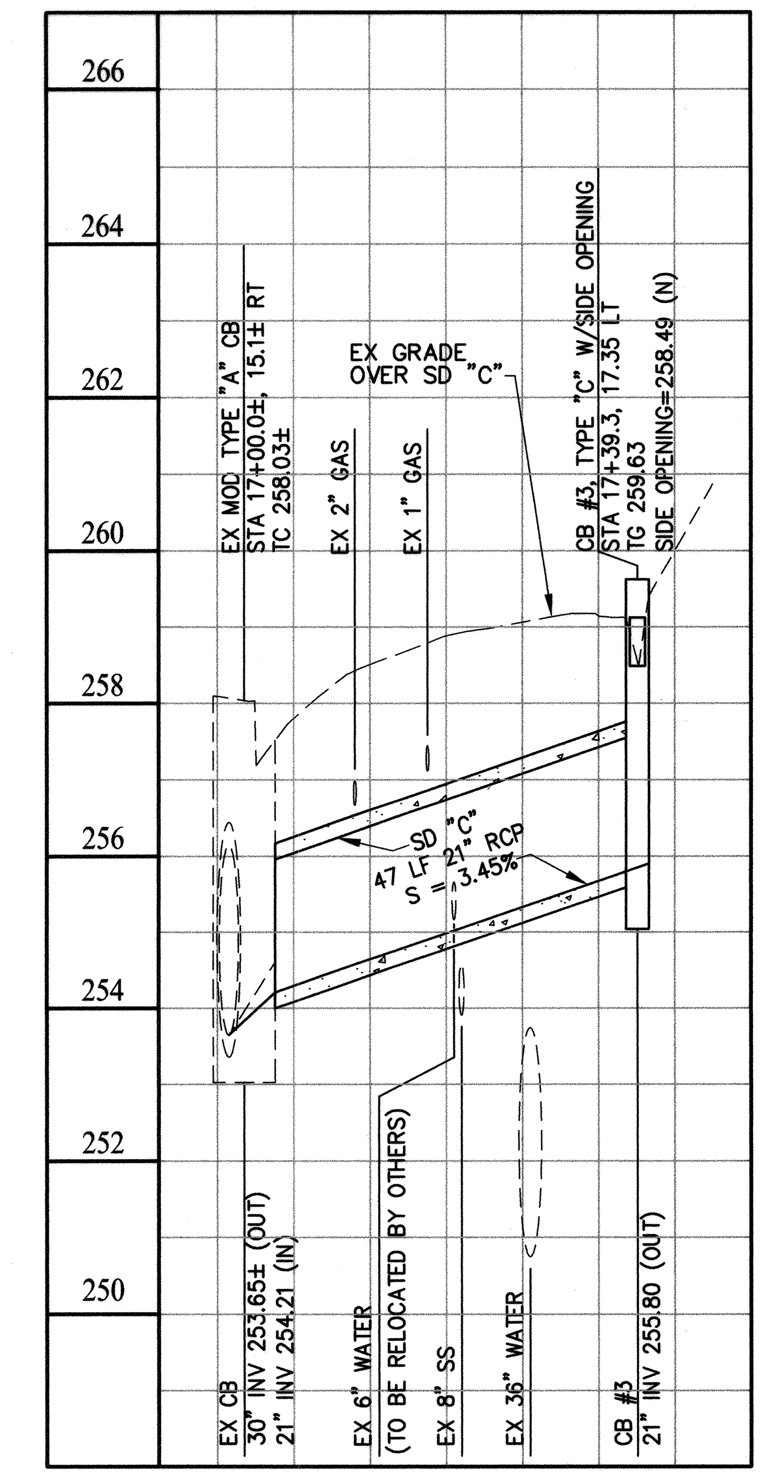


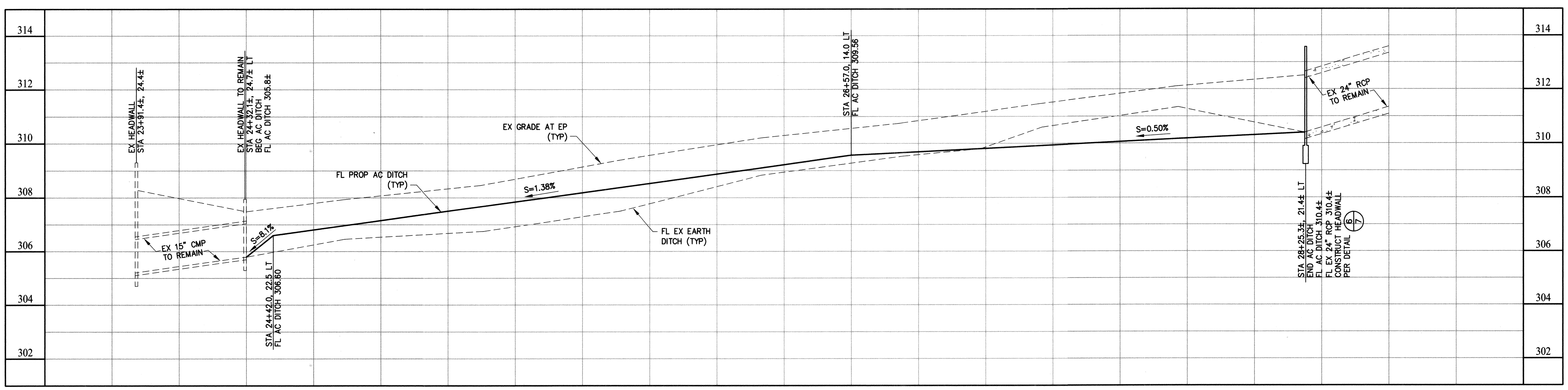
SD "A" PROFILE



SD "B" PROFILE



SD "C" PROFILE



AC DITCH PROFILE

CONTRACTOR TO VERIFY EXISTING UTILITY LOCATIONS PRIOR TO ANY EXCAVATION CALL USA AT (800) 227-2600

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4807 CLAYTON ROAD, SUITE 100
CONCORD, CA 94521
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FAX: (925) 676-4800

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CITY ENGINEER

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(NO WARRANTY AS TO ACCURACY)
DATE ACCEPTED ____
PROJECT ENGINEER

REGISTERED PROFESSIONAL ENGINEER · MEHRDAD AZARI · No. C 41731 · Exp. 03-31-08 · CIVIL · STATE OF CALIFORNIA

REVISIONS NO.	DESCRIPTION	BY	DATE

CITY OF LAFAYETTE

2007 PAVEMENT MANAGEMENT PROJECT
VOLUME B

STORM DRAIN PROFILES
LELAND DRIVE

DESIGNED: MA/JDV	PROJECT NO.: 014-9663	SCALE: HOR 1"=20' VERT 1"=2'
DRAWN: LVG/JH/FM	ROLL FRAME	
CHECKED: MA	AEI NO: 2507	
DATE: JAN 10, 2007	DWG: 33-2507-SD	SHEET 33 OF 35

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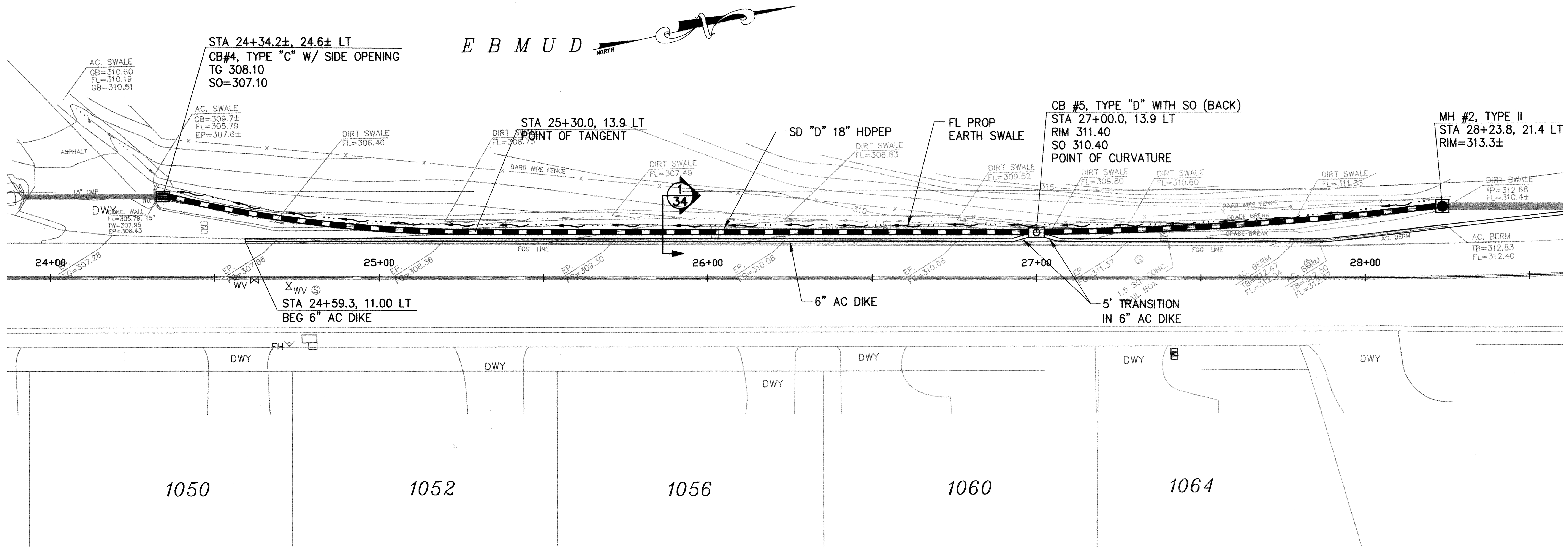
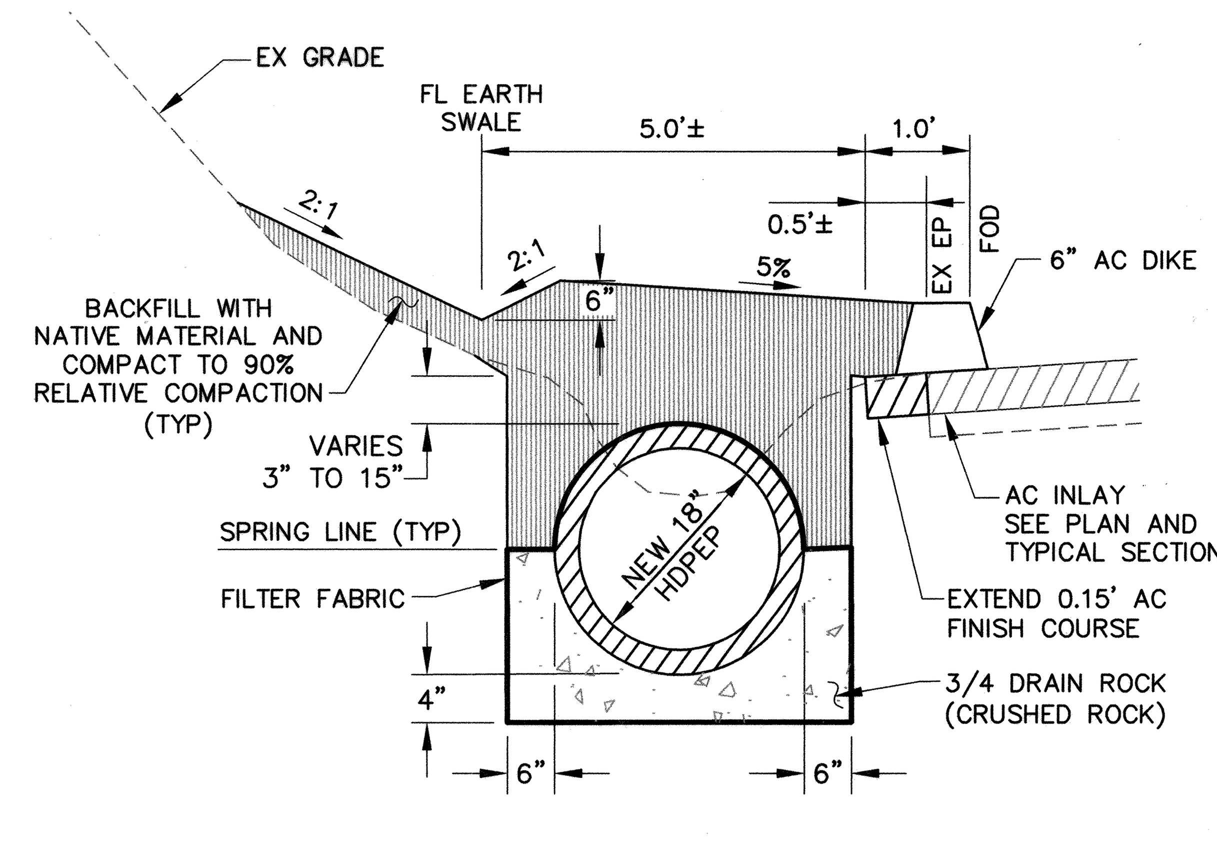
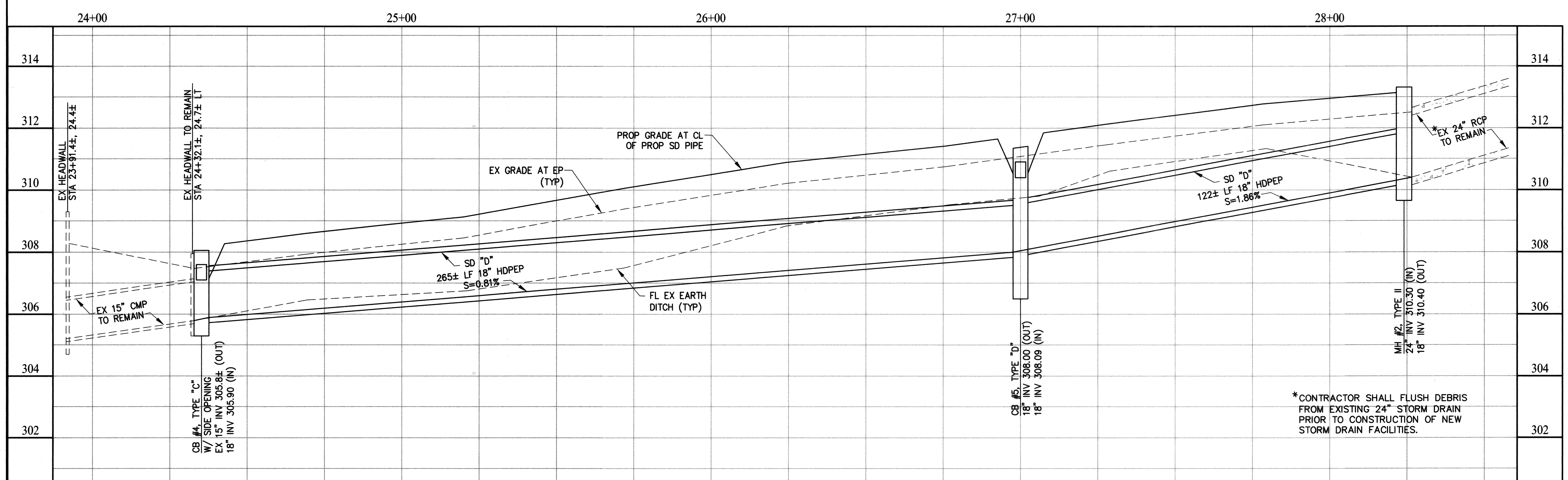


LELAND DRIVE



TYPICAL SECTION

1/34 NTS LELAND DRIVE



STORM DRAIN "D" PROFILE

NOTE:

1. THIS SHEET SHOWS BID ALTERNATE WORK ONLY WHICH CONSISTS OF CONSTRUCTING UNDERGROUND STORM DRAIN FACILITIES AND AN EARTH SWALE IN LIEU OF THE AC SWALE. THE PROPOSED AC DIKE IS SHOWN ON THIS PLAN TO SHOW DEVIATIONS FROM SHEET 32. ALL OTHER WORK SHOWN ON SHEET 32, INCLUDING RELOCATION OF MAILBOXES, REMAIN AS PART OF THE BASE BID.

CONTRACTOR TO VERIFY EXISTING UTILITY LOCATIONS PRIOR TO ANY EXCAVATION CALL USA AT (800) 227-2600

AZARI ENGINEERING, INC.
4807 CLAYTON ROAD, SUITE 100
CONCORD, CA 94521
TEL: (925) 676-3700
FAX: (925) 676-4800

SUBMITTED JAN 10, 2007 — PROJECT ENGINEER

APPROVED Jan. 11 2007 — CITY ENGINEER

RECORD DRAWING (NO WARRANTY AS TO ACCURACY)

DATE ACCEPTED ____

PROJECT ENGINEER

REGISTERED PROFESSIONAL ENGINEER MEHRZAD AZARI No. C 41731 Exp. 03-31-08 CIVIL STATE OF CALIFORNIA

REVISIONS NO.	DESCRIPTION	BY	DATE

CITY OF LAFAYETTE

2007 PAVEMENT MANAGEMENT PROJECT VOLUME B

STORM DRAIN PLAN & PROFILE LELAND DRIVE (BID ALTERNATE)

DESIGNED: MA/JDV	PROJECT NO.: 014-9663	SCALE: H: 1"=20' V: 1"=2'
DRAWN: LVG/JH/FM	ROLL FRAME	
CHECKED: MA	AEI NO: 2507	
DATE: JAN 10, 2007	DWG: 34-2507-ALT	SHEET 34 OF 35

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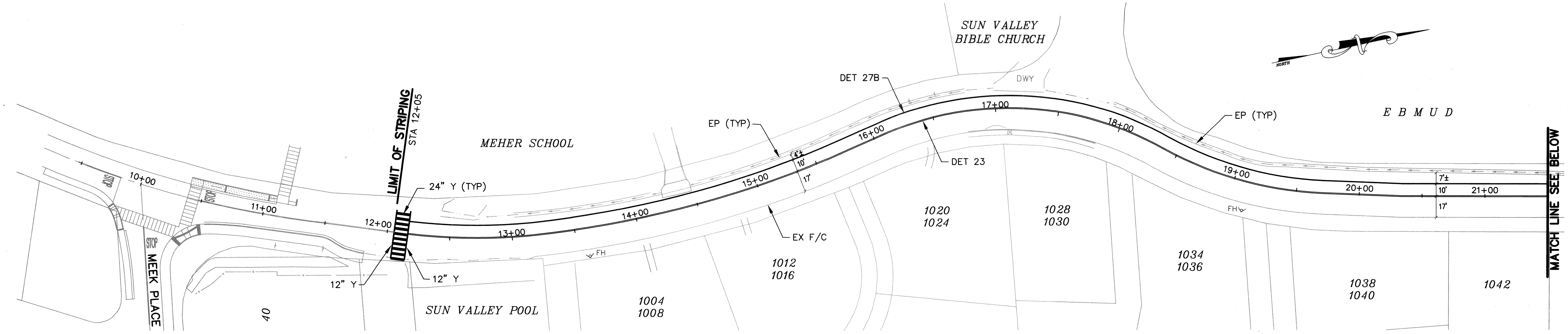
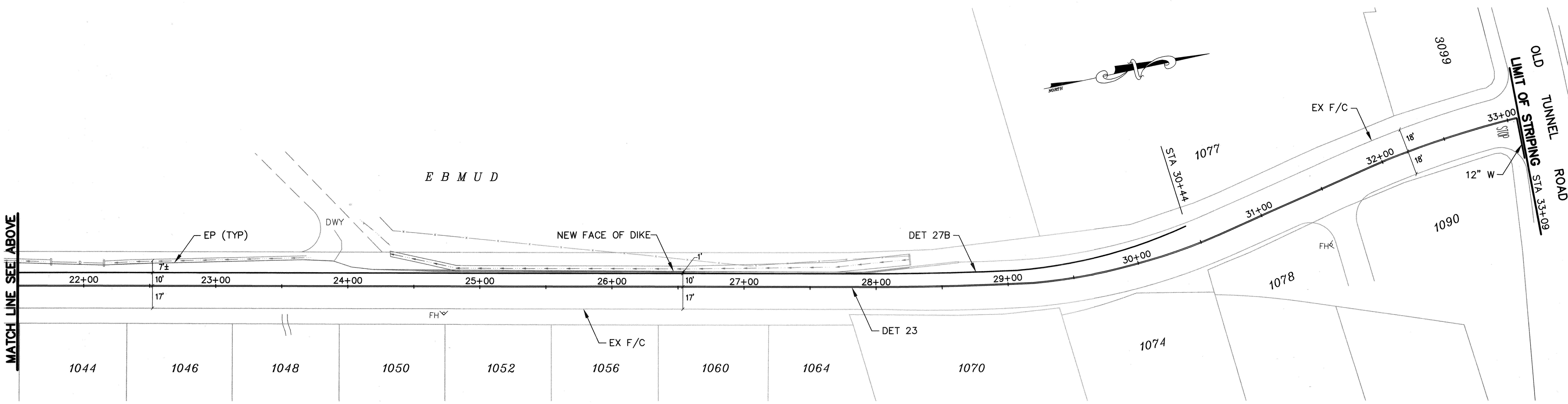


LELAND DRIVE



LELAND DRIVE

PAVEMENT DELINEATION NOTES:

1. THE LAYOUT AND CONTROL MARKS SHALL BE PLACED BY THE CONTRACTOR AND APPROVED BY THE ENGINEER PRIOR TO THE PLACEMENT OF ANY PERMANENT STRIPING, OR MARKINGS.
2. ALL PROPOSED DELINEATION SHALL MATCH THE LAYOUT OF EXISTING STRIPING AT LIMITS OF WORK.
3. INSTALL BLUE REFLECTIVE PAVEMENT MARKERS AT ALL FIRE HYDRANT LOCATIONS PER FIGURE 3B-102 OF THE CALIFORNIA SUPPLEMENT TO THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES".
4. ALL AC DIKES WITH END TAPERS SHALL BE PAINTED WHITE FOR A DISTANCE OF FIVE FEET FROM THE END OF TAPER. INSTALL ONE WHITE REFLECTIVE MARKER ON TOP OF DIKE AT EACH TAPER.

CONTRACTOR TO VERIFY EXISTING UTILITY LOCATIONS PRIOR TO ANY EXCAVATION CALL USA AT (800) 227-2600

AZARI ENGINEERING, INC.
4807 CLAYTON ROAD, SUITE 100
CONCORD, CA 94521
TEL: (925) 676-3700
FAX: (925) 676-4800

SUBMITTED JAN 10, 2007
PROJECT ENGINEER

REGISTERED PROFESSIONAL ENGINEER MEHRDAD AZARI No. C 41731 Exp. 03-31-08 CIVIL STATE OF CALIFORNIA

APPROVED Jan. 11 2007
CITY ENGINEER

RECORD DRAWING
(NO WARRANTY AS TO ACCURACY)
DATE ACCEPTED
PROJECT ENGINEER

REVISIONS NO.	DESCRIPTION	BY	DATE

CITY OF LAFAYETTE

2007 PAVEMENT MANAGEMENT PROJECT VOLUME B

LELAND DRIVE - STRIPING PLAN

DESIGNED: MA/JDV	PROJECT NO.: 014-9663	SCALE: 1"=40'
DRAWN: LVG/JH/FM	ROLL FRAME	
CHECKED: MA	AEI NO: 2507	
DATE: JAN 10, 2007	DWG: 35-2507-ST	SHEET 35 OF 35

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Appendix L: Technical Memorandum – Noise and Vibration

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Orion
Environmental
Associates

550 Kearny Street, Suite #800A
San Francisco, CA 94108
Tel. (415) 951-9503

Technical Memorandum (Final)

Leland Reservoir Replacement Project

Subject: Noise and Vibration

Prepared For: East Bay Municipal Utility District

Prepared by: Valerie Chew Geier, Orion Environmental Associates

Reviewed by: Robin Cort, RMC Water and Environment

Date: January 5, 2018

Reference: 0061-009.00

Table of Contents

Definition of Terms and Acronyms

Decibel, dB	The decibel (dB) is a logarithmic unit used to quantify sound intensity. Because sound or noise 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.
A-Weighted Sound Level, dBA	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", written as "dBA". Environmental noise is measured in units of dBA. The dBA, or A-weighted decibel, refers to a scale of noise measurement, which approximates the range of sensitivity of the human ear to sounds of different frequencies. On the dBA scale, the normal range of human hearing extends from about 0 dBA to about 140 dBA.
Equivalent Continuous Noise Level, L_{eq}	The energy equivalent noise level is a single decibel value that describes sound levels that vary over time. It takes into account the total sound energy over the period of time of interest.
Day-Night Noise Level, L_{dn}	Day-Night Noise Level is commonly used to describe community noise levels. L_{dn} is the 24-hour L_{eq} with a "penalty" of 10 dBA added during the nighttime hours (10:00 p.m. and 7:00 a.m.) which is normally used for sleep.
L_{max}	The highest instantaneous noise level measured on a sound level meter during a specified time period.
Ambient Noise Level	The all-encompassing noise levels at a given place and time, usually a composite of sounds from all sources near and far, including specific noise sources of interest. Typically, ambient noise levels include highway and community noise levels.
Sensitive Receptors	Sensitive receptors include, but are not limited to, residents, hospitals, schools, daycare facilities, elderly housing, and convalescent facilities. These are areas where the occupants are more susceptible to the adverse effects of exposure to toxic chemicals, pesticides, and other pollutants.

1 Introduction

This Technical Memorandum (TM) provides information on noise and vibration that will be used in the evaluation of environmental impacts associated with the Leland Reservoir Replacement Project (Project), which is proposed by the East Bay Municipal Utility District (EBMUD).

2 Project Description

Project Location

The Project site is located in the City of Lafayette (**Figure 1**). State Route 24, located north of the project site, provides regional access to the site. Pleasant Hill Road, Old Tunnel Road, Leland Drive, Windsor Drive, and Condit Road provide local access to the site.

Project Construction

The Project includes two primary elements: demolition and replacement of the existing open-cut Leland Reservoir with two new concrete 8-MG storage tanks and replacement of the existing pipeline that is located under the reservoir. The 36-inch critical transmission pipeline that is located beneath the existing reservoir basin would be demolished and removed as part of the reservoir demolition. In addition the 36-inch pipeline that extends beyond the reservoir basin would be abandoned in place along with a 30-inch pipeline in an unimproved right-of-way, west of the property boundary.

Construction Phasing and Schedule. Construction would occur in phases. The first phase would involve construction of approximately 2,700 feet of 36-inch diameter pipeline in Windsor Drive, Condit Road, and Leland Drive, which replaces the existing transmission pipeline located beneath the existing reservoir. Once the new pipeline is completed and in service, the second phase would begin, which includes demolition of the reservoir and construction of the new tanks. An additional 950 feet of 36-inch pipeline would be constructed on the reservoir site, connecting the new tanks to the existing transmission main in Leland Drive. Approximately 1,000 feet of 30-inch storm drain would also be constructed on the reservoir site. The pipeline on the reservoir site would connect the new tanks to the existing transmission main in Leland Drive. **Figure 2** indicates the locations of the proposed pipeline alignments.

The pipeline in Windsor Drive and Condit Road would be constructed using open-trench construction method. After construction of this new pipeline is complete, the work to connect the new pipeline to existing pipelines (pipeline tie-ins) would require the excavation of a trench or pit at each connection location: on Old Tunnel Road at Windsor Drive and on Leland Drive at Meek Place. The entire pipeline construction process from start to finish could take approximately six months, out of which active construction[1] would occur over approximately 16 weeks, proceeding along the alignment at a rate of approximately 80 linear feet per day. **Figure 3** illustrates how the various phases of pipeline construction would proceed along the alignment and how an individual sensitive receptor would be exposed to different activities over the approximate 16-week construction duration.

Prior to the start of reservoir construction, trees would be removed from the existing embankment on the east side and southwest side of the reservoir, and the existing reservoir would be drained. Once the reservoir is fully drained and sediments are disposed of, the east side embankment would be breached and approximately 42,000 cubic yards (CY) of excavated soil would be stockpiled and approximately 66,000 CY of excavated soil and demolition debris would be hauled off site. **Figure 4** shows the soil stockpile and staging areas on the reservoir site. The existing reservoir and pipeline beneath the existing reservoir basin would be demolished and construction of the new tanks could begin. Existing pipelines beyond the

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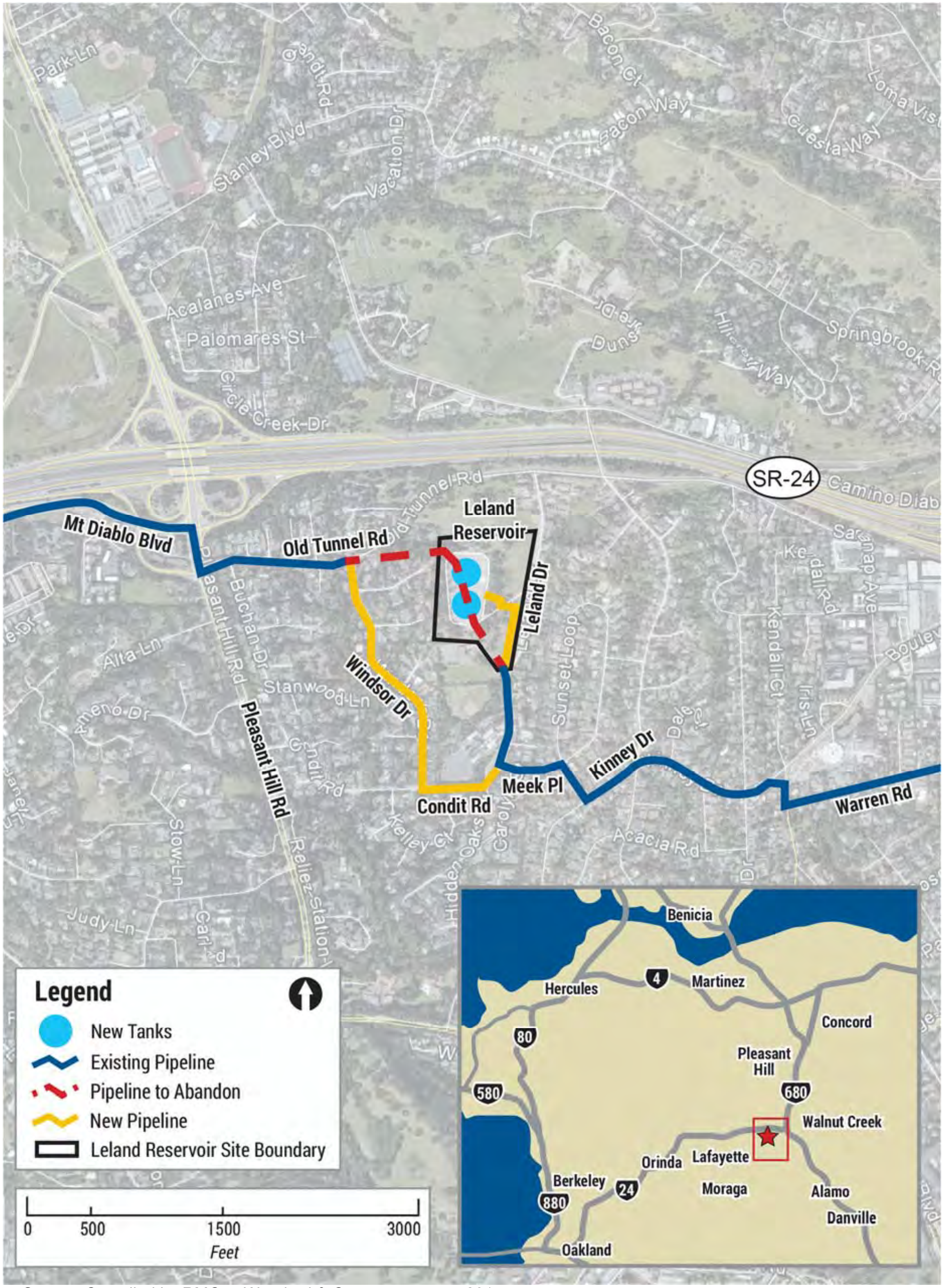
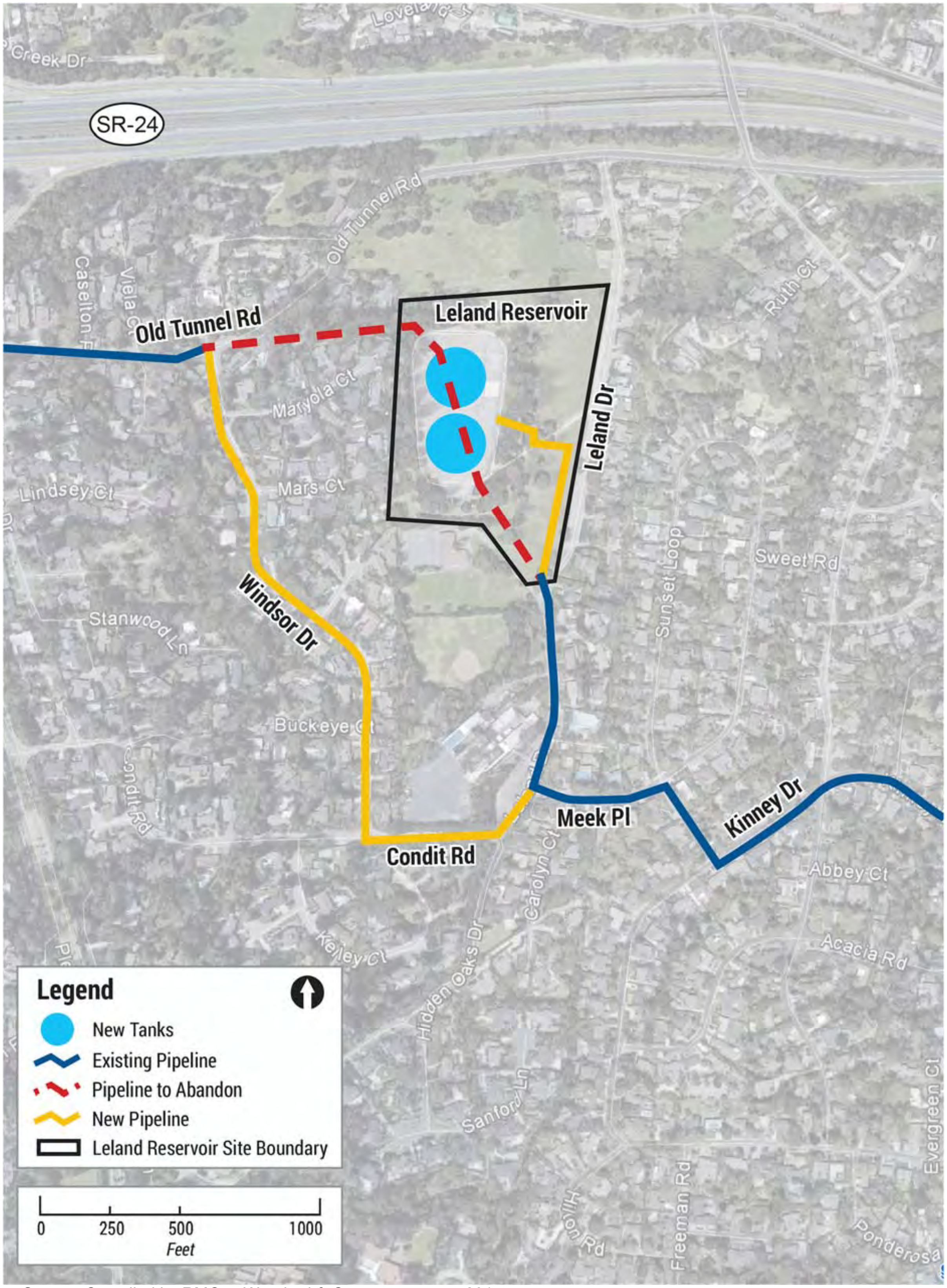
[1] Active construction time does not include down time, submittal review, material procurement, and fabrication inspection and approval process.

Figure 1: Project Location



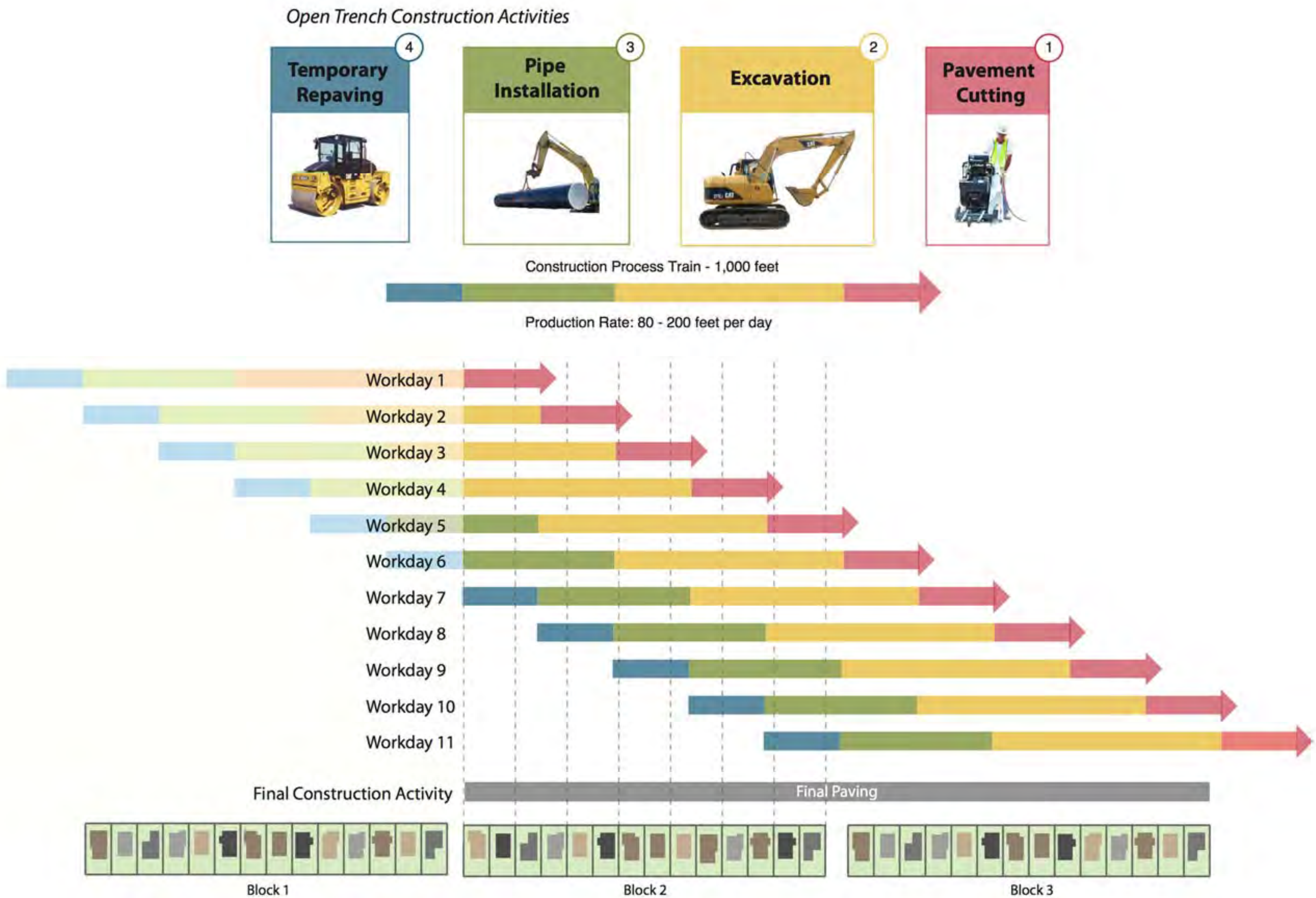
Source: Compiled by RMC, a Woodard & Curran company, 2017

Figure 2: Proposed Pipeline Alignments



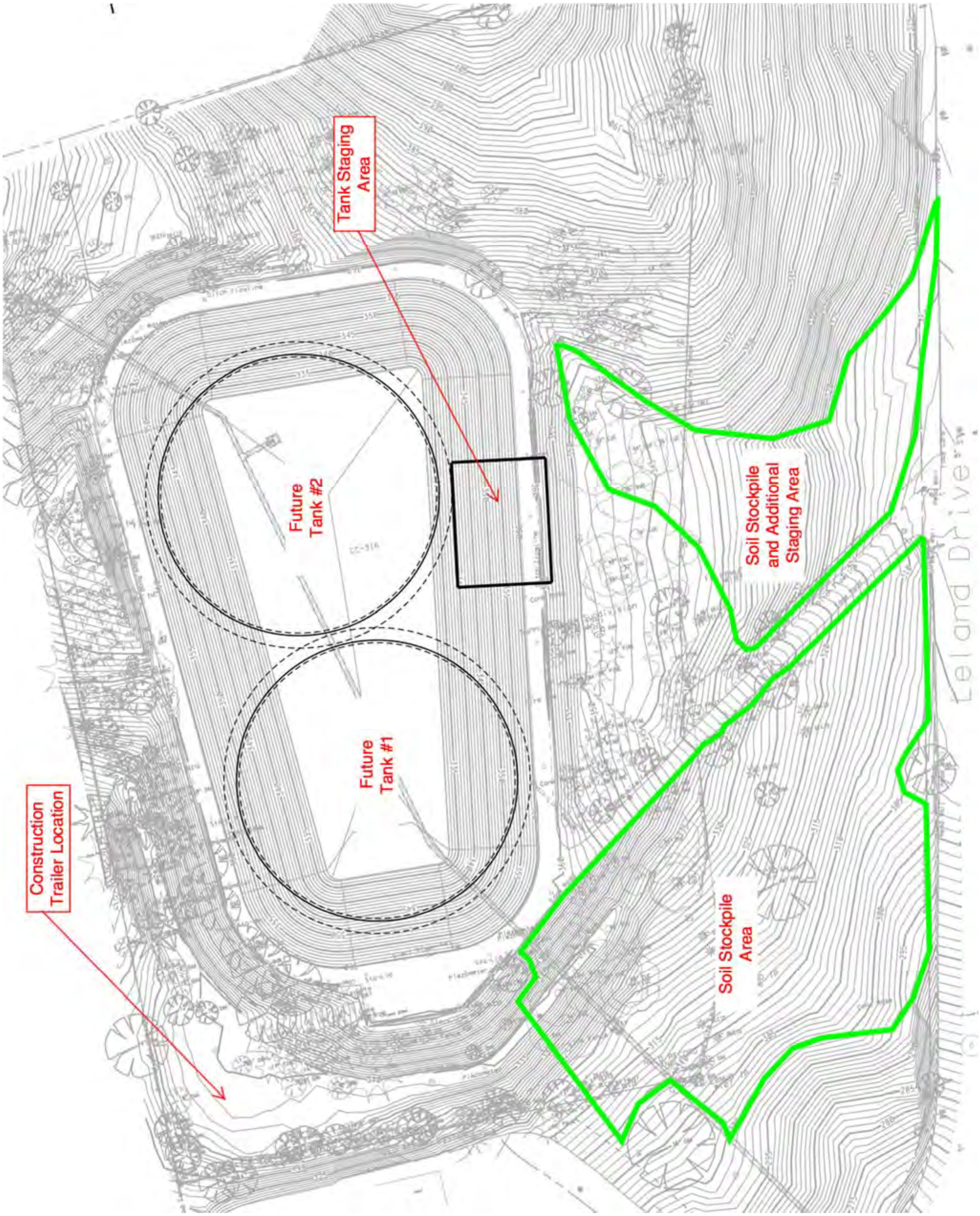
Source: Compiled by RMC, a Woodard & Curran company, 2017

Figure 3: Typical Progression of Open Trench Construction



Source: EBMUD (2013)

Figure 4: Reservoir Facility, Stockpiles, and Staging Locations



Source: EBMUD (2016)

reservoir basin and in an unimproved right-of-way (R/W 1002), west of the property boundary, would be abandoned in place and filled with cellular concrete. Once the tanks are constructed the stockpiled soil would be used to partially backfill around the tanks and reconstruct the embankment. A new access road from Leland Drive would also be constructed. The new road would provide access to the tank roofs via the existing upper perimeter road around the dual tanks and into the basin of the new tanks via a new lower road. A new pipeline would be installed on site to connect the reservoir with the existing pipeline in Leland Drive. After construction of this new pipeline is completed, the work to connect the new pipeline tie-in would require the excavation of a trench or pit at the connection location on the southeast side of the reservoir property.

Proposed reservoir demolition activities would occur over approximately 50 weeks, while construction of the new tanks would occur over approximately 63 weeks. The on-site pipeline would be installed and connected to the existing pipeline in Leland Drive (approximately 7 weeks), and a storm drain connection would be constructed within the reservoir site and across Leland Drive (approximately 5 weeks). Final site restoration (tank backfilling and contouring/landscaping) would occur over approximately 21 weeks. Total construction duration is estimated at approximately 168 weeks (or 3+ years), spanning from fall 2022 to fall 2025.

Construction Hours. Construction hours are 7:00 a.m. to 7:00 p.m., Monday through Friday, but on rare occasions, hours would need to be extended because construction work must be performed continuously without stopping until finished. Examples include critical pipeline connections (tie-ins), emergencies, and special situations such as concrete pours. During concrete pours, concrete mixer trucks may need to access the site as early as 6:30 a.m. On a typical day, construction trucks and personnel would report to the site at 7:00 a.m., and no noise-generating activities greater than 90 dBA (e.g., impact construction such as concrete breaking, concrete crushing, tree grinding) would occur before 8:00 a.m. or after 4:00 p.m. A 6:00 a.m. start time is needed during reservoir foundation and roof slab concrete pour work, which is estimated to occur over a total of about 16 days for both tanks (8 days per tank). During the pipeline tie-ins, the entire process could occur continuously for approximately 71 to 76 hours, although during approximately half of this time there would be little to no construction noise (i.e., application of the mortar and waiting for it to dry would extend over about 36 hours).

Staging and Parking Areas. At the reservoir site, the primary staging area for tank construction (approximately 100 feet by 75 feet in size) would be located in the eastern portion of the area where the existing reservoir is located (**Figure 4**). Soil stockpiling and staging areas would also be located on site in the eastern portion of the reservoir site to the north and south of the site access road and a construction trailer would be located on the southwest portion of the site (**Figure 4**). The staging and stockpile areas would be used from 7:00 a.m. to 7:00 p.m., Monday through Friday. Construction equipment would be stored overnight in the staging areas. Workers would also park on-site in the area north of the existing site access road (between Project property boundary and the west side of Leland Drive).

During construction of the 2,700 feet of 36-inch pipeline in Windsor Drive, Condit Road, and Leland Drive, materials and off-road equipment (e.g., pipeline, pipe fittings, and imported fill, excavators and backhoes, etc.) would be staged at the curbside of the road/work area. Excavated soils and other materials would be hauled off-site on a daily basis. Staging areas would provide short-term (including overnight) storage of heavy equipment, piping, and other materials. The staging area would move along with the pipeline installation activity. Construction workers would utilize on-street parking along the pipeline alignment along Windsor Drive, Condit Road, and Leland Drive.

Construction Traffic and Access Routes. During pipeline installation, a maximum of 4 one-way truck trips per hour (trips/hour) and 24 one-way worker vehicle trips/hour would be generated (30 one-way truck and 48 one-way worker trips/day), while lower levels of traffic would be generated during pipeline testing (up to 1 one-way truck and 13 one-way worker trips/hour or 6 one-way truck and 26 one-way worker trips/day) and paving (up to 3 one-way truck and 13 one-way worker trips/hour or 20 one-way truck and 26 one-way worker trips/day). During reservoir demolition, up to 10 one-way truck and 15 one-way worker trips/hour would be generated (or up to 70 one-way truck and 30 one-way worker trips/day). Higher truck and worker vehicles volumes (up to 16 one-way trucks and 23 one-way worker trips/hour or 106 one-way truck and 46 one-way worker trips/day) would occur during tank construction. Traffic levels would decrease during site restoration (up to 7 one-way trucks and 8 one-way worker trips/hour or 48 one-way trucks and 16 one-way worker trips/day).

It is assumed that construction worker vehicles and trucks would typically use the most direct access routes to and from the Project site. For reservoir construction, and construction of the 2,700 feet of 36-inch pipeline in Windsor Drive, Condit Road, and Leland Drive, worker vehicles and trucks (including haul trucks) could use Pleasant Hill Road, Old Tunnel Road, and Leland Drive for site access but could use Windsor Drive, Condit Road, or Leland Drive, whichever provides the most direct access.

Project Operation, Maintenance, and Dam Inspections

The existing open cut Leland Reservoir is unstaffed and generates approximately three site visits each month for operations, site maintenance, dam inspections and a yearly inspection with the Division of Safety of Dams (DSOD), Following construction completion of the open cut reservoir replacement with dual concrete tanks, the monthly/yearly dam inspections will no longer be necessary as the facility will be out of DSOD jurisdiction. Site visits would be reduced to approximately two per month for operation and site maintenance inspections.

2.1 Approach

This TM describes the existing noise environment in the general Project vicinity and local noise regulations and ordinances that pertain to the Project. Based on criteria specified in Appendix G, Environmental Checklist of the California Environmental Quality Act (CEQA) Guidelines, this TM analyzes potential short- and long-term noise and vibration impacts from Project sources on nearby receptors, and identifies mitigation measures that could be implemented to reduce any identified noise impacts resulting from proposed demolition and construction activities as well as ongoing operation.

3 Environmental Setting, Impacts and Mitigation

3.1 Sound Fundamentals

Sound is characterized by various parameters that describe the rate of oscillation (frequency) of sound waves, the distance between successive troughs or crests in the wave, the speed that it travels, 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, and 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 reflect this wide range. Since the human ear is not equally sensitive to all sound frequencies within the entire spectrum, human response is reflected in the A-weighted decibel (expressed as “dBA”), which refers to a scale of noise measurement that approximates the range of sensitivity of the human ear to sounds of different frequencies. On the dBA scale, the normal range of human hearing extends from about 0 dBA to about 140 dBA. Except in carefully controlled laboratory experiments, a change of only 1-dBA in sound level cannot be perceived. Outside of the laboratory, a 3-dBA change is considered a perceptible difference, while a 5-dBA change is readily noticeable. A 10-dBA increase in the level of a continuous noise represents a perceived doubling of loudness (Caltrans, 2013a).

3.1.1 Noise Descriptors

Noise is generally defined as sound that is loud, disagreeable, unexpected, or unwanted. Sound is mechanical energy transmitted in the form of a wave by a disturbance or vibration that causes pressure variation in air the human ear can detect. Variations in noise exposure over time are typically expressed in terms of a steady-state energy level (called L_{eq}) that represents the acoustical energy of a given measurement, or alternatively as a statistical description of what sound level is exceeded over some fraction (10, 50, or 90 percent) of a given measurement period (i.e., L_{10}, L_{50}, L_{90}). $L_{eq(24)}$ is the steady-state acoustical energy level measured over a 24-hour period. L_{max} is the maximum, instantaneous noise level registered during a measurement period.

Because community receptors are more sensitive to unwanted noise intrusion during the evening and at night, 24-hour noise descriptors called the Community Noise Equivalent Level (CNEL) and Day-Night Noise Level (L_{dn}) are used for planning purposes because they add an artificial dBA increment to evening and nighttime noise levels to account for this increased sensitivity. CNEL adds a 5-dBA penalty during the evening (7:00 p.m. to 10:00 p.m.) and a 10-dBA penalty at night (10:00 p.m. to 7:00 a.m.). Another 24-hour noise descriptor, called the day-night noise level (L_{dn}), is similar to CNEL. Both CNEL and L_{dn} add a 10-dBA penalty to all nighttime noise levels between 10:00 p.m. and 7:00 a.m., but L_{dn} does not add the evening 5-dBA penalty between 7:00 p.m. and 10:00 p.m. In practice, L_{dn} and CNEL usually differ by less than 1 dBA at any given location for transportation noise sources (Caltrans, 2013a).

Table 1 presents representative noise sources and their corresponding noise levels in dBA at varying distances from the noise sources.

Table 1: Representative Environmental Noise Levels

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	110	Rock Band
Jet Fly-Over at 100 feet		
	100	
Gas Lawnmower at 3 feet		
	90	
Diesel Truck going 50 mph at 50 feet		Food Blender at 3 feet
	80	Garbage Disposal at 3 feet
Noise Urban Area during Daytime		
Gas Lawnmower at 100 feet	70	Vacuum Cleaner at 10 feet
Commercial Area		Normal Speech at 3 feet
Heavy Traffic at 300 feet	60	
		Large Business Office
Quiet Urban Area during Daytime	50	Dishwasher in Next Room
Quiet Urban Area during Nighttime	40	Theater, Large Conference Room (background)
Quiet Suburban Area during Nighttime		
	30	Library
Quiet Rural Area during Nighttime		Bedroom at Night, Concert Hall (background)
	20	
		Broadcast/Recording Studio
	10	
	0	

Note: dBA = A-weighted decibel; mph = miles per hour
Source: Caltrans (2013a)

Attenuation of Noise

A receptor's distance from a noise source affects how noise levels attenuate (decrease). Transportation noise sources tend to be arranged linearly, such that roadway traffic attenuates at a rate of 3.0 dBA to 4.5 dBA per doubling of distance from the source, depending on the intervening surface (paved or vegetated, respectively). Point sources of noise, such as stationary equipment or construction equipment, typically attenuate at a rate of 6.0 dBA to 7.5 dBA per doubling of distance from the source.[2] For example, a sound level of 80 dBA at 50 feet from the noise source will be reduced to 74 dBA at 100 feet, 68 dBA at 200 feet, and so on. Noise levels can also be attenuated by "shielding" or providing a barrier between the source and the receptor. With respect to interior noise levels, noise attenuation effectiveness depends on whether windows are closed or open. Based on the United States Environmental Protection Agency (EPA) national average, closed windows reduce noise levels by approximately 25 dBA, while open windows reduce noise levels by about 15 dBA (EPA, 1974).

3.1.2 Vibration

Vibrations caused by construction activities can be interpreted as energy transmitted in waves through the soil mass. The 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). For comparison purposes, 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. Minor cosmetic damage to buildings can occur at vibration levels as low as 0.5 in/sec PPV.

3.2 Environmental Setting

The following sections describe the existing environmental conditions regarding noise and the potential effects the Project may have on the site and its surrounding area.

3.2.1 Existing Noise Environment

The Project site is located in the City of Lafayette, surrounded to the east and west by single-family residential homes. A church is adjacent to the southern property boundary of the Project site. The land between the northern property boundary and Old Tunnel Road is primarily vacant land, zoned for single-family residential use, with two existing homes located at the corner of Leland Drive and Old Tunnel Road; State Route 24 freeway is located immediately north of Old Tunnel Road. The proposed 2,700 feet of 36-inch pipeline in Windsor Drive, Condit Road, and Leland Drive is under streets in single-family residential neighborhoods, and also passes a private elementary school, and a pool operated by a local swimming club.

Even though land around the Project site is primarily residential, the State Route 24 freeway is the predominant source of noise in the Project vicinity. The freeway is located approximately 500 feet north

[2] The 1.5-dBA variation in attenuation rate (6 dBA vs. 7.5 dBA) can result from ground absorption effects, which occur as sound travels over soft surfaces such as soft earth or vegetation (7.5-dBA attenuation rate) vs. over hard ground such as pavement or very hard-packed earth (6-dBA rate; HUD, 1985).

of the site's northern boundary and about 700 feet north of the reservoir's northern boundary. Noise levels on the Project site and vicinity vary with their elevation relative to the freeway. The hill along the northern Project boundary (approximately 450 feet in elevation at the top of the hill) partially blocks freeway noise from the site, where elevations are lower, generally ranging from a low of 260 feet at the southeast corner to highs of 375 feet along the western boundary and 415 feet along the northern boundary. There are hills to the northwest and northeast that also partially block freeway noise and they limit direct exposure of the Project site and its vicinity to freeway noise. In order to characterize the existing noise environment in the site vicinity, two long-term (24-hour) noise measurements were taken in September 2016 at two locations in the reservoir vicinity. **Figure 5** shows the noise measurement locations, while **Table 2** summarizes the results of the noise measurements.

In general, existing noise levels in the site vicinity ranged from 52 to 59 dBA (L_{dn}) with higher noise levels occurring with proximity to the State Route 24 freeway. Noise levels at the Project site also varied with elevation and topographic barriers. Freeway noise is less noticeable in areas below the freeway elevation and behind the hills to the north, while it is more noticeable at the reservoir, which is higher in elevation than the freeway and where hills to the north do not completely block freeway noise. In general, noise levels ranged from 49 to 52 dBA (L_{eq}) during the daytime hours (7:00 a.m. to 7:00 p.m.), 48 to 55 dBA (L_{eq}) during the evening hours (7:00 p.m. to 10:00 p.m.), and 44 to 52 (L_{eq}) during the nighttime hours (10:00 p.m. to 7:00 a.m.). As indicated in **Table 2**, noise levels near the freeway (Location 2) are higher during the evening than the daytime hours, but at Location 1, which is farther from the freeway, evening noise levels are slightly lower than daytime levels.

3.2.2 Sensitive Receptors

Some land uses are generally regarded as being more sensitive to noise than others due to the types of population groups or activities involved. According to the City of Lafayette General Plan Noise Element (2002), sensitive land uses generally include residential uses, hospitals, schools, convalescent homes, and libraries.

Figure 5 shows the locations of sensitive receptors adjacent to the reservoir site. There are residences directly adjacent to the western reservoir site boundary and east of the project site across Leland Drive. Most existing residences to the west are located approximately 115 feet or more from the existing reservoir and approximately 80 feet or more from the western site boundary with one exception, the residence on the northern side of the cul-de-sac at the end of Maryola Court (3134 Maryola Court) is located approximately 80 feet from the reservoir and approximately 30 feet from the site boundary, and approximately 10 to 13 feet lower in elevation than the existing reservoir's upper perimeter road. The residence on the southern side of the cul-de-sac (3135 Maryola Court) is also located about 5 to 10 feet below the perimeter road but there is an intervening hill that blocks the line-of-sight between this home and the perimeter road. Southwest of the reservoir site, the residences at the end of Mars Court (3132 and 3131) are located farther away from the reservoir (approximately 120 feet away) and also located approximately 30+ feet below the perimeter road elevation. Existing residences to the east are on the east side of Leland Drive and are located at least 400 feet from the existing reservoir, but located as close as 65 feet from the eastern site boundary. In general, homes to the east are located at the same elevation or slightly higher than the eastern project boundary along Leland Drive. There is one residence located on the west side of Leland Drive, approximately 125 feet north of the site's northeast boundary. The Meher Schools are located approximately 800 feet south of the reservoir site.

Although not identified as noise-sensitive in the Lafayette General Plan, the Sun Valley Bible Chapel is located approximately 130 feet south of the existing reservoir and approximately 80 feet from the southern site boundary. Services are held on Sundays (9:15 a.m. to noon), and some activities are held on weekdays (e.g., bible study groups). There are residences located on Windsor Drive, Condit Road, and Leland Drive and they are adjacent to the off-site pipeline alignment, within 50 feet of the centerlines of these streets.

Figure 5: Noise Measurement Locations

Source: Compiled by Orion Environmental Associates and RMC, a Woodard & Curran company (2017)

Table 2: Summary of Noise Measurement Results

Time	Noise Measurement Locations, Hourly Noise Levels (Leq) #1: Leland Drive (150 feet from centerline) Day 1	Day 2	#2: Old Tunnel Road (150 feet from centerline) Day 1	Day 2
12:00 a.m. to 1:00 a.m.	43.6	43.1	49.2	50.7
1:00 a.m. to 2:00 a.m.	40.1	40.3	47.5	47.9
2:00 a.m. to 3:00 a.m.	39.4	37.2	46.9	47.9
3:00 a.m. to 4:00 a.m.	37.9	38.8	46.9	48.7
4:00 a.m. to 5:00 a.m.	39.5	41.3	49.9	51.5
5:00 a.m. to 6:00 a.m.	46.6	46.0	51.5	54.7
6:00 a.m. to 7:00 a.m.	49.8	48.2	52.8	54.7
7:00 a.m. to 8:00 a.m.	51.8	50.1	54.6	53.5
8:00 a.m. to 9:00 a.m.	52.2	55.5	52.5	52.3
9:00 a.m. to 10:00 a.m.	47.7	53.7	50.0	51.5
10:00 a.m. to 11:00 a.m.	48.3	48.5	49.8	50.7
11:00 a.m. to 12:00 p.m.	47.3	46.7	49.8	50.1
12:00 p.m. to 1:00 p.m.	47.2	54.6	49.6	49.1
1:00 a.m. to 2:00 p.m.	49.1	50.1	50.8	50.3
2:00 p.m. to 3:00 p.m.	49.8	49.7	51.2	53.2
3:00 p.m. to 4:00 p.m.	48.9	51.7	49.8	53.7
4:00 p.m. to 5:00 p.m.	47.9	49.4	50.4	54.0
5:00 p.m. to 6:00 p.m.	48.6	48.8	54.3	53.5
6:00 p.m. to 7:00 p.m.	48.8	46.6	55.9	50.5
7:00 p.m. to 8:00 p.m.	48.2	48.4	54.7	51.2
8:00 p.m. to 9:00 p.m.	48.7	52.5	55.4	53.9
9:00 p.m. to 10:00 p.m.	47.6	48.9	54.7	55.0
10:00 p.m. to 11:00 p.m.	45.4	45.7	53.4	54.5
11:00 p.m. to 12:00 a.m.	44.4	44.4	52.0	51.8
Daytime Leq (7:00 a.m. to 7:00 p.m.)	49-51		52	
Evening Leq (7:00 p.m. to 10:00 p.m.)	48-50		54-55	
Nighttime Leq (10:00 p.m. to 7:00 a.m.)	44-45		51-52	
Ldn[a]	52-53		57-59	

Notes: See Figure 5 for noise measurement locations. Both measurements were taken from midnight on Tuesday, September 13, 2016, to midnight on Thursday, September 15, 2016, using a Quest Soundpro D/L meter.

[a] Ldn is a 24-hour noise level with 10-dBA penalty between 10:00 p.m. and 7 a.m.

Source: Orion Environmental Associates (2016)

3.3 Regulatory Framework

3.3.1 Federal and State Policies and Regulations

No federal or state standards related to noise are applicable to the Project. The Federal Noise Control Act of 1972 divides powers between federal, state, and local governments, in which the primary federal responsibility is for noise source emission control. State and local governments are responsible for controlling the operation of fixed noise sources (i.e., air conditioning and swimming pool equipment) and determining the levels of noise to be permitted in their environment (EPA, 1974).

3.3.2 Local Policies and Regulations

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. Government Code 53091(d) states: "(d) Building and zoning ordinances of a county or city shall not apply to the location or construction of facilities for the production, generation, storage, treatment, or transmission of water, wastewater, or electrical energy by a local agency." Although building and zoning 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, therefore relevant noise regulations and standards for the City of Lafayette are outlined below.

City of Lafayette Municipal Code

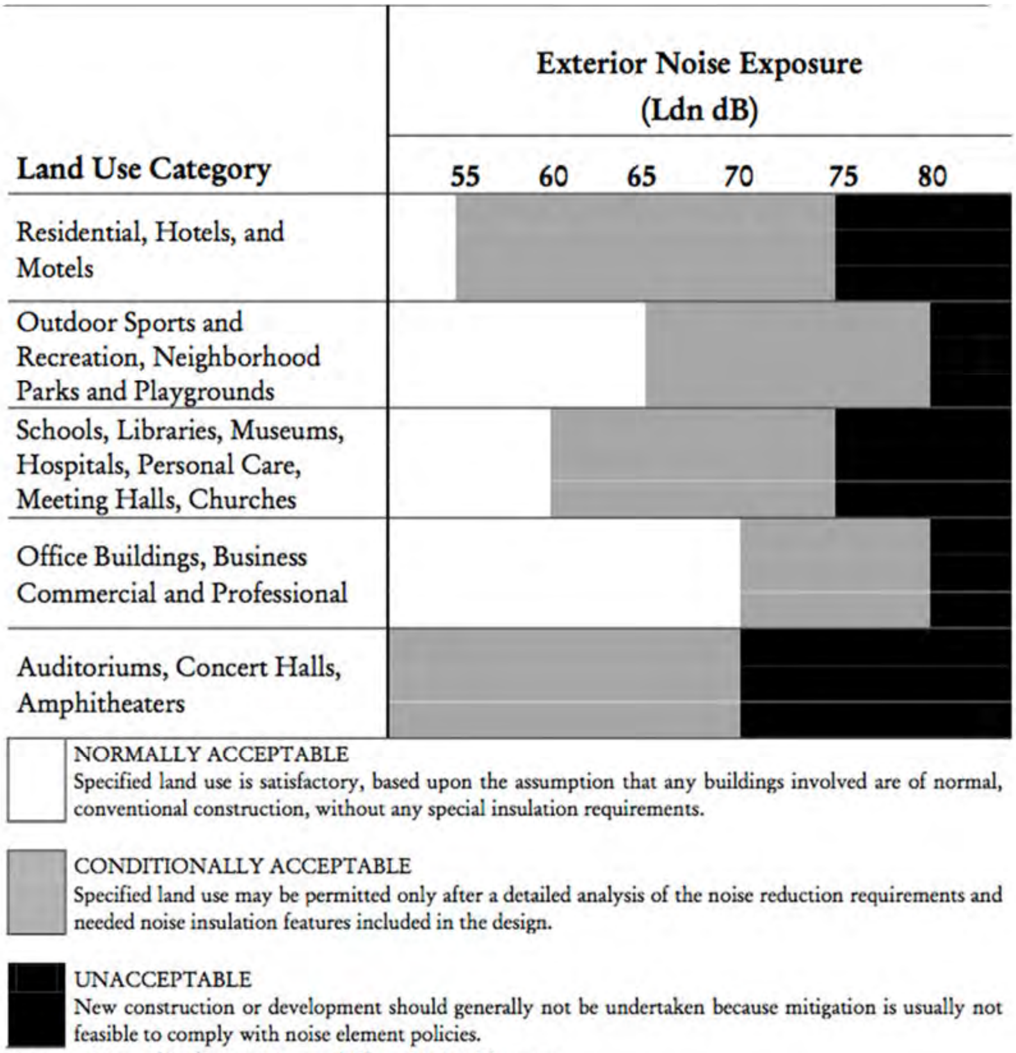
The Lafayette Municipal Code (Chapter 5-2) contains the City's Noise Ordinance. The Noise Ordinance is designed to control unnecessary, excessive, and annoying sounds from sources on private property by setting limits that cannot be exceeded at adjacent properties. The Noise Ordinance specifies noise limits at property boundaries and the limits apply to fixed noise sources such as air conditioners and pool equipment.

The City's Noise Ordinance also limits the hours of permitted construction activities to the hours of 8:00 a.m. to 8:00 p.m. Monday through Saturday, and between 10:00 a.m. to 6:00 p.m. on Sundays and legal holidays, provided that such construction activities do not exceed 80 dBA at the nearest affected property or individual equipment items do not exceed 83 dBA at 50 feet (Section 5-208[d]). For any construction noise occurring outside these hours, the City's outdoor noise limits specified in Section 5-205 are applicable. Therefore, on weekdays from 7:00 a.m. to 10:00 p.m., Section 5-205 stipulates that 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. From 10:00 p.m. to 7:00 a.m., these limits are reduced by 5 dBA. These time-based noise limits convert to an equivalent L_{eq} noise limit 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 noise level exceeds these standards, the allowable noise exposure standard shall be increased at 5 dB increments as appropriate to reflect the ambient noise level.

City of Lafayette General Plan Noise Element

The Noise Element of the City of Lafayette's General Plan (p. VII-10) sets forth several policies and programs to assess and control environmental noise. The General Plan policies and programs establish indoor and outdoor noise standards for residential uses. None of the policies specifically pertain to the proposed Project because they do not apply to a water facility use. However, the Noise Element includes land use and noise compatibility standards (presented in **Table 3**), and indicates what noise environments are considered acceptable for a range of urban land uses. For example, ambient noise levels of up to 55 dBA (L_{dn}) are considered "normally acceptable" for residential uses, while ambient noise levels ranging from 55 dBA (L_{dn}) to 75 dBA (L_{dn}) are considered "conditionally acceptable" for residential uses.

Table 3: City of Lafayette Land Use and Noise Compatibility Standards



Source: City of Lafayette General Plan, Noise Element.

EBMUD Standard Construction Specifications

EBMUD's Standard Construction Specification 01 35 44 (Environmental Requirements) includes practices and procedures for reducing noise and vibration impacts including restrictions on noise generating activities, and noise and vibration control methods and monitoring, as described below.

Work Restrictions

EBMUD Standard Construction Specification 01 14 00, Section 1.8(A) requires that noise generating activities greater than 90 dBA (impact construction such as concrete breaking, concrete crushing, tree grinding, etc.) shall be limited to the hours of 8:00 a.m. to 4:00 p.m., Monday through Friday.

Noise Control and Monitoring Plan

EBMUD's Standard Construction Specification 01 35 44 Part 1, Section 1.3, Subsection G requires that the contractor submit a plan detailing the means and methods for controlling and monitoring noise generated by construction activities, including demolition, alteration, repair or remodeling of or to existing structures and construction of new structures, as well as by items of machinery, equipment or devices used during construction activities on the site for the Engineer's acceptance prior to any work at the jobsite. The plan shall detail the equipment and methods used to monitor compliance with the plan.

Noise Control

EBMUD's Standard Construction Specification 01 35 44 Part 3, Section 3.6 requires noise controls on site activities and describe measures that shall be implemented to reduce the potential for noise disturbance at adjacent or nearby residences. Noise control measures required by the specification include:

- Contractor is responsible for taking appropriate measures, including muffling of equipment, selecting quieter equipment, erecting noise barriers, modifying work operations, and other measures as needed to bring construction noise into compliance.
- Each internal combustion engine, used for any purpose on the job or related to the job, shall be equipped with a muffler of a type recommended by the manufacturer. No internal combustion engine shall be operated on the project without said muffler.
- Best available noise control techniques (including mufflers, intake silencers, ducts, engine enclosures, and acoustically attenuating shields or shrouds) shall be used for all equipment and trucks, as necessary.
- Truck operations (haul trucks and concrete delivery trucks) will be limited to daytime hours from 7:00 am to 7:00 pm Monday through Friday.
- Stationary noise sources (e.g., chippers, grinders, compressors) shall be located as far from sensitive receptors as possible. If they must be located near receptors, adequate muffling (with enclosures) shall be used. Enclosure opening or venting shall face away from sensitive receptors. Enclosures shall be designed by a registered engineer regularly involved in noise control analysis and design.
- Material stockpiles as well as maintenance/equipment staging and parking areas (all on-site) shall be located as far as practicable from residential receptors.
- If impact equipment (e.g., jack hammers, pavement breakers, and rock drills) is used, Contractor is responsible for taking appropriate measures, including but not limited to the following:
  - Hydraulically or electric-powered equipment shall be used wherever feasible 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 shall be used (a muffler can lower noise levels from the exhaust by up to about 10 dB). External jackets on the tools themselves shall 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. It is the Contractor's responsibility to implement any mitigations necessary to meet applicable noise requirements. Impact construction including jackhammers, hydraulic backhoe, concrete crushing/recycling activities, vibratory pile drivers will be limited to between 8:00 a.m. and 4:00 p.m., Monday through Friday within residential communities, and will be limited in duration to the maximum extent feasible.
  - Erect temporary noise barriers or noise control blankets around the construction site, particularly along areas adjacent to residential buildings.

- Utilize noise control blankets around the major noise sources to reduce noise emission from the site.
- Evaluate the feasibility of noise control at the receivers by temporarily improving the noise reduction capability of adjacent buildings by the use of sound blankets for example.
- Limit the noisiest phases of construction to 10 workdays at a time, where feasible.
- Notify neighbors/occupants within 300 feet of project construction at least thirty days in advance of extreme noise generating activities about the estimated duration of the activity.

- Monitoring for noise shall be conducted periodically during noise generating activities. Monitoring shall be conducted using a precision sound-level meter that is in conformance with the American National Standards Institute (ANSI) Standard S1.4, Specification for Sound Level Meters. Monitoring results shall be submitted weekly to the Engineer.

Vibration Control and Monitoring Plan

EBMUD's Standard Construction Specification 01 35 44 Part 1, Section 1.3, Subsection H requires that the contractor submit a plan detailing the means and methods for controlling and monitoring surface vibration generated by demolition and other work on the site for the Engineer's acceptance prior to any work at the jobsite. The plan shall detail the equipment and methods used to monitor compliance with the plan.

Vibration Controls

EBMUD's Standard Construction Specification 01 35 44 Part 3, Section 3.5 requires vibration controls on site activities and describes measures that shall be implemented to reduce the potential for cosmetic damage to adjacent or nearby structures. Vibration control measures required by the specification include:

- Limit surface vibration to no more than 0.5 in/sec PPV, measured at the nearest residence or other sensitive structure.
- Upon homeowner request, and with homeowner permission, the District will conduct preconstruction surveys of homes, sensitive structures and other areas of concern within 15 feet of continuous vibration-generating activities (i.e. vibratory compaction). Any new cracks or other changes in structures will be compared to preconstruction conditions and a determination made as to whether the project could have caused such damage. In the event that the project is demonstrated to have caused the damage, the District will have the damage repaired to the pre-existing condition.

3.4 Impact Analysis

3.4.1 Methodology for Analysis

Potential impacts related to noise and vibration are analyzed based on the potential for the Project to result in substantial changes in the noise environment during construction or operation. Existing site conditions prior to construction of the Project are compared to site conditions both during construction activities and after the Project facilities are operational.

Noise

Project implementation would result in temporary increases in construction noise in the vicinity of the pipeline alignments and the reservoir site. The noise impact assessment evaluates short-term (temporary) impacts associated with the construction of the pipelines and replacement of the existing reservoir. For Criterion #1 and Criterion #2 below, the determination of impact significance for noise takes into account combined construction noise from simultaneous use of on-site equipment, Noise Ordinance standards, proximity of noise-sensitive uses, and the potential duration that sensitive receptors would be subject to construction noise.

To assess potential short-term construction noise impacts, the analysis identifies and describes sensitive receptors and their relative exposure to estimated construction noise. The analysis considers the attenuation of noise with distance but not attenuation potentially provided by existing topography such as an embankment or trench because attenuation effects can be variable and receptor benefits depend on the degree a source is blocked. With no topographic barrier attenuation effects included, the estimated noise levels are considered to be conservatively high. Construction-related noise impacts were assessed in part using the U.S. Federal Transit Administration (FTA) methodology for general quantitative noise assessment (FTA, 2006). The FTA methodology considers operation of the two noisiest pieces of equipment and applies documented usage to account for the amount of time that equipment is in use. The distance between noise source and receptor was based on the distance between each facility's closest boundary to the specified receptors.

Vibration and Groundborne Noise

The operation of impact or vibratory equipment (i.e. vibratory compactors or rollers) as part of Project construction could result in vibration that, in turn, could cause cosmetic damage to buildings or structures or disturb nearby residents at night. The impact assessment for vibration (Criterion #3 below) evaluates the potential for construction to result in excessive groundborne vibration or groundborne noise. Groundborne noise is experienced inside a building or structure but is the result of vibrations produced outside of the building and transmitted as ground vibration between the source and receiver. Groundborne noise can be problematic in situations where the primary airborne noise path is blocked, as in the case of a subway tunnel passing near homes or other noise-sensitive structures. However, the proposed noise- and vibration-generating construction activities associated with the Project would involve techniques (i.e. pavement cutting, excavation, and paving) that generate airborne noise and surface vibration. Groundborne noise is not discussed further since any potential groundborne noise from construction activities would be imperceptible; therefore, no impact related to groundborne noise would occur. The analysis of groundborne vibration impacts uses standard analytical methodologies, such as estimating vibration levels at sensitive receptors for a given vibration source and setback distance, comparing the estimated vibration levels with recommended limits or significance thresholds, determining potentially significant impacts on nearby sensitive receptors, and providing mitigation where applicable.

3.4.2 Thresholds of Significance

Consistent with Appendix G of the *CEQA Guidelines* a noise or vibration impact would be considered significant if the Project would:

1. Result in exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;
2. Result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project;
3. Result in exposure of persons or structures to or generation of excessive groundborne vibration or groundborne noise levels;
4. Result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project;
5. For a project located within an airport land use plan area, or, where such a plan has not been adopted, in an area within two miles of a public airport or public use airport, expose people residing or working in the area to excessive noise levels; or
6. For a project located in the vicinity of a private airstrip, expose people residing or working in the project area to excessive noise levels.

3.4.3 Criteria Requiring No Further Evaluation

Criteria listed above that are not applicable to actions associated with the Project are identified below along with a supporting rationale as to why further consideration is unnecessary and a no-impact determination is appropriate (numbers correlate to the list above).

- *Criterion 4: Result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project.* The primary sources of noise typically associated with the operation of water facilities include pumps and electrical facilities (substations, transformers, and emergency generators). The Project would not include any such noise sources. The proposed pipelines would be located underground and the new tanks would be partially backfilled. Following the completion of Project improvements, pipeline operations would be similar to operations for other existing pipelines operated by EBMUD (i.e., flushing, hydrant testing, anode replacement every 25 years, leak detection, leak repair, right-of-way maintenance). Maintenance activities would occur as needed or as part of routine of facility monitoring in accordance with standard inspection schedules, and the frequency of monitoring or maintenance activities would not change substantially from current conditions. The Project would not result in any permanent surface operations that would introduce new sources of noise or vibration. In addition, traffic (and resulting traffic noise) associated with operations and maintenance at the reservoir facility would decrease from approximately three trips per month to two after the existing reservoir is replaced with dual concrete tanks and is no longer under DSOD jurisdiction; therefore, there would be no impact.
- *Criterion 5: For a project located within an airport land use plan area, or, where such a plan has not been adopted, in an area within two miles of a public airport or public use airport, expose people residing or working in the area to excessive noise levels.* The Project site is not within an airport land use plan area, nor is it in the vicinity of a private airstrip. Therefore, the Project would not result in the long-term exposure of workers to excessive airport-related noise levels and there would be no impact.
- *Criterion 6: For a project located in the vicinity of a private airstrip, expose people residing or working in the project area to excessive noise levels.* The Project site is not within an airport land use plan area, nor is it in the vicinity of a private airstrip. Therefore, the Project would not result in the long-term exposure of workers to excessive airport-related noise levels and there would be no impact.

3.4.4 Impacts and Mitigation Measures

Impact NOI-1 Result in exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies. (Criterion 1)

Lafayette's Noise Ordinance includes a limited exception from noise level limits (i.e., higher or relaxed noise limits) for construction activity occurring between the less noise-sensitive daytime hours of 8:00 a.m. and 8:00 p.m. Outside of that timeframe, construction noise is expected to fall below the otherwise applicable, more stringent noise limits found in the ordinance. Because Lafayette's Noise Ordinance imposes differing noise level limits depending on the time of day during which construction occurs, this analysis considers two categories of construction noise: (1) that generated by construction activities occurring between 8:00 a.m. and 8:00 p.m., and (2) that generated by construction activities occurring outside of the ordinance's 8:00 a.m. to 8:00 p.m. timeframe.

Construction Activities Occurring Between 8:00 a.m. and 8:00 p.m.

Operation of construction equipment between the hours of 8:00 a.m. and 8:00 p.m. would result in temporary noise increases in the Project vicinity. Some proposed construction activities could expose nearby residents to noise levels that exceed ordinance noise limits.

To assess which construction activities could exceed noise ordinance limits, **Table 4** presents the estimated daytime Project-related construction noise levels at the closest property boundary, based on distance, equipment type and duration of equipment use. The table is organized by the daytime construction activities (open trench pipeline construction, reservoir replacement and pipeline tie-ins) and equipment associated with each activity (i.e., principal noise sources). **Table 4** also indicates the reference noise level (L_{max} in dBA) at 50 feet, typical minimum distances between specific construction activities and the closest property lines, the noise level reduction adjustment to account for distance attenuation effects ("Noise Level Adjustment for Distance"), typical duration factor to reflect equipment use ("Assumed Usage Factor"[3]), and noise level adjustment to account for duration of use ("Noise Level Adjustment for Usage"). The results of these adjustments are the L_{eq} noise levels shown in **Table 4** ("L_{eq} Noise Level Adjusted for Distance and Usage").

To assess which construction activities exceed the construction noise limits (i.e., L_{max} over 83 dBA at 50 feet or L_{eq} over 80 dBA at the nearest property line), the reference L_{max} noise level and time-adjusted L_{eq} noise levels are compared to the respective limits for each construction activity. If at least one of the two noise limits would be met, the construction activity is considered to be consistent with the ordinance, resulting in a less-than-significant noise impact. However, if both noise limits are exceeded, the construction activity is considered to conflict with the ordinance, and the impact would be significant.

Pipeline Construction. As shown on **Table 4,** all equipment for pipeline construction expect for the grader, tractor, jackhammer and pavement saw meet the construction ordinance noise level limits of either 83 dBA (L_{max}) at 50 feet or 80 dBA (L_{eq}) at the property line and noise impacts are therefore considered less-than-significant. The grader and tractor equipment, either of which could be used 40 percent of the time, would generate noise levels of 84 to 85 dBA (L_{max}) at 50 feet or 90 to 91 dBA (L_{eq}) at the property line. In addition, the jackhammer and pavement saw equipment, either of which would be expected to only be used 20 percent of the time, would generate noise levels of 84 dBA to 90 dBA (L_{max}) at 50 feet or 87 to 93 dBA (L_{eq}) at the closest property line. Operation of these four types of equipment could not meet the construction ordinance noise level limits of either 83 dBA (L_{max}) at 50 feet or 80 dBA (L_{eq}) at the property line. Accordingly, use of these four types of equipment would result in a significant noise impact. However, it is noted that operation of these equipment types would be very limited in duration. Pavement saws are typically used in lieu of jackhammers and therefore not operated at the same time as jackhammers. Pavement saws typically maintain speeds between 8 to 10 feet per minute (fpm) to cut pavement. The saw cutting equipment would pass by each residential property twice to cut the pavement for each side of the pipeline trench, which would take approximately 10 to 15 minutes for each side of the trench. Therefore, pavement cutting noise is expected to only last for a total of 20 to 30 minutes in front of each residential property. Operation of the grader and tractor is expected to be limited to 6 to 8 hours per day in front of each residential property for approximately two days.

[3] Equipment usage factors are estimated by the Federal Highway Administration based on a roadway tunnel project (FHWA, 2017).

Table 4: Estimated Daytime Construction Noise Levels at Closest Property Lines

Pipeline and Closest Noise-Sensitive Property Location	Construction Activity	Maximum Noise Source	Reference Noise Level, Lmax in dBA at 50 feet[a]	Reference Noise Level Exceeds 83-dBA (Lmax) Ordinance Limit at 50 feet? (Impact NOI-1)	Distance Between Project and Closest Property Line[b]	Noise Level Adjustment for Distance	Assumed Usage Factor[c]	Noise Level Adjustment for Usage	Leq Noise Level Adjusted for Distance and Usage	Adjusted Noise Level Exceeds 80-dBA (Leq) Ordinance Limit at Closest Property Line? (Impact NOI-1)	Impact NOI-1 Significance Determination[d]	Duration of Active Construction	Impact NOI-2 Significance Determination With Duration Considered[e]
Open Trench Pipeline Construction													
Closest residential properties on Leland Drive, Condit Road, and Windsor Drive	Pavement Cutting	Pavement Saw	**90**	Yes	15	10	20%	-7	**93**	Yes	SU	≤10 days	LS
		Jackhammer with Jacket[f]	**84**	Yes	15	10	20%	-7	**87**	Yes	SU	≤10 days	LS
	Excavation and Pipe Installation	Excavator	81	No	15	10	40%	-4	**87**	Yes	LS	≤10 days	LS
		Grader	**85**	Yes	15	10	40%	-4	**91**	Yes	SU	≤10 days	LS
		Concrete Mixer Truck	79	No	15	10	40%	-4	**85**	Yes	LS	≤10 days	LS
		Dump Truck	76	No	15	10	40%	-4	**82**	Yes	LS	≤10 days	LS
		Backhoe	78	No	15	10	40%	-4	**84**	Yes	LS	≤10 days	LS
		Front End Loader	79	No	15	10	40%	-4	**85**	Yes	LS	≤10 days	LS
		Tractor	**84**	Yes	15	10	40%	-4	**90**	Yes	SU	≤10 days	LS
		Dewatering Pump	45	No	15	10	100%	0	55	No	LS	≤10 days	LS
		Welder/Torch	74	No	15	10	40%	-4	80	No	LS	≤10 days	LS
		Compressor	78	No	15	10	40%	-4	**84**	Yes	LS	≤10 days	LS
		Generator	81	No	15	10	50%	-3	**88**	Yes	LS	≤10 days	LS
	Repaving	Paver	77	No	15	10	50%	-3	**84**	Yes	LS	≤10 days	LS
		Roller	80	No	15	10	20%	-7	**83**	Yes	LS	≤10 days	LS
		Compactor	80	No	15	10	20%	-7	**83**	Yes	LS	≤10 days	LS
		Sweeper	82	No	15	10	10%	-10	**82**	Yes	LS	≤10 days	LS
The Meher Schools on Leland Drive	Pavement Cutting	Pavement Saw	**90**	Yes	15	10	20%	-7	**93**	Yes	SU	≤10 days	LS
		Jackhammer with Jacket[f]	**84**	Yes	15	10	20%	-7	**87**	Yes	SU	≤10 days	LS
	Excavation and Pipe Installation	Excavator	81	No	15	10	40%	-4	**87**	Yes	LS	≤10 days	LS
		Grader	**85**	Yes	15	10	40%	-4	**91**	Yes	SU	≤10 days	LS
		Concrete Mixer Truck	79	No	15	10	40%	-4	**85**	Yes	LS	≤10 days	LS
		Dump Truck	76	No	15	10	40%	-4	**82**	Yes	LS	≤10 days	LS
		Backhoe	78	No	15	10	40%	-4	**84**	Yes	LS	≤10 days	LS
		Front End Loader	79	No	15	10	40%	-4	**85**	Yes	LS	≤10 days	LS
		Tractor	**84**	Yes	15	10	40%	-4	**90**	Yes	SU	≤10 days	LS
		Dewatering Pump	45	No	15	10	100%	0	55	No	LS	≤10 days	LS
		Welder/Torch	74	No	15	10	40%	-4	80	No	LS	≤10 days	LS
		Compressor	78	No	15	10	40%	-4	**84**	Yes	LS	≤10 days	LS
		Generator	81	No	15	10	50%	-3	**88**	Yes	LS	≤10 days	LS
	Repaving	Paver	77	No	15	10	50%	-3	**84**	Yes	LS	≤10 days	LS
		Roller	80	No	15	10	20%	-7	**83**	Yes	LS	≤10 days	LS
		Compactor	80	No	15	10	20%	-7	**83**	Yes	LS	≤10 days	LS
		Sweeper	82	No	15	10	10%	-10	**82**	Yes	LS	≤10 days	LS

NOTES: Under Impact NOI-1, noise levels in **BOLD** exceed the referenced ordinance noise limit.

[a] Reference noise levels are based on the actual measured Lmax noise levels at 50 feet that are listed in Table 9.1 (RCNM Default Noise Emissions Reference Levels and Usage Factors) of the FHWA Roadway Construction Noise Model (2017).

[b] Distances represent typical minimum setback distances from the closest property lines/rights-of-way to 7 feet from the curb, which is the closest possible location where most construction equipment would operate.

[c] Acoustical usage factors are estimated based on on extensive measurements taken by FHWA (2017) in conjunction with the Central Artery/Tunnel Project and intended for noise modeling purposes. The acoustical usage factors represent the percentage of time that a particular item of equipment is assumed to be running at full power (i.e., loudest condition) during a construction operation.

[d] Significance is determined by comparing project-related nosie levels to the 83-dBA (Lmax) at 50 feet ordinance limit and the 80-dBA (Leq) ordinance limit. If only one of the two noise limits is exceeded, the construction activity is considered to be consistent with the ordinance, a less-than-significant noise impact. However, if both noise limits are exceeded, the construction activity is considered to conflict with the ordinance, and the impact would be significant.

[e] Under Impact NOI-2, adjusted noise levels exceeding the 80-dBA (Leq) ordinance limit for longer than two weeks (10 weekdays) is considered to be a significant noise impact.

[f] Jackhammers typically generate noise levels of 89 dBA (Lmax) at 50 feet, but when equipped with an external jacket, noise can be reduced to 84 dBA (Lmax) at 50 feet.

Table 4: Estimated Daytime Construction Noise Levels at Closest Property Lines (Continued)

Pipeline and Closest Noise-Sensitive Property Location	Construction Activity	Maximum Noise Source	Reference Noise Level, Lmax in dBA at 50 feet[a]	Reference Noise Level Exceeds 83-dBA (Lmax) Ordinance Limit at 50 feet? (Impact NOI-1)	Distance Between Project and Closest Property Line[b]	Noise Level Adjustment for Distance	Assumed Usage Factor[c]	Noise Level Adjustment for Usage	Leq Noise Level Adjusted for Distance and Usage	Adjusted Noise Level Exceeds 80-dBA (Leq) Ordinance Limit at Closest Property Line? (Impact NOI-1)	Impact NOI-1 Significance Determination[d]	Duration of Active Construction	Impact NOI-2 Significance Determination With Duration Considered[e]
Reservoir Replacement													
Demolition of Existing Reservoir and Tank Construction													
Closest residential properties to the east on Leland Drive	Vegetation Clearing	Chain Saws	**85**	Yes	175	-11	10%	-10	64	No	LS	≤10 days	LS
		Wood Chipper	**90**	Yes	175	-11	10%	-10	69	No	LS	≤10 days	LS
	Demolition and Construction	Excavator	81	No	350	-17	40%	-4	60	No	LS	>10 days	LS
		Grader	**85**	Yes	350	-17	40%	-4	64	No	LS	>10 days	LS
		Concrete Mixer Truck	79	No	350	-17	40%	-4	58	No	LS	>10 days	LS
		Dump Truck	76	No	350	-17	40%	-4	55	No	LS	>10 days	LS
		Backhoe	78	No	350	-17	40%	-4	57	No	LS	>10 days	LS
		Front End Loader	79	No	350	-17	40%	-4	58	No	LS	>10 days	LS
		Tractor	**84**	Yes	350	-17	40%	-4	63	No	LS	>10 days	LS
		Hoe Ram (Impact Hammer)	**90**	Yes	350	-17	20%	-7	66	No	LS	>10 days	LS
		Crane	**85**	Yes	350	-17	16%	-8	60	No	LS	>10 days	LS
		Concrete Crusher	**90**	Yes	350	-17	50%	-3	70	No	LS	>10 days	LS
		Compressor	78	No	350	-17	40%	-4	57	No	LS	>10 days	LS
		Generator	81	No	350	-17	50%	-3	61	No	LS	>10 days	LS
		Paver	77	No	350	-17	50%	-3	57	No	LS	>10 days	LS
		Roller	80	No	350	-17	20%	-7	56	No	LS	>10 days	LS
		Compactor	80	No	350	-17	20%	-7	56	No	LS	>10 days	LS
Closest residential properties to the northwest off Old Tunnel Road	Vegetation Clearing	Chain Saws	**85**	Yes	450	-19	10%	-10	56	No	LS	≤10 days	LS
		Wood Chipper	**90**	Yes	450	-19	10%	-10	61	No	LS	≤10 days	LS
	Demolition and Construction	Excavator	81	No	90	-5	40%	-4	72	No	LS	>10 days	LS
		Grader	**85**	Yes	90	-5	40%	-4	76	No	LS	>10 days	LS
		Concrete Mixer Truck	79	No	90	-5	40%	-4	70	No	LS	>10 days	LS
		Dump Truck	76	No	90	-5	40%	-4	67	No	LS	>10 days	LS
		Backhoe	78	No	90	-5	40%	-4	69	No	LS	>10 days	LS
		Dozer	82	No	90	-5	40%	-4	73	No	LS	>10 days	LS
		Scraper	**84**	Yes	90	-5	40%	-4	75	No	LS	>10 days	LS
		Hoe Ram (Impact Hammer)	**90**	Yes	90	-5	20%	-7	78	No	LS	>10 days	LS
		Crane	81	No	90	-5	16%	-8	68	No	LS	>10 days	LS
		Concrete Crusher	**90**	Yes	90	-5	50%	-3	**82**	Yes	LSM	>10 days	LSM
		Compressor	78	No	90	-5	40%	-4	69	No	LS	>10 days	LS
		Generator	81	No	90	-5	50%	-3	73	No	LS	>10 days	LS
		Paver	77	No	90	-5	50%	-3	69	No	LS	>10 days	LS
		Roller	80	No	90	-5	20%	-7	68	No	LS	>10 days	LS
		Compactor	80	No	90	-5	20%	-7	68	No	LS	>10 days	LS

NOTES: Under Impact NOI-1, noise levels in **BOLD** exceed the referenced ordinance noise limit.

[a] Reference noise levels are based on the actual measured Lmax noise levels at 50 feet that are listed in Table 9.1 (RCNM Default Noise Emissions Reference Levels and Usage Factors) of the FHWA Roadway Construction Noise Model (2017).

[b] Distances represent typical minimum setback distances from the closest property lines/rights-of-way to 7 feet from the curb, which is the closest possible location where most construction equipment would operate.

[c] Acoustical usage factors are estimated based on on extensive measurements taken by FHWA (2017) in conjunction with the Central Artery/Tunnel Project and intended for noise modeling purposes. The acoustical usage factors represent the percentage of time that a particular item of equipment is assumed to be running at full power (i.e., loudest condition) during a construction operation.

[d] Significance is determined by comparing project-related nosie levels to the 83-dBA (Lmax) at 50 feet ordinance limit and the 80-dBA (Leq) ordinance limit. If only one of the two noise limits is exceeded, the construction activity is considered to be consistent with the ordinance, a less-than-significant noise impact. However, if both noise limits are exceeded, the construction activity is considered to conflict with the ordinance, and the impact would be significant.

[e] Under Impact NOI-2, adjusted noise levels exceeding the 80-dBA (Leq) ordinance limit for longer than two weeks (10 weekdays) is considered to be a significant noise impact.

[f] Jackhammers typically generate noise levels of 89 dBA (Lmax) at 50 feet, but when equipped with an external jacket, noise can be reduced to 84 dBA (Lmax) at 50 feet.

Table 4: Estimated Daytime Construction Noise Levels at Closest Property Lines (Continued)

Pipeline and Closest Noise-Sensitive Property Location	Construction Activity	Maximum Noise Source	Reference Noise Level, Lmax in dBA at 50 feet[a]	Reference Noise Level Exceeds 83-dBA (Lmax) Ordinance Limit at 50 feet? (Impact NOI-1)	Distance Between Project and Closest Property Line[b]	Noise Level Adjustment for Distance	Assumed Usage Factor[c]	Noise Level Adjustment for Usage	Leq Noise Level Adjusted for Distance and Usage	Adjusted Noise Level Exceeds 80-dBA (Leq) Ordinance Limit at Closest Property Line? (Impact NOI-1)	Impact NOI-1 Significance Determination[d]	Duration of Active Construction	Impact NOI-2 Significance Determination With Duration Considered[e]
Reservoir Replacement (Continued)													
Demolition of Existing Reservoir and Tank Construction (Continued)													
Closest residential properties to the west on Maryola Court (at east end)	Vegetation Clearing	Chain Saws	**85**	Yes	280	-15	10%	-10	60	No	LS	≤10 days	LS
		Wood Chipper	**90**	Yes	280	-15	10%	-10	65	No	LS	≤10 days	LS
	Demolition and Construction	Excavator	81	No	50	0	40%	-4	77	No	LS	>10 days	LS
		Grader	**85**	Yes	50	0	40%	-4	81	No	LS	>10 days	LS
		Concrete Mixer Truck	79	No	50	0	40%	-4	75	No	LS	>10 days	LS
		Dump Truck	76	No	50	0	40%	-4	72	No	LS	>10 days	LS
		Backhoe	78	No	50	0	40%	-4	74	No	LS	>10 days	LS
		Dozer	82	No	50	0	40%	-4	78	No	LS	>10 days	LS
		Scraper	**84**	Yes	50	0	40%	-4	80	No	LS	>10 days	LS
		Hoe Ram (Impact Hammer)	**90**	Yes	50	0	20%	-7	**83**	Yes	LSM	>10 days	LS
		Crane	81	No	50	0	16%	-8	73	No	LS	>10 days	LS
		Concrete Crusher	**90**	Yes	50	0	50%	-3	**87**	Yes	LSM	>10 days	LSM
		Compressor	78	No	50	0	40%	-4	74	No	LS	>10 days	LS
		Generator	81	No	50	0	50%	-3	78	No	LS	>10 days	LS
		Paver	77	No	50	0	50%	-3	74	No	LS	>10 days	LS
		Roller	80	No	50	0	20%	-7	73	No	LS	>10 days	LS
		Compactor	80	No	50	0	20%	-7	73	No	LS	>10 days	LS
Closest residential properties to the west and southwest on Mars Court (at east end)	Vegetation Clearing	Chain Saws	**85**	Yes	60	-2	10%	-10	73	No	LS	≤10 days	LS
		Wood Chipper	**90**	Yes	60	-2	10%	-10	78	No	LS	≤10 days	LS
	Demolition and Construction	Excavator	81	No	55	-1	40%	-4	76	No	LS	>10 days	LS
		Grader	**85**	Yes	55	-1	40%	-4	80	No	LS	>10 days	LS
		Concrete Mixer Truck	79	No	55	-1	40%	-4	74	No	LS	>10 days	LS
		Dump Truck	76	No	55	-1	40%	-4	71	No	LS	>10 days	LS
		Backhoe	78	No	55	-1	40%	-4	73	No	LS	>10 days	LS
		Dozer	82	No	55	-1	40%	-4	77	No	LS	>10 days	LS
		Scraper	**84**	Yes	55	-1	40%	-4	79	No	LS	>10 days	LS
		Hoe Ram (Impact Hammer)	**90**	Yes	55	-1	20%	-7	82	No	LS	>10 days	LS
		Crane	81	No	55	-1	16%	-8	72	No	LS	>10 days	LS
		Concrete Crusher	**90**	Yes	55	-1	50%	-3	**86**	Yes	LSM	>10 days	LSM
		Compressor	78	No	55	-1	40%	-4	73	No	LS	>10 days	LS
		Generator	81	No	55	-1	50%	-3	77	No	LS	>10 days	LS
		Paver	77	No	55	-1	50%	-3	73	No	LS	>10 days	LS
		Roller	80	No	55	-1	20%	-7	72	No	LS	>10 days	LS
		Compactor	80	No	55	-1	20%	-7	72	No	LS	>10 days	LS

NOTES: Under Impact NOI-1, noise levels in **BOLD** exceed the referenced ordinance noise limit.

[a] Reference noise levels are based on the actual measured Lmax noise levels at 50 feet that are listed in Table 9.1 (RCNM Default Noise Emissions Reference Levels and Usage Factors) of the FHWA Roadway Construction Noise Model (2017).

[b] Distances represent typical minimum setback distances from the closest property lines/rights-of-way to 7 feet from the curb, which is the closest possible location where most construction equipment would operate.

[c] Acoustical usage factors are estimated based on on extensive measurements taken by FHWA (2017) in conjunction with the Central Artery/Tunnel Project and intended for noise modeling purposes. The acoustical usage factors represent the percentage of time that a particular item of equipment is assumed to be running at full power (i.e., loudest condition) during a construction operation.

[d] Significance is determined by comparing project-related nosie levels to the 83-dBA (Lmax) at 50 feet ordinance limit and the 80-dBA (Leq) ordinance limit. If only one of the two noise limits is exceeded, the construction activity is considered to be consistent with the ordinance, a less-than-significant noise impact. However, if both noise limits are exceeded, the construction activity is considered to conflict with the ordinance, and the impact would be significant.

[e] Under Impact NOI-2, adjusted noise levels exceeding the 80-dBA (Leq) ordinance limit for longer than two weeks (10 weekdays) is considered to be a significant noise impact.

[f] Jackhammers typically generate noise levels of 89 dBA (Lmax) at 50 feet, but when equipped with an external jacket, noise can be reduced to 84 dBA (Lmax) at 50 feet.

Table 4: Estimated Daytime Construction Noise Levels at Closest Property Lines (Continued)

Pipeline and Closest Noise-Sensitive Property Location	Construction Activity	Maximum Noise Source	Reference Noise Level, Lmax in dBA at 50 feet[a]	Reference Noise Level Exceeds 83-dBA (Lmax) Ordinance Limit at 50 feet? (Impact NOI-1)	Distance Between Project and Closest Property Line[b]	Noise Level Adjustment for Distance	Assumed Usage Factor[c]	Noise Level Adjustment for Usage	Leq Noise Level Adjusted for Distance and Usage	Adjusted Noise Level Exceeds 80-dBA (Leq) Ordinance Limit at Closest Property Line? (Impact NOI-1)	Impact NOI-1 Significance Determination[d]	Duration of Active Construction	Impact NOI-2 Significance Determination With Duration Considered[e]
Reservoir Replacement (Continued)													
Staging and Stockpile Areas													
Closest residential properties on Leland Drive (to the east)	Equipment Storage and Soil Stockpiling Activities	Dump Truck	76	No	50	0	40%	-4	72	No	LS	>10 days	LS
		Backhoe	78	No	50	0	40%	-4	74	No	LS	>10 days	LS
		Front End Loader	79	No	50	0	40%	-4	75	No	LS	>10 days	LS
Pipeline Tie-ins													
Closest residential properties at Laland Drive/Meek Place intersection	Pipe Cutting and Removal	Pipe Cutter	78	No	20	8	10%	-10	76	No	LS	<10 days	LS
		Backhoe	78	No	20	8	40%	-4	**82**	Yes	LS	<10 days	LS
		Front End Loader	79	No	20	8	40%	-4	**83**	Yes	LS	<10 days	LS
	Installation of Tee	Dump Truck	76	No	20	8	40%	-4	80	No	LS	<10 days	LS
		Flatbed Truck	74	No	20	8	40%	-4	78	No	LS	<10 days	LS
		Welder	74	No	20	8	40%	-4	78	No	LS	<10 days	LS
	Dewatering and Welding	Dewatering Pump	45	No	20	8	100%	0	53	No	LS	<10 days	LS
		Generator	81	No	20	8	100%	0	**89**	No	LS	<10 days	LS
Closest residential properties at Old Tunnel Road/ Windsor Drive intersection	Pipe Cutting and Removal	Pipe Cutter	78	No	15	10	10%	-10	78	No	LS	<10 days	LS
		Backhoe	78	No	15	10	40%	-4	**84**	Yes	LS	<10 days	LS
		Front End Loader	79	No	15	10	40%	-4	**85**	Yes	LS	<10 days	LS
	Installation of Tee	Dump Truck	76	No	15	10	40%	-4	**82**	Yes	LS	<10 days	LS
		Flatbed Truck	74	No	15	10	40%	-4	80	No	LS	<10 days	LS
		Welder	74	No	15	10	40%	-4	80	No	LS	<10 days	LS
	Dewatering and Welding	Dewatering Pump	45	No	15	10	100%	0	55	No	LS	<10 days	LS
		Generator	81	No	15	10	100%	0	**91**	Yes	LS	<10 days	LS

NOTES: Under Impact NOI-1, noise levels in **BOLD** exceed the referenced ordinance noise limit.

[a] Reference noise levels are based on the actual measured Lmax noise levels at 50 feet that are listed in Table 9.1 (RCNM Default Noise Emissions Reference Levels and Usage Factors) of the FHWA Roadway Construction Noise Model (2017).

[b] Distances represent typical minimum setback distances from the closest property lines/rights-of-way to 7 feet from the curb, which is the closest possible location where most construction equipment would operate.

[c] Acoustical usage factors are estimated based on on extensive measurements taken by FHWA (2017) in conjunction with the Central Artery/Tunnel Project and intended for noise modeling purposes. The acoustical usage factors represent the percentage of time that a particular item of equipment is assumed to be running at full power (i.e., loudest condition) during a construction operation.

[d] Significance is determined by comparing project-related nosie levels to the 83-dBA (Lmax) at 50 feet ordinance limit and the 80-dBA (Leq) ordinance limit. If only one of the two noise limits is exceeded, the construction activity is considered to be consistent with the ordinance, a less-than-significant noise impact. However, if both noise limits are exceeded, the construction activity is considered to conflict with the ordinance, and the impact would be significant.

[e] Under Impact NOI-2, adjusted noise levels exceeding the 80-dBA (Leq) ordinance limit for longer than two weeks (10 weekdays) is considered to be a significant noise impact.

[f] Jackhammers typically generate noise levels of 89 dBA (Lmax) at 50 feet, but when equipped with an external jacket, noise can be reduced to 84 dBA (Lmax) at 50 feet.

Source: Orion Environmental Associates (2017)

As detailed in the Project Description and described above, a number of EBMUD standard practices and procedures, applicable to all EBMUD projects, have been incorporated into the Project, and they include a wide range of noise control measures including development of a noise control and monitoring plan and requiring the contractor to implement noise control measures (e.g., mufflers or noise attenuating shield on all equipment, and construction of temporary sound barriers where impact equipment is used). Implementation of EBMUD's standard noise controls as required by Section 3.6 of EBMUD's Standard Construction Specification 01 35 44 would reduce equipment-related noise levels, but not necessarily to below either ordinance noise limit. Therefore, noise increases associated with operation of these four equipment types, despite the short duration of their operation in front of each residential property, is considered to be a significant and unavoidable impact because it would not meet either the equipment noise limit of 83 dBA at 50 feet or the 80-dBA noise limit at the property line.

Reservoir Construction. The reservoir replacement would entail demolishing the existing reservoir and replacing it with two concrete tanks within the existing reservoir basin. The loudest noise generating activities would occur during the demolition phase. During the demolition phase, vegetation and trees would be removed, the existing Leland Reservoir would be demolished, and soil stockpile and staging areas would be constructed. Demolition activities would include operation of chain saws and a wood chipper for tree removals. A hoe-ram (mounted impact hammer) and concrete crusher (recycler) would be used to break up and process the reservoir's concrete. Operation of heavy equipment would be necessary for grading the reservoir/tank locations and stockpile/staging areas. Trucks would also operate in the stockpile and staging areas as materials and equipment are stored there. As shown on **Table 4**, even with the incorporation of EBMUD's standard practices and procedures for noise control measures, much of the construction equipment noise would still have a noise level between 76 dBA to 90 dBA (L_{max}) at 50 feet and therefore could not meet the construction ordinance noise level limit of 83 dBA at 50 feet.

As indicated in **Table 4** residential receptors to the east, north, and west would be subject to noise levels related to the reservoir replacement construction of less than 80 dBA (L_{eq}) at the property line, with two exceptions. The hoe ram and concrete crusher would generate noise levels of 83 dBA (L_{eq}) and 87 dBA (L_{eq}), respectively, if they are located within 50 feet of the property line to the west, which would be at the edge of the existing reservoir facility. At this distance, operation of the hoe ram and concrete crusher would exceed both the City's 83-dBA at 50 feet and 80-dBA at the closest property line thresholds. Accordingly, use of the hoe-ram (mounted impact hammer) and concrete crusher would be considered a potentially significant impact related to noise. However, implementation of **Mitigation Measure NOI-1a** would reduce this potential impact to a less-than-significant level by requiring a temporary barrier or sufficient setbacks between the hoe ram and concrete crusher and the property line to the west. As detailed in the Project Description and described above, Section 1.3(G) of EBMUD's Standard Construction Specification 01 35 44 requires the contractor to have a noise control and monitoring plan, and Section 3.6 requires implementation of noise controls. Therefore, noise generated by the hoe ram, concrete crusher and other construction activities would be monitored and additional noise controls (e.g., construction of a sound barrier or relocation of the concrete crusher) would be implemented. Additionally, the hillside surrounding the reservoir basin would serve as a topographic noise barrier, effectively blocking construction noise generated within or east of the basin from sensitive receptors to the west, which are located closest to the reservoir site.

Pipeline Tie-Ins. The new 36-inch pipeline construction installation would need to be connected to the existing water distribution system at three connection points: (1) the intersection of Windsor Drive and Old Tunnel Road, (2) the intersection of Leland Drive and Meek Place, and (3) on the southeast side of the Leland Reservoir property. The pipeline tie-ins at the intersections of Windsor Drive/Old Tunnel Road and Leland Drive/Meek Place would require a continuous process of approximately 71 to 76 hours, with some work occurring between 8 a.m. and 8 p.m. As **Table 4** shows, noise levels related to the pipeline tie-in construction would not exceed the 80-dBA (L_{eq}) threshold at the property line, with three exceptions. The backhoe would generate noise levels of 82 to 84 dBA (L_{eq}), the front end loader would generate 83 to 85 dBA (L_{eq}), and the generator could generate 89 to 91 dBA (L_{eq}) if they are located within 15 to 20 feet of the closest property line. None of the tie-in work would exceed the Noise Ordinance's 83-dBA (L_{max}) at 50 feet limit for daytime construction activity. As indicated above, even though the 80-dBA (L_{eq}) threshold would not be met at the closest property line during operation of these three equipment types, the pipeline tie-in work is still considered to be consistent with the ordinance because the 83-dBA (L_{max}) at 50 feet threshold would be met, a less-than-significant noise impact. Additionally, pipeline tie-in activities would generate noise levels in excess of the 80-dBA (L_{eq}) threshold at the property line for only approximately three days and only when these three specific types of equipment are operated.

Construction Activities Occurring Outside 8:00 a.m. to 8:00 p.m. Timeframe

The Project's construction hours would be 7:00 a.m. to 7:00 p.m., Monday through Friday, and construction-related vehicles could travel on neighborhood streets prior to 7:00 a.m. in order to reach the site by 7:00 a.m. On a typical day, construction trucks and personnel would report to the site at 7:00 a.m. for minor tasks and meetings, and there would be morning construction-related activities between 7:00 a.m. and 8:00 a.m. A 6:00 a.m. start time is needed during reservoir foundation and roof slab concrete pour work, which is estimated to occur over a total of approximately 16 days for both tanks (approximately 8 days per tank).

Because of the Project's proximity to residential areas, construction noise occurring outside of the 8:00 a.m. to 8:00 p.m. timeframe is expected to exceed the ordinance's more stringent noise limits. The ordinance requires noise occurring between 10:00 p.m. and 7:00 a.m. to remain below 53 dBA (L_{eq}), and noise occurring between 7:00 a.m. and 8:00 a.m. to remain below 58 dBA (L_{eq}). As explained above, the Project would include work on a daily basis beginning at 7:00 a.m., as well as limited amounts of overnight and early morning work, all of which could exceed these limits.

Table 4 presents estimated Project-related construction equipment noise levels generated during typical work on the Project, including work likely to be completed prior to 8:00 a.m. As the table indicates, construction noise could exceed the Lafayette Noise Ordinance's applicable limits of 58 dBA (L_{eq}) between 7:00 a.m. and 8:00 a.m., and 53 dBA (L_{eq}) between 10:00 p.m. and 7:00 a.m., a significant noise impact. EBMUD has considered the practicability of prohibiting construction work before 8:00 a.m. in order to meet the ordinance time limit and has determined that this is not feasible because:

- Construction work must start as early in the morning as possible to allow workers, deliveries, and equipment movement to avoid the heaviest rush hour traffic on highways and roads. Deliveries may arrive early in the morning before 7:00 a.m. due to either lighter traffic or permits that prohibit travel during certain hours.
- Earlier start times also allow the work to avoid the heat of the day in summer and the darkness when the daylight hours are shorter. During summertime heatwaves, contractors will sometimes request earlier start times to avoid working throughout the heat of the day.
- Starting early in the morning also allows for a larger time buffer in the afternoon, when adhering to an 8-hour work day. The buffer can provide extra daylight hours in case the project schedule slips or a construction issue comes up during the day that must be corrected.
- Concrete work requires a 6:00 a.m. start time due to the need for setup in the morning to mobilize a pump truck prior to the first delivery of concrete. Pump trucks will typically arrive at 6:00 a.m., ahead of the rest of the concrete crew. Disruptions in the concrete pour can affect the quality of the concrete work and service life of the structure; therefore, it is extremely important that concrete trucks arrive at regular intervals, particularly later in the concrete pour. If concrete truck movement is inhibited by heavy traffic later during afternoon commute hours, the concrete pour operation could be disrupted. In addition, concrete work is affected by temperature. Early start

times ensure longer periods of time when temperatures are lower and concrete sets slower and is easier to work with.

- For concrete work that involves flat work, such as the tank floor, the concrete finishers typically stay later to finish the concrete after the remainder of the crew has gone home. Starting concrete work early allows concrete finishers to complete their work during daylight hours, or at least minimize the amount of work being performed after dark under floodlights. Finishing concrete after dark can negatively affect the quality of the concrete finish.

In addition to early morning activities, construction activities would need to extend later than the 8:00 p.m. ordinance time limits for pipeline tie-ins at Old Tunnel Road at Windsor Drive and Leland Drive at Meek Place. The entire tie-in process could require continuous work for approximately 71 to 76 hours, although the noisiest activity would occur over a 24-hour period. The tie-in process would be short-term, intermittent in nature, and would cease upon completion of the tie-in process. The process would entail some limited construction activities during nighttime (7:00 p.m. to 7:00 a.m.) weekday hours. The nighttime work would occur primarily during one 24-hour period. The tie-in process would involve: (1) approximately 5 to 7 hours to dewater and shut down existing mains (no major equipment noise sources); (2) approximately 24 hours to cut and weld the inside and outside of the each pipeline connection and valve installation (audible equipment noise would be generated during this process); (3) approximately 36 hours to apply the mortar and allow it to dry (little to no noise); and (4) approximately 6 to 9 hours to flush/chlorinate/recharge/return existing pipelines back into service (no major equipment noise sources).

Table 5 presents the estimated nighttime Project-related construction noise levels generated during the pipeline tie-in process at the closest property line based on distance, equipment type and duration of equipment use. As indicated in **Table 5**, Project-related nighttime construction equipment noise levels at the closest property line to tie-in sites are estimated to range between 53 and 91 dBA (L_{eq}) at the closest property line. Noise levels from all equipment proposed to be used (except dewatering pumps) would exceed the 53-dBA nighttime and 58-dBA early morning thresholds at the closest property lines for one night when pipeline cutting and welding occur, which would be a significant impact. As detailed in the Project Description and described above, a number of EBMUD standard practices and procedures, applicable to all EBMUD projects, have been incorporated into the Project. Sections 1.3G and 3.6 of EBMUD's Standard Construction Specification 01 35 44 require implementation of a wide range of noise control measures including development of a noise control and monitoring plan and requiring the contractor to implement noise control measures (e.g., mufflers or noise attenuating shield on all equipment, and construction of temporary sound barriers where impact equipment is used). Implementation of EBMUD's standard noise controls, provision of alternative lodging for affected residents as described in **Mitigation Measure NOI-1b,** and assignment of an EBMUD contact person as a community-construction liaison as specified in **Mitigation Measure NOI-1c** would reduce this impact but not to a less-than-significant level because nighttime construction noise would not meet noise ordinance limits. As a result, the noise impacts associated with nighttime construction at the tie-in sites for one night are considered to be significant and unavoidable.

In summary, Project construction hours would extend one hour earlier than ordinance time limits (7:00 a.m. versus 8:00 a.m.) on most days and two hours earlier than ordinance time limits (6:00 a.m. versus 8:00 a.m. on reservoir foundation and roof slab concrete pour days) for 16 days during the 3+ year construction duration. Additionally, Project construction activities would extend overnight for two days (7:00 p.m. to 7:00 a.m.) for the two tie-in locations (one night per tie-in) and construction noise levels during this work would exceed the applicable noise level limits set forth in Lafayette's Noise Ordinance. These conflicts with the ordinance for overnight and early morning work are considered to be a significant and unavoidable noise impact.

Significance Determination before Mitigation

Significant.

Table 5: Estimated Nighttime Construction Noise Levels at Closest Property Lines

Pipeline and Closest Noise-Sensitive Property Location	Construction Activity	Maximum Noise Source	Reference Noise Level, Lmax in dBA at 50 feet[a]	Distance Between Project and Closest Property Line[b]	Noise Level Adjustment for Distance	Assumed Usage Factor[c]	Noise Level Adjustment for Usage	Leq Noise Level Adjusted for Distance and Usage	Adjusted Noise Level Exceeds 53-dBA (Leq) Ordinance Limit (10 p.m. to 7 a.m.) at Closest Property Line?	Adjusted Noise Level Exceeds 58-dBA (Leq) Ordinance Limit (7 a.m. to 8 a.m.) at Closest Property Line? (Impact	Duration of Active Construction
Pipeline Tie-ins											
Closest residential properties at Laland Drive/Meek Place intersection	Pipe Cutting and Removal	Pipe Cutter	78	20	8	10%	-10	76	**Yes**	**Yes**	24 hours
		Backhoe	78	20	8	40%	-4	82	**Yes**	**Yes**	24 hours
		Front End Loader	79	20	8	40%	-4	83	**Yes**	**Yes**	24 hours
	Installation of Tee	Dump Truck	76	20	8	40%	-4	80	**Yes**	**Yes**	24 hours
		Flatbed Truck	74	20	8	40%	-4	78	**Yes**	**Yes**	24 hours
		Welder	74	20	8	40%	-4	78	**Yes**	**Yes**	24 hours
	Dewatering and Welding	Dewatering Pump	45	20	8	100%	0	53	No	No	up to 76 hours
		Generator	81	20	8	100%	0	89	**Yes**	**Yes**	24 hours
Closest residential properties at Old Tunnel Road/ Windsor Drive intersection	Pipe Cutting and Removal	Pipe Cutter	78	15	10	10%	-10	78	**Yes**	**Yes**	24 hours
		Backhoe	78	15	10	40%	-4	84	**Yes**	**Yes**	24 hours
		Front End Loader	79	15	10	40%	-4	85	**Yes**	**Yes**	24 hours
	Installation of Tee	Dump Truck	76	15	10	40%	-4	82	**Yes**	**Yes**	24 hours
		Flatbed Truck	74	15	10	40%	-4	80	**Yes**	**Yes**	24 hours
		Welder	74	15	10	40%	-4	80	**Yes**	**Yes**	24 hours
	Dewatering and Welding	Dewatering Pump	45	15	10	100%	0	55	**Yes**	No	up to 76 hours
		Generator	81	15	10	100%	0	91	**Yes**	**Yes**	24 hours

NOTES: Noise levels in BOLD indicate a significant impact because they exceed either the 53-dBA (Leq) ordinance noise limit during the nighttime hours (10:00 p.m. to 7:00 a.m.) or 58-dBA (Leq) ordinance noise limit in the early morning hours (7:00 a.m. to 8:00 a.m.) at the property line.

[a] Reference noise levels are based on the actual measured Lmax noise levels at 50 feet that are listed in Table 9.1 (RCNM Default Noise Emissions Reference Levels and Usage Factors) of the FHWA Roadway Construction Noise Model (2017). Reference noise level for a pipe cutter is based on the reference noise level for a hot tapping machine.

[b] Distances represent typical minimum setback distances from the closest property line to the tie-in-location.

[c] Acoustical usage factors are estimated based on on extensive measurements taken by FHWA (2017) in conjunction with the Central Artery/Tunnel Project and intended for noise modeling purposes. The acoustical usage factors represent the percentage of time that a particular item of equipment is assumed to be running at full power (i.e., loudest condition) during a construction operation.

[d] Significance is determined by comparing projecct-related noise levels to the 53-dBA (Leq) nighttime and 58-dBA (Leq) early morning ordinance noise limits. If either of these limits would be exceeded, the construction activity is considered to have a significant noise impact.

[e] Under Impact NOI-2, adjusted noise levels exceeding the 53-dBA or 58-dBA (Leq) ordinance limits for any amount of time is considered to be a significant noise impact.

Source: Orion Environmental Associates (2017)

Mitigation Measures

Mitigation Measure NOI-1a: Noise Control Measures for Hoe Ram and Concrete Crusher

During reservoir construction, EBMUD shall locate the concrete crusher within the reservoir basin (east of the access road) and at least 110 feet away from the closest property line to the west. During periods when the hoe ram needs to be operated within 70 feet of the closest property line to the west, a temporary noise barrier will be erected as necessary to ensure that the noise from the hoe ram does not exceed the 80-dBA (L_{eq}) ordinance limit at the western property line.

Mitigation Measure NOI-1b: Nighttime Construction Measure

EBMUD will provide alternative lodging for residents, if requested, that are adversely affected by nighttime pipeline tie-in construction at Windsor Drive /Old Tunnel Road and Leland Drive /Meek Place. This measure would only be implemented if nighttime construction occurs. EBMUD will notify residents that could be affected by nighttime project construction at least ten (10) days in advance. Residences within 500 feet of the tie-in construction sites and with a direct line-of-sight[4] who could be significantly affected by nighttime construction may request alternative lodging for the night(s) of the potential nighttime construction from EBMUD; alternative lodging will consist of a standard room at a hotel located within 6 miles of the affected residence or as close as feasible. Alternative lodging will be provided and approved by EBMUD the day before the known nighttime construction occurs, or sooner, based upon the types of construction activities that may occur during the nighttime hours (10:00 p.m. to 7:00 a.m.).

Mitigation Measure NOI-1c: Construction Liaison

EBMUD will maintain ongoing communication with residents adjacent to active construction areas. The following measures would be implemented during construction of the proposed Project.

- An EBMUD contact person will be designated to respond to construction-related issues, including noise. The phone number of the liaison will be conspicuously posted at construction areas, on all advanced notifications, and on the EBMUD Project website. The EBMUD contact person will take steps to resolve complaints, including coordinating periodic noise monitoring, if necessary.
- Residents located within 500 feet of project construction and with a direct line-of-sight to the construction area will be notified at least seven (7) days in advance of noisy activities and about the estimated duration of the activity. EBMUD will also send emails to individuals on the Project's mailing list to update them prior to noisy phases.

Significance Determination after Mitigation

The impacts of Project construction occurring outside of the noise ordinance's 8:00 a.m. to 8:00 p.m. timeframe for relaxed construction noise standards would be significant and unavoidable because construction noise prior to 7:00 a.m. could exceed the Lafayette Noise Ordinance's applicable limits of 58 dBA (L_{eq}) between 7:00 a.m. and 8:00 a.m. and 53 dBA between 10:00 p.m. and 7:00 a.m. (See **Table 5**).

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[4] The 500-foot distance applies only to residences with a direct line-of-sight to construction activities, and is determined by applying spherical spreading losses (6 dBA per doubling of distance) to a noise level of 80 dBA (L_{eq}) at 50 feet, resulting in a noise level of 60 dBA (L_{eq}) at 500 feet. While an exterior noise level of 60 dBA (L_{eq}) would still exceed the 53-dBA nighttime ordinance threshold, the exterior shell of a house can reduce exterior noise levels by 25 dBA with the windows closed, which would result in an interior level of 35 dBA (L_{eq}) with windows closed. Based on available sleep criteria data, an interior nighttime level of 35 dBA is considered acceptable (U.S. EPA, 1974). The requirement that windows must be closed to achieve this acceptable level is assumed to be feasible since exposure would only be for one night.

EBMUD has considered the practicability of prohibiting construction work before 8:00 a.m. in order to meet the ordinance time limit and has determined that this is not feasible, as detailed above.

In addition, as explained above, nighttime work is also required to complete the Project's pipeline tie-ins. The nighttime pipeline tie-in construction work would violate the Lafayette Noise Limit Ordinance of 53 dBA (L_{eq}) for nighttime noise. Implementation of **Mitigation Measure NOI-1b** would mitigate noise impacts associated with pipeline tie-ins by providing affected residents with the option to temporarily relocate to alternative lodging. However, **Mitigation Measure NOI-1b** would not necessarily reduce this impact to a less-than-significant level because residents may choose not to move to alternative lodging for one night and therefore would be subject to nighttime noise. Per **Mitigation Measure NOI-1c**, EBMUD will also maintain ongoing communication with residents and will address noise issues during construction, but this impact would remain significant and unavoidable because the Project would not comply with the noise ordinance.

Construction noise generated during the noise ordinance's 8:00 a.m. to 8:00 p.m. timeframe for relaxed construction noise standards could also exceed either the ordinance's noise limits of 83 dBA (L_{max}) at 50 feet or 80 dBA (L_{eq}) at the closest property line. As explained above, exceedance of only one of the two noise limits would be a less-than-significant noise impact, but exceedance of both noise limits would be a significant noise impact. Both limits would be exceeded when four equipment types are operated during pipeline construction and when the hoe-ram (mounted impact hammer) and concrete crusher are operated during reservoir construction. Implementation of **Mitigation Measure NOI-1a**, which requires a temporary noise barrier or minimum set back from the closest property line to the west of 70 feet for the hoe ram and 110 feet for the concrete crusher, would reduce the noise impact of reservoir construction to a less-than-significant level. However, implementation of EBMUD's standard noise controls on the pavement saw, jackhammer, grader, and tractor would not necessarily reduce their noise levels to below either ordinance noise limit. Therefore, noise increases associated with operation of these four equipment types, despite the short duration of their operation in front of each residential property, would be significant and unavoidable.

Impact NOI-2 Result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project. (Criterion 2)

Noise Limit Considerations

The following noise limit considerations were applied to determine whether a noise increase is considered to be a "substantial" temporary or periodic noise increase:

1. For daytime construction noise: Impacts would be significant if temporary noise increases from construction activities greater than 80 dBA (L_{eq}) during the day (7:00 a.m. to 10:00 p.m.) at the closest property line of any sensitive receptor occurred for more than two consecutive weeks (10 work days).
2. For nighttime construction noise: Temporary noise increases that cause sleep disturbance for any duration are considered to cause significant impacts.
3. For noise generated by construction-related traffic: Traffic noise increases that result in the ambient noise environment becoming "unacceptable" for the affected land use (as defined in the City of Lafayette's General Plan Noise Element Land Use and Noise Compatibility standards) for more than two consecutive weeks (10 work days) would be considered a significant impact. These standards consider noise levels up to 75 dBA (L_{dn}) to be "conditionally acceptable" for residential and school uses (see **Table 3**).

Each piece of construction equipment is evaluated as a "point source" and is perceived as a single source of noise at a specific location (such as the reservoir site or active pipeline construction area), and thus construction noise impacts are evaluated based on the 80-dBA (L_{eq}) noise limit defined in the City's

Noise Ordinance. A temporary noise increase that exceeds 80 dBA (L_{eq}) during the day (7:00 a.m. to 10:00 p.m.) and affects any given receptor for more than two consecutive weeks (10 work days) is considered to be a noticeable, but less-than-significant temporary impact. However, if such an increase occurs for longer than two consecutive weeks at any given receptor, the increase in ambient noise levels in the project vicinity is considered to be a significant temporary impact.

In contrast to noise generated by individual equipment (point sources), when noise is generated by many passing vehicles traveling along a roadway, all of the vehicles traveling along a roadway are evaluated as a single "line source" and this source affects the noise environment along the entire roadway. The change in the ambient noise environment due to project-related traffic noise is thus evaluated using the City's Land Use and Noise Compatibility standards because these standards consider whether the noise level is acceptable for a residential area. Any traffic increase that results in traffic noise levels along local streets remaining below the 75-dBA (L_{dn}) noise level, which is considered "conditionally acceptable" for residential and school uses, is considered to be a less-than-significant impact. However, if traffic noise increases cause noise levels along local streets to exceed the 75-dBA (L_{dn}) noise level and also occur for more than two weeks, the increase is considered to be a significant temporary impact.

A temporary nighttime noise increase that causes interior noise levels to exceed 35 dBA (L_{eq}) with the windows closed for any duration, even one night, is considered significant. Based on available sleep criteria data, an interior nighttime level of 35 dBA is considered acceptable (U.S. EPA, 1974). The requirement that windows must be closed to achieve this acceptable level is assumed to be feasible since exposure would only be for one night. The exterior shell of a house typically reduces exterior noise levels by 25 dBA with the windows closed. To maintain an interior level of 35 dBA (L_{eq}) with windows closed, exterior noise levels should not exceed 60 dBA (L_{eq}).

Construction Equipment Noise Increases

Pipeline Construction. As shown in **Table 4**, Project-related construction equipment noise levels adjacent to the pipeline alignment are estimated to range between 55 and 93 dBA (L_{eq}) at the closest property lines. Noise levels would exceed the 80-dBA threshold over approximately 7 to 8 work days at the closest property lines. While noise levels exceeding 80-dBA would indicate a considerable noise increase, each individual residential receptor would be subject to noise increases for less than two weeks (10 work days) as pipeline construction progresses down the street. Although such temporary noise increases would be noticeable, the noise increases are considered to be less than significant because the potential exposure duration at any given receptor would be less than two weeks.

A portion of the pipeline alignment would extend along the sections of Leland Drive and Condit Road where The Meher Schools are located. Construction activities could be located as close as 15 feet from the closest property line, but much farther from the closest school building (130 feet away). As shown in **Table 4**, Project-related construction noise levels of up to 93 dBA (L_{eq}) would occur at the closest property line, but noise levels outside the closest school building would be up to 75 dBA (L_{eq}), which would exceed the 80-dBA threshold at the property line but not at the closest school building. As stated in the Project Description, EBMUD proposes to schedule pipeline construction directly in front of The Meher Schools when school is not in session to minimize disruption of school activities as well as interruption of the pipeline construction in front of The Meher Schools. Due to the construction of the pipeline during non-school hours, the potential for adverse noise effects on classroom activities would be avoided, resulting in a less-than-significant impact.

Small dewatering pumps could operate occasionally along the pipeline alignment if dewatering is required (e.g., after rainfall). The pumps would be similar in size to the pumps used for swimming pools (about 1.5 horsepower) and typically generate noise levels of approximately 45 dBA (L_{eq}) at 50 feet. At distances of 15 to 20 feet, the pumps would generate noise levels of 53 to 55 dBA (L_{eq}) at the closest property lines, but noise levels would actually be lower since they would be located at the bottom of the pipeline trenches. Regardless of their locations, pump noise associated with the pipeline installation would not exceed the 80-dBA noise limit during the day (see **Table 4**), resulting in a less-than-significant impact.

Reservoir Construction. As shown in **Table 4**, the majority of the construction activities related to the reservoir replacement would exceed two weeks (10 work days). Construction equipment noise levels are estimated to range between 55 and 87 dBA (L_{eq}) at the closest property lines. Operation of most equipment would not exceed the 80-dBA (L_{eq}) limit, but there would be two exceptions. Operation of the hoe ram and concrete crusher along the western edge of the reservoir site would exceed the 80-dBA (L_{eq}) threshold for longer than 10 work days, and this would be a significant noise impact. However, this impact would be reduced to a less-than-significant level with implementation of **Mitigation Measure NOI-1a**, which requires that a noise barrier be used or that this equipment be sufficiently set back from residences to the west so as to not exceed the 80-dBA (L_{eq}) noise limit during the day.

Pipeline Tie-ins. As indicated in **Table 5**, operation of all construction equipment (except the dewatering pump) during the nighttime hours would exceed the 60-dBA (L_{eq}) threshold for nighttime noise at the closest property lines. Although residences would be set back farther (about 65 feet away) from tie-in locations, at this distance, exterior noise levels would be lower (ranging from 66 to 73 dBA for all equipment except the quieter dewatering pump), but would still exceed the 60-dBA (L_{eq}) threshold for one night at two tie-in-locations (near the Windsor Drive/Old Tunnel Road and Leland Drive/Meek Place intersections). Such noise levels during the noise-sensitive nighttime hours could result in sleep disturbance on one night at these two tie-in locations, which is considered to be a significant impact. Implementation of **Mitigation Measure NOI-1b**, provision of alternative lodging for affected residents, would reduce this impact but not necessarily to a less-than-significant level because residents may choose not to move to alternative lodging for one night and would be subject to nighttime noise. As a result, the potential sleep disturbance effects of nighttime construction at the tie-in sites for one night are considered to be significant and unavoidable.

Truck Traffic Increases on Local Roadways

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 environments or during quieter times of the day, truck noise is mainly a single-event disturbance. Although the hourly average noise level associated with short, single events is not very high, individual noise peaks of 75 to 80 dBA at 50 feet are common during a truck passage.[5] However, in noisy environments or during less noise-sensitive daytime hours, truck noise is perceived as part of the total noise environment rather than as an individual disturbance. Therefore, this analysis focuses on noise levels associated with hourly haul truck volumes (rather than a single passing truck).

As indicated in the Project's traffic impact study (CHS Consulting Group, 2017), truck and worker vehicle volumes would vary with each construction phase. In order to assess the Project's maximum traffic noise impact, the maximum hourly truck and worker vehicle volumes estimated in the Project's traffic impact analysis were assigned to two primary routes: (1) Leland Drive, Old Tunnel Road, and possibly Condit Road; and (2) Leland Drive, Condit Road, Windsor Drive, and Old Tunnel Road. Even though any neighborhood street between the Project site and Pleasant Hill Road could be used, it is expected that most project-related construction traffic associated with reservoir replacement would use the first route, while construction traffic associated with the pipeline work would use the second route. However, by assigning all construction-related traffic equally to each street along these routes, this analysis evaluates the maximum noise increase that could occur on any neighborhood street during the construction of the pipeline and reservoir replacement. If construction traffic were to travel on more than one route, then the incremental increase on each route would be less than the maximum estimated

[5] California Vehicle Code (Section 27204) limits noise from trucks to 80 dBA (models after 1987).

increase for a particular street. While it is possible that vehicles would be more distributed over the neighborhood street network depending on the location of construction activities, it is expected that most would use the shortest, most direct route to access the reservoir site.

Table 6 presents estimated maximum hourly traffic noise increases along access routes by adding maximum hourly Project-related traffic increases to maximum (PM peak hour) traffic levels (L_{eq}) on neighborhood streets. **Table 6** also presents maximum 24-hour (Ldn) traffic noise increases along access routes by adding maximum Project-related early morning[6] and daytime traffic increases to existing 24-hour noise levels (L_{dn}) on neighborhood streets. In general, residential streets in the Project vicinity carry very low levels of traffic, and therefore truck traffic increases would likely be noticeable. However, the noise environment in the Project vicinity is influenced by traffic noise from the nearby SR 24 freeway and Pleasant Hill Road. Noise measurements indicate that ambient noise levels in the Project vicinity range from 52 to 59 dBA (L_{dn}, see **Table 2**) depending on proximity to the freeway. In contrast, when noise levels on residential streets in the Project vicinity are estimated based on traffic volumes, modeled noise levels are generally 1 to 3 dBA lower than measured noise levels (Leland Drive: 51 dBA (L_{dn}) modeled versus 52 to 53 dBA (L_{dn}) measured; Old Tunnel Road: 54 to 56 dBA (L_{dn}) modeled versus 57 to 59 dBA (L_{dn}) measured; see **Table 2** for measured noise levels and **Table 6** for modeled noise levels). Given the influence of freeway noise on the ambient noise environment, the analysis evaluates not only the incremental change in noise that would result from increased traffic on neighborhood streets but also the change in ambient noise levels as a result of this incremental change.

Pipeline Construction. As indicated in **Table 6**, maximum hourly traffic volumes generated during pipeline construction would result in incremental L_{eq} increases of 2 dBA to 5 dBA along neighborhood streets during any given hour. A 3-dBA change is perceptible while a 5-dBA change is readily noticeable and therefore, traffic noise increases associated with pipeline construction could be noticeable on streets like Windsor Drive and Leland Drive, but barely perceptible on Old Tunnel Road and Condit Road. When the maximum hourly Project-related early morning and daytime traffic increases are added to existing 24-hour noise levels (L_{dn}) along neighborhood streets, similar Project-related noise increases of 2 to 5 dBA (L_{dn}) could occur, which would also be readily noticeable on some neighborhood streets. However, noise levels would remain at levels considered "conditionally acceptable" for residential and school uses (the City of Lafayette's Land Use and Noise Compatibility Standards [**Table 3**] identifies noise levels of up to 75 dBA [L_{dn}] as "conditionally acceptable"), even when measured background noise levels that are 1 to 3 dBA higher are considered. Therefore, traffic noise increases on neighborhood streets during the pipeline construction duration could be noticeable but considered to be less than significant because the residential noise environment would continue to be "conditionally acceptable."

Reservoir Construction. During most of the three-year reservoir construction duration, truck and worker traffic increases would result in barely perceptible noise increases of up to 3 dBA (L_{eq} and L_{dn}) on Old Tunnel Road and Condit Road, and more noticeable increases of up to 5 dBA on Leland Drive (see **Table 6**). However, there would be two periods with higher traffic noise increases: (1) during reservoir demolition, open cut excavation and soil hauling would result in traffic noise increases of 5 dBA (L_{eq} and L_{dn}) on Old Tunnel Road and Condit Road and readily noticeable increases of 8 dBA on Leland Drive for 120 work days (24 weeks); and (2) during the concrete pours for both tank foundations, noticeable noise increases of 6 to 7 dBA (L_{eq}) and 8 to 9 dBA (L_{dn}) would occur on Old Tunnel Road and Condit Road while very noticeable increases of 10 dBA (L_{eq}) and 11 dBA (L_{dn}) would occur on Leland Drive for 8 work days. After the tank walls are constructed, concrete pours for both roof slabs would again result in

[6] When calculating L_{dn} noise levels, a 10-dBA penalty is added to any traffic increases occurring between 10 p.m. and 7 a.m. Therefore, a 10-dBA penalty was added to truck traffic increases occurring between 6:30 a.m. to 7:00 a.m., with a slightly earlier start time of 5:30 a.m. to 7:00 a.m. on the 16 concrete pour days.

Table 6: Estimated Construction Traffic Noise Increases

Segment	Noise Level (dBA) at 50 Feet from Roadway Centerline					
	Existing Leq	Existing + Project Leq	Change	Existing Ldn	Existing + Project Ldn	Change
Pipeline Construction						
Pipeline Installation (With Addition of Maximum 4 Trucks and 24 Cars Per Hour Over 35 Days)						
Old Tunnel Rd. (East of Pleasant Hill Rd.)	57	59	2	56	58	2
Old Tunnel Rd. (West of Windsor Dr.)	56	58	2	55	57	3
Old Tunnel Rd. (Windsor Dr. to Leland Dr.)	55	58	3	54	57	3
Windsor Dr. (South of Old Tunnel Rd.)	51	56	5	50	56	5
Windsor Dr. (North of Condit Rd.)	53	57	4	52	56	4
Condit Rd. (West of Windsor Dr.)	56	58	2	55	57	3
Condit Rd. (East of Windsor Dr.)	56	58	2	55	58	3
Leland Dr. (South of Old Tunnel Road)	52	56	4	51	56	5
Reservoir Construction						
Most Demolition Activities, Tank Walls/Pipeline/Storm Drain Construction Activities, and Site Restoration Activities (With Addition of Maximum 1 to 4 Trucks and 2 to 24 Cars Per Hour Over 3 Years)						
Old Tunnel Rd. (East of Pleasant Hill Rd.)	57	57-59	1-3	56	56-58	1-3
Old Tunnel Rd. (West of Windsor Dr.)	56	57-59	1-3	55	55-57	1-3
Old Tunnel Rd. (Windsor Dr. to Leland Dr.)	55	56-59	1-3	54	55-27	1-3
Condit Rd. (West of Windsor Dr.)	56	57-59	1-3	55	56-58	1-3
Condit Rd. (East of Windsor Dr.)	56	57-59	1-3	55	56-58	1-3
Leland Dr. (South of Old Tunnel Road)	52	54-57	2-5	51	53-56	2-5
Open Cut Excavation and Soil Hauling (With Addition of Maximum 10 Trucks and 10 Cars Per Hour Over 120 Days)						
Old Tunnel Rd. (East of Pleasant Hill Rd.)	57	61	5	56	60	5
Old Tunnel Rd. (West of Windsor Dr.)	56	61	5	55	60	5
Old Tunnel Rd. (Windsor Dr. to Leland Dr.)	55	61	6	54	60	5
Condit Rd. (West of Windsor Dr.)	56	61	5	55	60	5
Condit Rd. (East of Windsor Dr.)	56	61	5	55	60	5
Leland Dr. (South of Old Tunnel Road)	52	60	8	51	60	8
Concrete Foundation and Roof Slab (With Addition of Maximum of up to 16 Trucks and up to 23 Cars Per Hour Over 16 Days[a])						
Old Tunnel Rd. (East of Pleasant Hill Rd.)	57	63	6	56	63	8
Old Tunnel Rd. (West of Windsor Dr.)	56	63	7	55	63	8
Old Tunnel Rd. (Windsor Dr. to Leland Dr.)	55	62	7	54	63	9
Condit Rd. (West of Windsor Dr.)	56	63	7	55	63	8
Condit Rd. (East of Windsor Dr.)	56	63	7	55	63	8
Leland Dr. (South of Old Tunnel Road)	52	62	10	51	63	11

Notes: Because the adjusted noise levels have been rounded to the nearest whole number, the difference/change may vary by up to 1 dBA. Traffic noise modeling completed using FHWA RD-77-108 model. Assumptions include: travel speeds of 25 mph on local streets (posted speed limit); vehicle mixes based on heavy vehicle counts included in data collected by CHS Consulting Group in June 2016; and construction-related vehicles could travel on neighborhood streets as early as 6:30 a.m. and as late as 7:30 p.m. based on proposed construction hours of 7:00 a.m. to 7:00 p.m., even though most work days would only be 8 to 10 hours long. Background noise levels due to traffic on other roadways (e.g. Pleasant Hill Rd or SR 24) and non-traffic-related activities are not reflected in these noise levels. Noise levels in this table are intended to indicate incremental noise changes during Project construction. Based on noise measurements collected on Old Tunnel Road and Leland Drive, actual noise levels can be slightly higher, depending on location and exposure to freeway noise.

[a] Maximum hourly volume of 16 trucks and 23 cars is the maximum construction volume expected during the reservoir construction phase of the project. The reservoir construction maximum hourly volume is specific to the concrete foundation slab pour days for the two new concrete tanks. Each foundation slab would require four concrete pours, eight pours total for both tanks, to complete the concrete slab pour activity. The concrete foundation pours would occur over a period of eight days. After the walls and internal columns are constructed, the concrete roof slab would be poured, and this could generate a maximum volume of 15 trucks and 18 cars for another period of eight days.

Source: Orion Environmental Associates (2017)

these same noise increases for another 8 work days (see **Table 6**). A 1-dBA increase cannot be perceived, a 3-dBA change is barely perceptible, while a 5-dBA change is readily noticeable. A 10-dBA change in continuous noise is perceived to be a doubling in the loudness of the sound.

Although project-related noise increases would range from 1 dBA (no noticeable change) to 11 dBA (L_{dn}) (perceived as a doubling in the loudness of the sound), the overall noise environment would remain at levels considered "conditionally acceptable" for residential and school uses. The City of Lafayette's Land Use and Noise Compatibility Standards (**Table 3**) identify noise levels of up to 75 dBA [L_{dn}] as "conditionally acceptable"), even when measured background noise levels that are 1 to 3 dBA higher are considered. During most of the three-year reservoir construction duration, traffic noise increases would be barely perceptible to residents living on streets like Old Tunnel Road and Condit Road, but readily noticeable on Leland Drive. However, during the 120 days of excavation/soil hauling and 16 days of concrete pour activities, traffic noise increases would be readily noticeable on these streets. Despite these noticeable traffic noise increases, the overall noise environment would continue to be "conditionally acceptable" for residential and school uses. Therefore, traffic noise increases on neighborhood streets during reservoir construction are considered to be a less-than-significant noise impact.

Significance Determination before Mitigation

Significant.

Mitigation Measures

Mitigation Measure NOI-1a: Placement of Hoe Ram and Concrete Crusher (see Impact NOI-1)

Mitigation Measure NOI-1b: Nighttime Construction Measure (see Impact NOI-1)

Mitigation Measure NOI-1c: Construction Issues Liaison (see Impact NOI-1)

Significance Determination after Mitigation

As explained above, nighttime work is required to complete the Project's pipeline tie-ins. The nighttime pipeline tie-in construction work could result in sleep disturbance effects for one night at two tie-in locations. Implementation of **Mitigation Measure NOI-1b** would mitigate noise impacts associated with pipeline tie-ins by providing affected residents with the option to temporarily relocate to alternative lodging. However, **Mitigation Measure NOI-1b** would not necessarily reduce this impact to a less-than-significant level because residents may choose not to move to alternative lodging for one night and therefore would be subject to nighttime noise. Therefore, the potential for sleep disturbance on one night at two tie-in locations is considered to be a substantial temporary noise increases that is significant and unavoidable.

A substantial temporary noise increase during the daytime hours is defined above as an increase that exceeds 80 dBA (L_{eq}) at the closest property line or causes the noise environment to be "unacceptable" for longer than 10 work days. The only equipment noise increases that would exceed the 80-dBA (L_{eq}) threshold and would occur for more than 10 work days would be operation of the hoe ram and concrete crusher. Implementation of **Mitigation Measure NOI-1a** would mitigate this noise impact to a less-than-significant level, by ensuring that a temporary noise barrier is used or that this equipment is placed far enough away from residential properties so as to not exceed 80 dBA at the property line. Although construction-related traffic noise increases on neighborhood streets would occur for over three years and would be noticeable, these noise increases were determined to be less than significant because the overall noise environment along these streets would continue to be "conditionally acceptable" for residential and school uses.

Impact NOI-3 Result in exposure of persons or structures to or generation of excessive groundborne vibration or groundborne noise levels. (Criterion 3)

Construction Vibration

The Project would include construction activities that could produce excessive groundborne vibration. An impact hammer would be used for demolition of the existing reservoir. Other types of construction equipment that would be used include jackhammers for pipeline construction and vibratory compactors for reservoir replacement. Project construction would also entail the use of heavy trucks for material deliveries and for off-site hauling of excavated materials and demolition debris, which could generate groundborne vibration along haul routes.

If groundborne vibration generated by Project-related demolition and construction activities were to exceed 0.5 in/sec PPV, vibration could cause damage to nearby structures, including adjacent buildings. A number of EBMUD standard practices and procedures, applicable to all EBMUD projects, have been incorporated into the Project, including Standard Construction Specification 01 35 44, Environmental Requirements. Section 3.5 of EBMUD's Standard Construction Specification 01 35 44 establishes a threshold vibration limit of 0.5 in/sec PPV to minimize the potential for structural damage from vibration.

Table 7 lists typical vibration levels associated with the operation of various types of construction equipment at specified distances, some of which are similar to those proposed to be used for the Project. No pile driving is proposed as part of pipeline construction or reservoir replacement, which would substantially reduce the potential for cosmetic damage to occur from construction-related vibration effects. However, if vibration levels generated by a hoe-ram, which is a mounted impact hammer, are conservatively considered to be similar to those generated by impact hammers associated with pile driving, maximum vibration levels at distances of less than 75 feet could exceed 0.5 in/sec PPV.

Table 7: Typical Vibration Levels from Construction Equipment

Equipment	Peak Particle Velocity (PPV) (in/sec)[a] at Specified Distances			
	40 Feet[b]	75 Feet[c]	100 Feet[d]	380 Feet[e]
Impact Hammer				
• Range	n/a	0.1 – 0.5	<0.1 – 0.4	≤0.1
• Typical	n/a	0.2	0.2	<0.1
Vibratory Roller/Compactor	0.1	0.1	0.1	<0.1
Large Bulldozer, Caisson Drilling, Loaded Trucks, Jackhammer, Small Vibratory Compactor, Small Bulldozer	<0.1	<0.1	<0.1	<0.1
Vibration Threshold for Damage to Reinforced Structures	0.5	0.5	0.5	0.5
Strongly Perceptible Threshold for Vibration	0.1	0.1	0.1	0.1

Notes: in/sec = inches per second; PPV = peak particle velocity

[a] Vibration amplitudes for construction equipment assume normal propagation conditions and are calculated using the following formula:

$PPV\ equip = PPV_{ref} \times (25/D)^{1.0}$ where:

PPV (equip) = the peak particle velocity in in/sec of the equipment adjusted for the distance
PPV (ref) = the reference vibration level in in/sec from pages 30-37 and Table 18 of the Caltrans Vibration Guidance Manual
D = the distance from the equipment to the receiver

[b] Minimum distance between the closest pipeline location (seven feet from the face of curb) and nearest residence.
[c] Minimum distance between vibration source and receptor that would not exceed the threshold for cosmetic damage to structures.
[d] Minimum distance between the existing reservoir and residences to the west.
[e] Minimum distance between the existing reservoir and residences to the east.

Source: Caltrans (2013b)

Vibration levels corresponding to the closest adjacent residential structures are listed in **Table 7**. While vibration attenuation with distance can vary depending on subsoils, typical vibration levels generated by impact hammers would not exceed the 0.5 in/sec PPV threshold at nearby residential structures if the impact hammer is operated more than 75 feet away from the nearest structures. Since the closest residential structure to the existing reservoir is approximately 100 feet away, vibration generated by use of a hoe-ram to demolish the existing reservoir would not exceed the 0.5 in/sec PPV threshold for cosmetic damage. Operation of compactors and other types of construction equipment would generate lower vibration levels and also would not exceed the 0.5 in/sec PPV threshold level.

While cosmetic damage would not occur, vibration levels during operation of the hoe-ram or vibratory rollers or compactors within 100 feet of a residence during pipeline construction or reservoir replacement would be noticeable to residents. However, since construction would occur during the daytime hours (7:00 a.m. to 7 p.m.), such noticeable vibrations would not result in sleep disruption and therefore, would would be a less-than-significant vibration impact.

During the pipeline tie-in process, a backhoe or front end loader could be operated occasionally, which would generate a vibration level similar to bulldozers and other heavy equipment, which is estimated at less than 0.1 in/sec PPV at 40 feet (**Table 7**). As indicated in **Table 7**, the threshold level for strong perceptibility is 0.1 in/sec PPV and at this level, sleep disturbance could occur. However, since vibration from equipment operations associated with the tie-in process would not exceed the 0.5 in/sec PPV threshold level at the closest residences and would also be less than 0.1 in/sec PPV, potential nighttime vibration effects during the pipeline tie-in process would be less than significant.

Significance Determination before Mitigation

Less than significant.

Mitigation Measures

No mitigation measures are required.

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Appendix M: Transportation Impact Study

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EBMUD Leland Reservoir Replacement Project

Transportation Impact Study - Final – December 2017

Prepared For: East Bay Municipal Utility District

Consulting Group
220 Montgomery Street, Suite 346 San Francisco, CA 94104

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APPENDICES

1.0 INTRODUCTION

This Transportation Impact Study (TIS) has been prepared as a resource document for the Environmental Evaluation of the proposed Leland Reservoir Replacement Project (herein referred to as the “Project”). The purpose of the TIS is to complete the technical analyses and documentation necessary to prepare an Environmental Impact Report (EIR) for the Project pursuant to the California Environmental Quality Act (CEQA). The TIS documents the existing transportation network and assesses potential transportation impacts associated with the construction-related and operational traffic for the Project.

The following topics are addressed in this report:

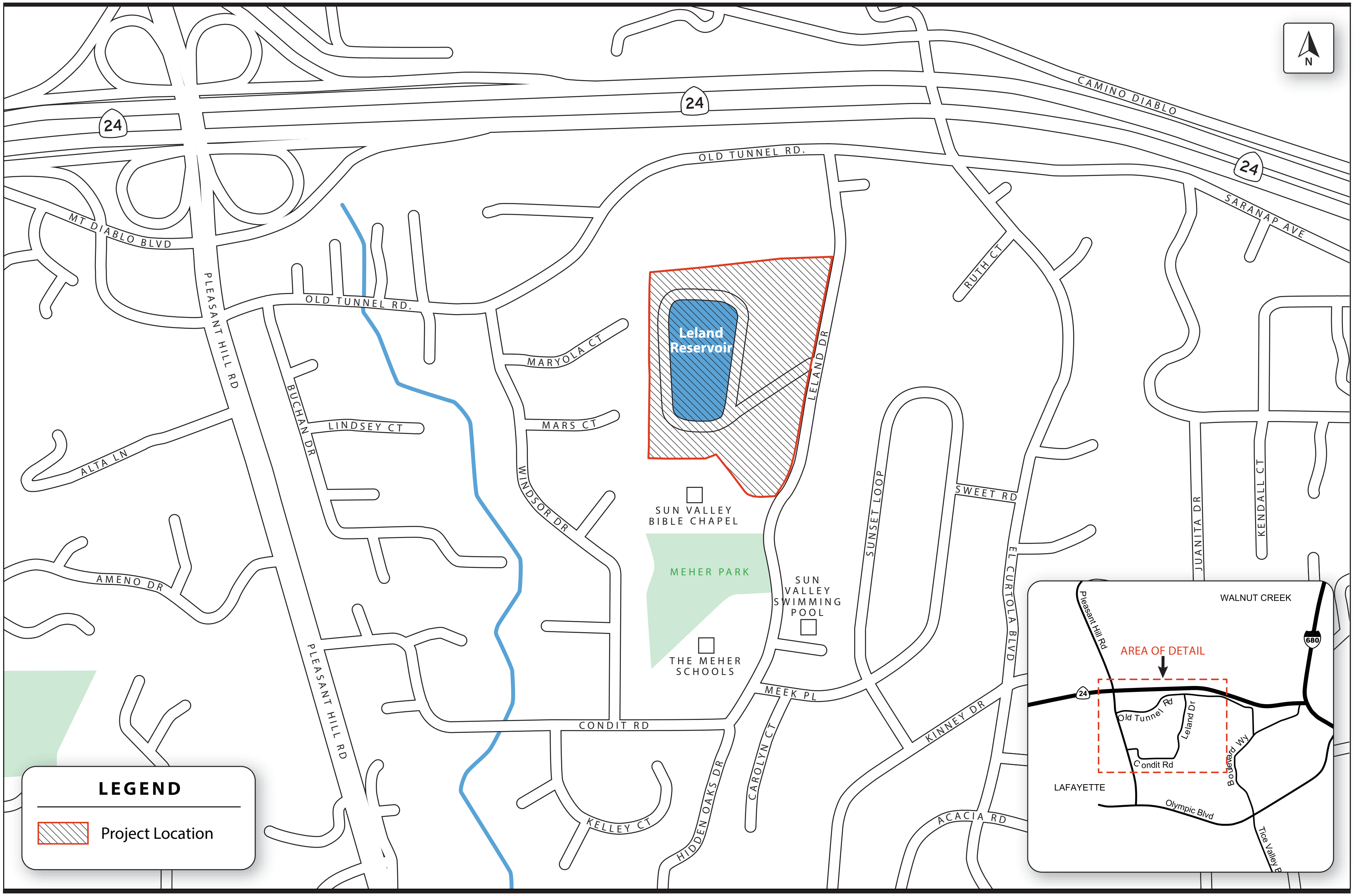
- Traffic conditions;
- Transit conditions;
- Bicycle conditions;
- Pedestrian conditions;
- Parking conditions; and
- Operational conditions.

1.1 Project Understanding

The Project site is located on a 14.5-acre site opposite of 1050 Leland Drive in the City of Lafayette. The Project site includes an 18-million gallon (MG) open cut reservoir owned and operated by the East Bay Municipal Utility District (EBMUD). **Figure 1** presents the Project location. The Project includes two primary elements: replacement of the existing pipeline that is located under the reservoir and replacement of the existing reservoir with two new 8-MG concrete tanks within the existing reservoir basin.

<u>Pipeline Construction</u>

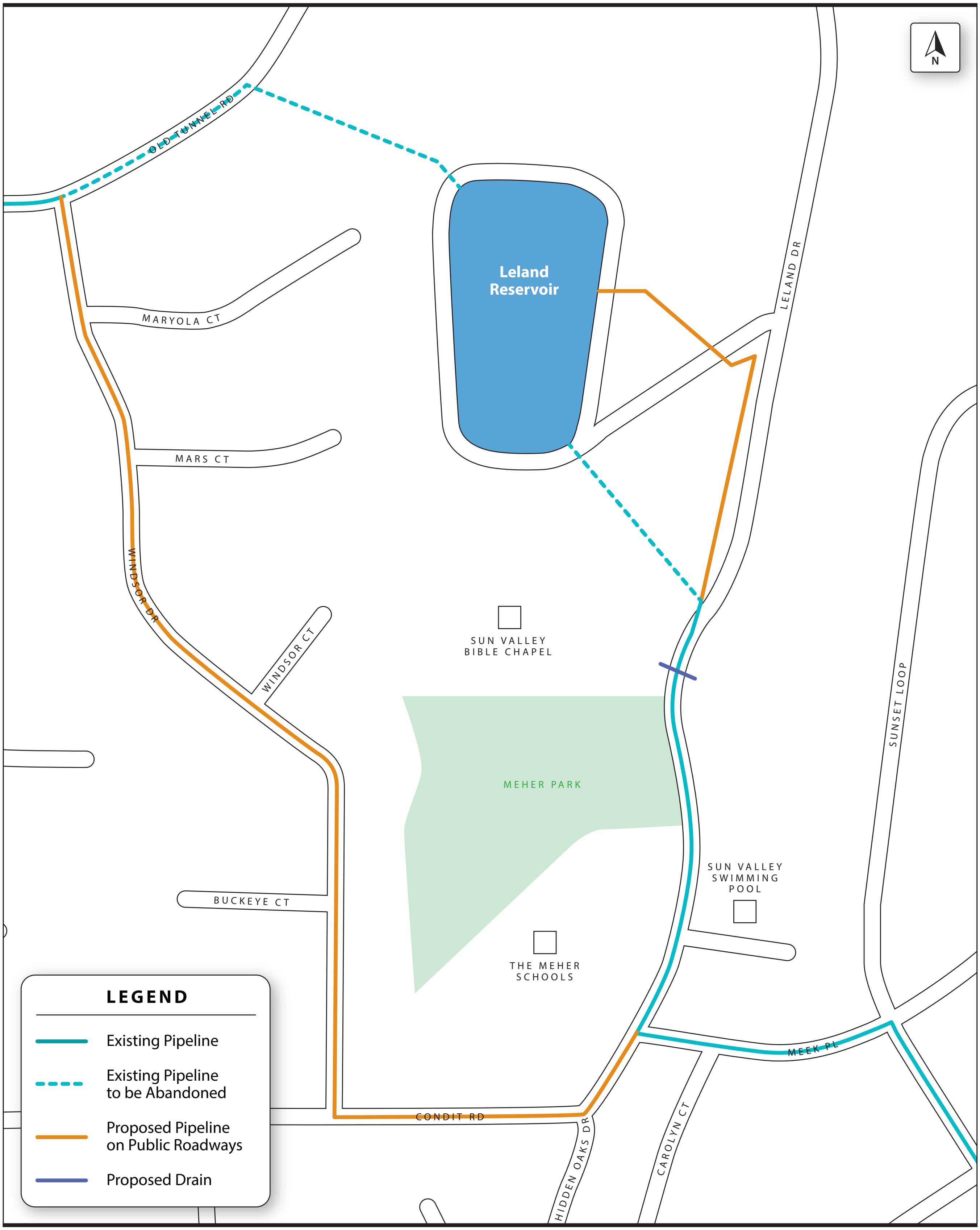
The Project would abandon approximately 1,700 linear feet of existing 30-inch and 36-inch transmission pipeline east of the intersection of Old Tunnel Road and Windsor Drive in Old Tunnel Road and through a right of way that leads into the Leland Reservoir site property, where the main runs beneath the existing open cut reservoir. The abandoned transmission pipeline would be replaced with 2,700 linear feet of pipeline to be constructed in public right-of-ways in Windsor Drive, Condit Road and Leland Drive and approximately 950 feet of pipeline within the Leland Reservoir site. **Figure 2A** presents the location of new pipelines. The new pipeline would be constructed using an open trench or “cut and cover” construction method involving excavating a trench, installing the pipeline, backfilling the trench, and repaving, and would proceed at a rate of about 80 feet per day.



EBMUD Leland Reservoir Replacement Project

Consulting Group

Figure 1
Project Location



EBMUD Leland Reservoir Replacement Project

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Figure 2A
Proposed Pipeline Installation

Installation only of the 36-inch pipeline within public roadways (Windsor Drive, Condit Road and Leland Drive) would last approximately seven weeks. The entire pipeline construction process from start to finish could take approximately six months out of which there would about 16 weeks of active construction.[1] Additionally, the pipeline installation of the 950-foot-long pipeline within the reservoir site property boundary, near the eastern side, would last approximately three weeks. The Project would also install approximately 1,000 linear feet of new 30-inch storm drain pipeline on site and connect to the City of Lafayette's existing storm drain system on the east side of Leland Drive, approximately twenty-five feet east of the intersection of Leland Drive and Patty Way. The storm drain installation and connection to the City's existing storm drain system would take approximately eight weeks (two months). The number of construction workers needed for pipeline construction would vary from 13 to 24 workers a day depending on the phase of construction.

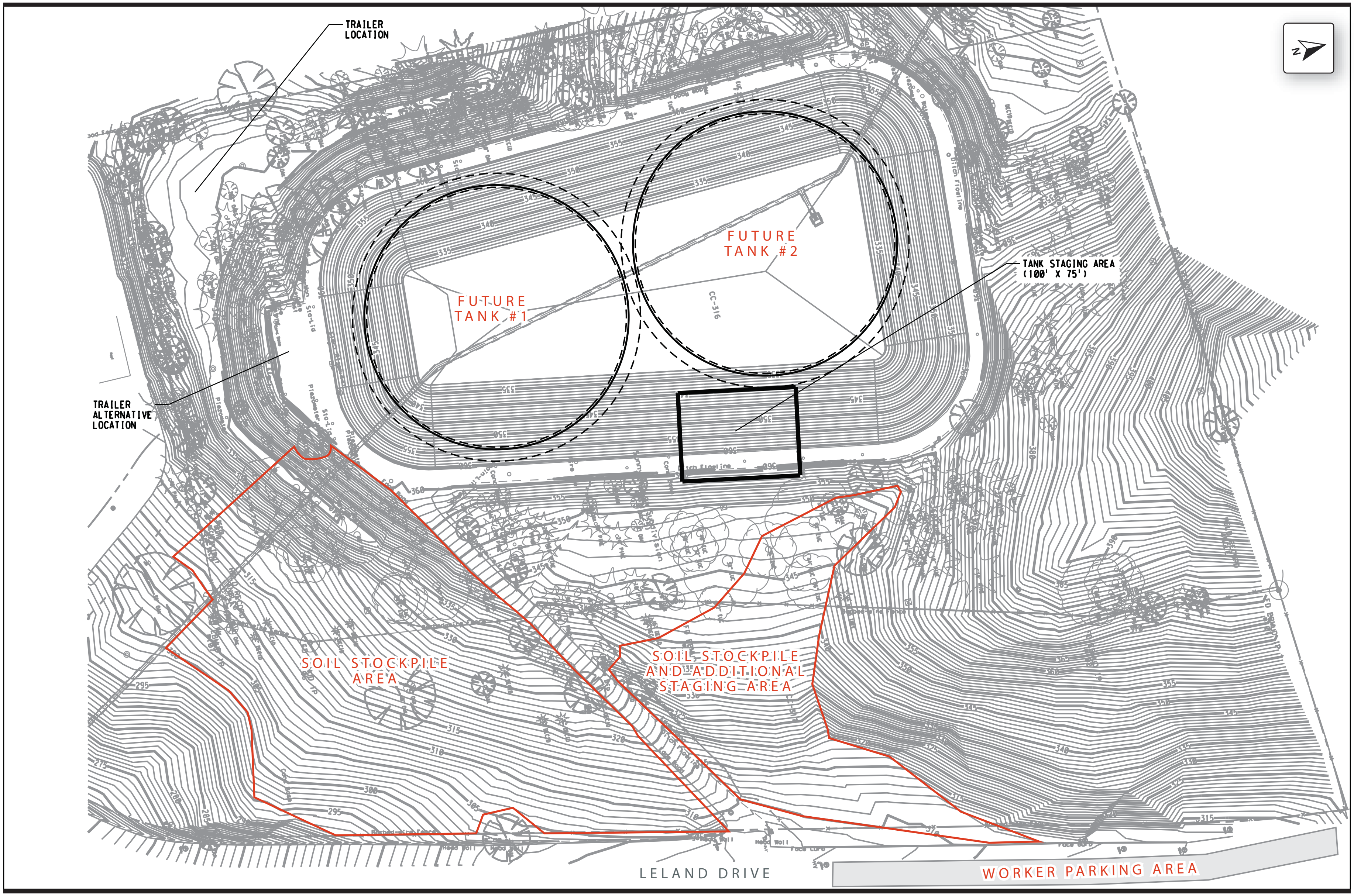
Reservoir Construction

After the new pipelines are installed in Windsor Drive, Condit Road and Leland Drive, the existing reservoir would be demolished and the construction of two new 8-MG concrete tanks and new pipelines within the reservoir site would follow. **Figure 2B** presents the location of the new tanks. After the new tanks are constructed, a new access road from Leland Drive would also be constructed. The new road would provide access to the tank roofs via an upper perimeter road around the tanks and to the basin of the new tanks via a lower road. The demolition of existing reservoir, the construction of new tanks, and the site restoration with improved access road would last for approximately 141 weeks (approximately 35 months). Approximately 102,000 cubic yards (CY) of soil would be excavated from the reservoir basin to provide a level surface for construction of the new tanks. Of this, 42,000 CY would be stockpiled on site, and the remaining 60,000 CY would be hauled off for disposal at an approved disposal facility. Additionally, an estimated 6,000 CY of demolition debris from the existing roof system and lining would be hauled off site for disposal. The number of construction workers needed for reservoir construction would vary from 2 to 23 a day depending on the phase of construction.

Construction Schedule

Construction is planned to start in 2022, beginning with pipeline construction in public right-of-ways. After the pipeline construction in public roadways is complete, the reservoir construction may begin in 2023 starting with mobilization. Reservoir construction is expected to be completed by the end of 2025. **Table 1** presents the summary of construction schedule and the sequence of construction activities.

[1] Active construction time does not include down-time, submittal review, material procurement, and fabrication inspection and approval process.



EBMUD Leland Reservoir Replacement Project

Consulting Group

Figure 2B
Proposed Reservoir Replacement Plan

Table 1 – Construction Schedule

Activity	Duration (Week)[1]
Construction of Pipeline in Public ROW	16[2]
Demolition of Reservoir	50
Construction of New Tanks	64
Construction of Pipelines within Reservoir property boundary	11[3]
Site Restoration	27
Total	**168**

Source: EBMUD, 2017

Notes:

1. Duration does not include down-time, submittal review, material procurement, and fabrication inspection and approval process.
2. Includes installation of pipelines within Windsor Drive, Condit Road and Leland Drive for a seven-week period.
3. Includes installation of 950-feet of 36-inch water pipeline near the eastern side of reservoir for a three-week period, and installation of 1,000-feet of 30-inch storm drain pipeline and connection to the City of Lafayette's storm drain system for an eight-week period.

Construction would occur between 7:00 a.m. and 7:00 p.m., Monday through Friday, with afterhours or weekend construction activity limited to unplanned/unexpected occurrences or critical shutdowns. Truck traffic on residential streets would not be permitted before 7:00 a.m. except for limited periods during reservoir construction when concrete is being poured for the tank floor and roof slab, when trucks could arrive to the site as early as 6:30 a.m. Given the proximity to a school, the work hours for some activities may need to be adjusted during the school year.

Construction Staging

The pipeline construction would be staged at the curbside of the road/work area. Staging areas would provide short term, including overnight, storage of heavy equipment, piping and other materials. The construction of new pipelines along public roadways would require a construction easement width of about 25 to 40 feet to accommodate pipe storage and to allow trucks and equipment access along the trench that would move along with the pipeline installation activity. Staging areas for the reservoir construction, including soil stockpile areas, would be provided on the east side of reservoir and contained within the reservoir site. Construction worker parking would be provided along the west side of Leland Drive adjacent to the reservoir site (see **Figure 2B**).

Operation, Maintenance, and Dam Inspections

The open cut Leland Reservoir is currently unstaffed and generates approximately three site visits each month for operations, site maintenance, dam inspections and a yearly inspection with the Division of Safety of Dams (DSOD), Following construction completion of the open cut reservoir replacement with dual concrete tanks, the monthly/yearly dam inspections will no longer be necessary as the facility will be out of DSOD jurisdiction. Site visits would be reduced to approximately two per month for operation and site maintenance inspections.

1.2 Study Scope and Approach

Since the site operations would be similar following construction as prior to construction, the analyses focus on construction-related transportation impacts.

Scenario Development

The TIS scope of work includes analysis of transportation impacts under Existing, Existing plus Project, and Cumulative conditions. Existing conditions are assumed to represent existing conditions "on the ground" at the TIS commencement; Existing plus Project conditions represent Existing conditions with added construction traffic and potential lane closures due to pipeline replacements; and Cumulative conditions represent traffic conditions associated with operational Project trips in the future.

Travel Demand Estimation

For purposes of assessing traffic conditions within the Project environs, vehicle trips were estimated based on the number of construction related vehicle trips needed in each phase of the Project. For the purpose of conservative traffic analyses, all workers are assumed to drive alone to the Project site. As an analytical assumption, about half of the vehicle trips are assumed to originate from west of the Project site and the remaining half are assumed to originate from east of the Project site. All vehicles are assumed to use the most direct access routes between the Project site and freeways.

Data Collection and Impact Analysis

Existing traffic volumes were collected during the AM and PM peak hours at major intersections in the vicinity of the Project area that would be directly affected by the Project. The intersection turning movement counts were collected on Thursday June 2, 2016 during the AM (7:00 a.m. to 9:00 a.m.) and PM (4:00 p.m. to 6:00 p.m.) peak periods. The locations are:

1. Pleasant Hill Road / Mt. Diablo Boulevard
2. Pleasant Hill Road / Old Tunnel Road
3. Old Tunnel Road / Windsor Drive
4. Old Tunnel Road / Leland Drive
5. Old Tunnel Road / El Curtola Boulevard
6. Condit Road / Windsor Drive

In addition, 120-hour traffic volumes were collected along residential streets that would be affected by the Project due to the proposed pipeline construction or increased traffic volumes. The daily vehicle volumes were collected from Thursday, June 9, 2016 through Monday, June 13, 2016 at the following locations:

1. Old Tunnel Road between Viela Court and Windsor Drive
2. Windsor Drive between Mars Court and Windsor Court
3. Condit Road between Windsor Drive and Leland Drive
4. Leland Drive between Old Tunnel Road and Meek Place

The number of bicyclists and pedestrians traveling through area intersections was also collected on Thursday, June 2, 2016. The bicycle and pedestrian activity in the vicinity of the Project are described qualitatively in this TIS. On- and off-street parking inventory and occupancy data are presented for Leland Drive between Old Tunnel Road and Condit Road, Windsor Drive between Old Tunnel Road and Condit Road, and Condit Road between Windsor Drive and Leland Drive, based on the data collected during a midday period (1:00 p.m. and 3:00 p.m.) on Tuesday, July 12, 2016. Major public transit facilities are described in terms of routes and stops in the vicinity of the Project site, and impacts are discussed.

2.0 ENVIRONMENTAL SETTING

The transportation and circulation study area extends beyond the Project area and includes the roadways and transportation facilities that could be affected by Project construction (see **Figure 1**). The existing setting includes descriptions of roadways and documentation of existing vehicular traffic, transit service, bicycle, pedestrian, and parking conditions.

2.1 Roadway Network

2.1.1 Regional Access

The Project site is located approximately one mile east of State Route 24 (SR-24) and Interstate 680 (I-680) interchange, and both SR-24 and I-680 provide freeway access to and from the Project site. The interstate freeway facilities are described below.

<u>State Route 24 (SR-24)</u> is a 15-mile-long east-west freeway that runs between Interstate 580 (I-580) in Oakland and I-680 in Walnut Creek. SR-24 travels through the Caldecott Tunnel approximately seven miles west of the Project site. In the vicinity of the Project site, SR-24 is an eight-lane freeway with four lanes in each direction. The Project site can be directly accessed from Pleasant Hill Road off-ramps in the eastbound and the westbound directions. The nearest on-ramps are also located on Pleasant Hill Road for the eastbound and the westbound directions. In the vicinity of the Project site, the average daily traffic volume on SR-24 is approximately 188,000 vehicles.[1] The AM and PM peak-hour traffic volumes near the Pleasant Hill Road on-ramps are approximately 10,000 and 9,400 vehicles, respectively.[2] According to the California Vehicle Code 31301, trucks transporting hazardous materials in a tanker truck are prohibited to travel through the Caldecott Tunnel except between the hours of 3:00 a.m. and 5:00 a.m.

<u>Interstate 680 (I-680)</u> is a north-south freeway that runs between Interstate 80 in Fairfield and the Interstate 280/U.S. Highway 101 interchange in San Jose. In the vicinity of the Project site, I-680 is an eight-lane freeway with four lanes in each direction. The Project area can be directly accessed from Olympic Boulevard off-ramps in the northbound and the southbound directions. The nearest on-ramps are also on Olympic Boulevard for both the northbound and southbound directions. However, given the proximity to SR-24/I-680 interchange located approximately one mile east of the Project, traffic going to or coming from east of the Project area via I-680 would likely use SR-24 on- and off-ramps at Pleasant Hill Road. In the vicinity of the Project site, the average daily traffic volume on I-680 is approximately

[1] Caltrans *2014 Traffic Volumes on California State Highways*, 2014
[2] Freeway Performance Measurement System, http:pems.dot.ca.gov, accessed August 2016.

168,000 vehicles.[3] The AM and PM peak-hour traffic volumes are approximately 10,100 and 9,400 vehicles, respectively.[4]

2.1.2 Local Access

The Project site is located within a residential area, and neighboring land uses along Leland Drive include single-family homes, a school (The Meher Schools), recreational facilities (Sun Valley Swimming Pool and Meher Field), and a church (Sun Valley Bible Chapel). Local access is provided by Arterial, Collector and Local Streets in proximity to the Project site within the City of Lafayette, as shown in **Figure 1**. Descriptions of the local roadways are presented below. The functional designation of local roadways was obtained from the *City of Lafayette General Plan (General Plan)*.[5]

Pleasant Hill Road is a two-way north-south street that runs between Taylor Boulevard and Olympic Boulevard. In the vicinity of the Project site, Pleasant Hill Road is approximately 100 feet wide and has two travel lanes and Class 2 bike lanes in each direction with a center median. There are Class 1 bike paths/sidewalks on both sides of the street. The posted speed limit on Pleasant Hill Road is 40 miles per hour (mph). There is no on-street parking on either side of the street south of Mt. Diablo Boulevard. The *General Plan* identifies Pleasant Hill Road as an Arterial Street. Pleasant Hill Road is also part of designated truck routes in the City of Lafayette.

Mt. Diablo Boulevard is a two-way east-west street that runs between Acalanes Road and Pleasant Hill Road. In the vicinity of the Project site, Mt. Diablo Boulevard is approximately 110 feet wide and has two travel lanes in each direction with a center median. The posted speed limit along Mt. Diablo Boulevard is 35 mph. On-street parking is generally allowed on both sides of the street. The *General Plan* identifies Mt. Diablo Boulevard as an Arterial Street.

Old Tunnel Road is a two-way east-west street that runs between Pleasant Hill Road and El Curtola Boulevard. In the vicinity of the Project site, Old Tunnel Road is approximately 40 feet wide and has one travel lane in each direction, and on-street parking is generally allowed on both sides of the street. The posted speed limit on Old Tunnel Road is 25 mph. The *General Plan* considers Old Tunnel Road as a Collector Street, as it provides direct access to properties and serves traffic between arterial and local streets.

Leland Drive is a two-way north-south street that runs between Old Tunnel Road and Condit Road. It is approximately 30 feet wide and has one travel lane in each direction, and on-street parking is generally allowed on both sides of the street. The posted speed limit on Leland Drive is 25 mph. The *General Plan*

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[3] Caltrans *2014 Traffic Volumes on California State Highways*, 2014
[4] Freeway Performance Measurement System, http:pems.dot.ca.gov, accessed August 2016.
[5] *City of Lafayette General Plan*, Chapter II Circulation, November 2012.

considers Leland Drive as a Local Street, as it provides direct access to properties and is designed to discourage through traffic by minimizing connectivity.

Windsor Drive is a two-way north-south street that runs between Old Tunnel Road and Condit Road. It is approximately 35 feet wide and has one travel lane in each direction, and on-street parking is generally allowed on both sides of the street. The posted speed limit on Windsor Drive is 25 mph. The *General Plan* considers Windsor Drive as a Local Street, as it provides direct access to properties and is designed to discourage through traffic by minimizing connectivity.

Condit Road is a two-way east-west street that runs between Pleasant Hill Road and Leland Drive. It is approximately 35 feet wide and has one travel lane in each direction, and on-street parking is allowed on the north side of the street only. The posted speed limit on Condit Road is 25 mph. The *General Plan* considers Condit Road as a Local Street, as it provides direct access to properties and is designed to discourage through traffic by minimizing connectivity.

2.2 Existing Traffic Operations

2.2.1 Intersection Levels of Service

A total of six intersections were analyzed for purposes of this TIS. Intersection level of service (LOS) for each intersection was analyzed for a 60-minute period when the highest traffic volume was recorded at each intersection during the peak period. Existing intersection turning movement counts were collected on Thursday, June 2, 2016 during the AM (7:00 a.m. to 9:00 a.m.) and PM (4:00 p.m. to 6:00 p.m.) peak periods. **Figure 3** shows the lane configurations, and **Figure 4** shows the existing vehicle turning movement volumes at the intersections. Intersection turning movement count data is provided in **Appendix A**. The six intersections analyzed are:

1. Pleasant Hill Road / Mt. Diablo Boulevard
2. Pleasant Hill Road / Old Tunnel Road
3. Old Tunnel Road / Windsor Drive
4. Old Tunnel Road / Leland Drive
5. Old Tunnel Road / El Curtola Boulevard
6. Condit Road / Windsor Drive

Traffic operating characteristics of intersections are described by the concept of LOS. LOS is a qualitative description of an intersection's performance based on the average delay per vehicle. Intersection LOS ranges from A, which indicates free flow or excellent conditions with short delays, to F, which indicates congested or overloaded conditions with extremely long delays. The *General Plan* considers LOS D with a delay of 33 seconds the lowest acceptable condition for signalized intersections outside of the downtown area. For unsignalized intersections, LOS D is the lowest acceptable condition.

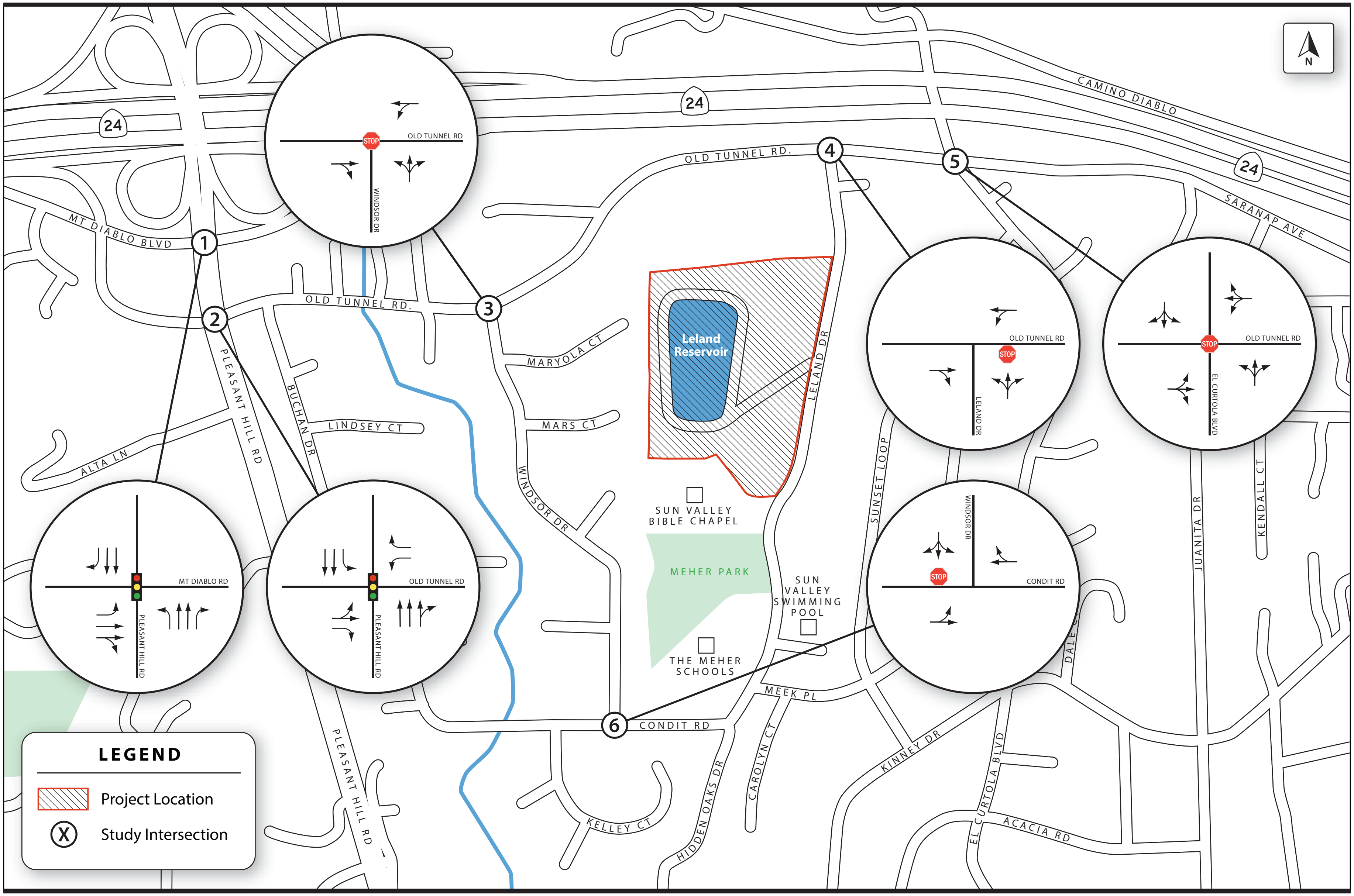

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Figure 3
Intersection Lane Configurations

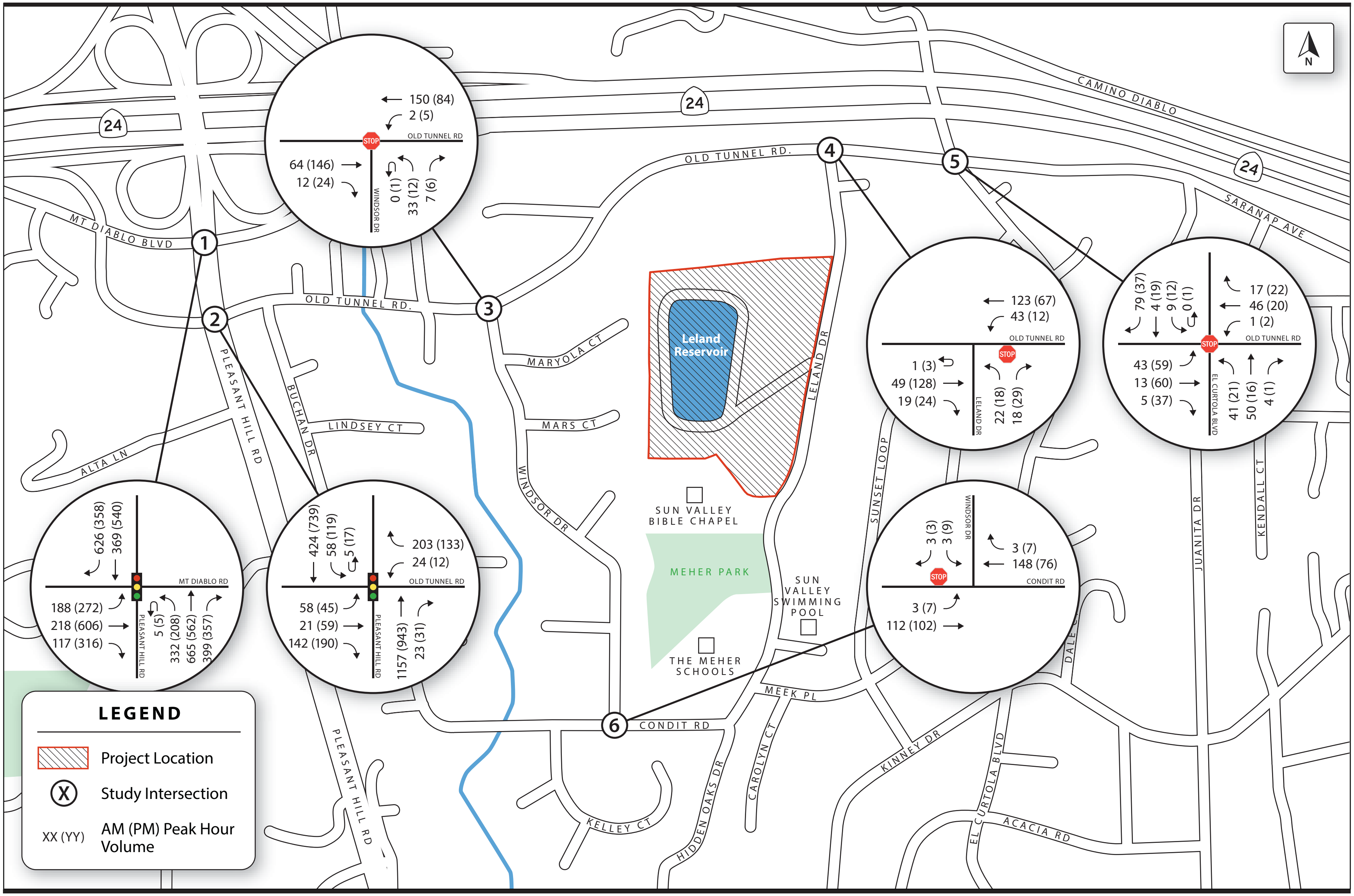

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Figure 4
Existing Weekday AM and PM Peak Hour Intersection Turning Movement Volumes

The intersections were evaluated using the *2000 Highway Capacity Manual* (HCM) operations methodology which determines the capacity for each lane group approaching the intersection. LOS is then based on the average stopped delay per vehicle (seconds per vehicle) for the various movements within the intersection. **Table 2** presents the LOS and delay data for the study intersections under the Existing conditions. Intersection LOS calculations are provided in **Appendix B**.

As shown in **Table 2**, all study intersections currently operate at acceptable service levels (LOS D or better) during the AM and PM peak hours under existing conditions, except for the intersection of Pleasant Hill Road and Mt. Diablo Boulevard which currently operates at unacceptable LOS conditions (LOS E) during the PM peak hour, with approximately 60 seconds of average delay and poorly-operating traffic conditions along the eastbound through movement on Mt. Diablo Boulevard.

Table 2 – Intersection Level of Service: Existing Weekday AM and PM Peak Hours

Intersection	Control[1]	AM Peak Hour		PM Peak Hour	
		Delay[2]	LOS[2]	Delay[2]	LOS[2]
1. Pleasant Hill Road / Mt. Diablo Boulevard	Signal	16.8	B	**60.6**	**E (EB)**
2. Pleasant Hill Road / Old Tunnel Road	Signal	9.9	A	10.2	B
3. Old Tunnel Road / Windsor Drive	AWSC	8.1	A	8.0	A
4. Old Tunnel Road / Leland Drive	SSSC	10.1	B	9.9	A
5. Old Tunnel Road / El Curtola Boulevard	AWSC	8.1	A	8.3	A
6. Condit Road / Windsor Drive	AWSC	8.4	A	7.8	A

Source: CHS Consulting Group, 2017.

Notes:

1. Signal = signalized intersection; AWSC = all-way stop-controlled intersection; SSSC = side street stop-controlled intersection
2. The LOS and delay (in seconds per vehicle) for signalized intersections represent conditions for the overall intersection. **BOLD** indicates unacceptable LOS conditions (LOS E or F).
3. Poorly operating approach (at LOS E or F) is indicated in parenthesis; EB = Eastbound

2.2.2 Daily Traffic Conditions

In order to assess the existing traffic conditions along residential streets, 120-hour traffic counts were collected from Thursday, June 9, 2016 through Monday, June 13, 2016 along Old Tunnel Road, Leland Drive, Condit Road, and Windsor Drive. Old Tunnel Road and Condit Drive carry a substantial amount of daily traffic volumes with approximately 2,569 and 1,861 vehicles throughout the day, respectively. Leland Drive and Windsor Drive carry lower traffic volumes with approximately 655 and 407 vehicles on an average weekday, respectively. **Table 3** presents the summary of daily and peak hour traffic volumes along Old Tunnel Road, Leland Drive, Condit Road and Windsor Drive.

Table 3 – Weekday Daily, 12-Hour, and Peak Hour Traffic Volumes along Residential Streets

Street	Direction	Daily Volume[1]	12-Hour Volume[2]	Peak Hour		
				Time	Volume	Percent of Daily
Old Tunnel Road	Eastbound	1,317	1,074	5:00 PM - 6:00 PM	154	12%
	Westbound	1,252	1,042		91	7%
	Total	2,569	2,116		245	10%
Leland Drive	Northbound	330	289	7:45 AM - 8:45 AM	39	12%
	Southbound	325	287		63	19%
	Total	655	576		102	16%
Condit Road	Eastbound	920	786	8:00 AM - 9:00 AM	100	11%
	Westbound	941	831		142	15%
	Total	1,861	1,618		242	13%
Windsor Drive	Northbound	200	160	1:15 PM - 2:15 PM	15	7%
	Southbound	207	161		25	12%
	Total	407	321		40	10%

Source: CHS Consulting Group, May 10, 2017.

Notes:

1. Represents the average of 24-hour counts collected on Thursday, Friday, and Monday.
2. Represents the average of 12-hour counts collected between 7:00 a.m. and 7:00 p.m. on Thursday, Friday and Monday

Traffic volumes on weekends are substantially lower than weekdays. Old Tunnel Road and Condit Road carry approximately 65 percent of weekday traffic on weekends. Leland Drive and Windsor Drive carry approximately 43 and 13 percent of weekday traffic on weekends, respectively. **Appendix A** includes detailed weekday and weekend daily traffic data.

2.3 Transit Network

The Central Contra Costa Transportation Authority (CCTA)'s County Connection operates one bus route in the vicinity of the Project site. Route 25 operates between Lafayette Bay Area Rapid Transit (BART) Station and Walnut Creek BART Station via Mt. Diablo Boulevard, Pleasant Hill Boulevard, and Olympic Boulevard. Service is provided from 7:30 a.m. to 6:30 p.m. at one-hour headway throughout the day. The nearest bus stop to the Project site is located at the intersection of Old Tunnel Road and Pleasant Hill Road, approximately 2,000 feet west of the Project site. Regional service is primarily provided by BART at the Lafayette Station, located about 2.5-mile southwest of the Project site.

The Lamorinda School Bus Transportation Agency (LSBTA) operates the Lamorinda School Bus Program in the City of Lafayette. In the vicinity of the Project site, Route 21 for Stanley Middle School and Route 25 for Burton Valley Elementary operate along Pleasant Hill Road, Old Tunnel Road, Windsor Drive and Leland Drive; and Route 28 for Burton Valley Elementary operates along Mt. Diablo Boulevard, Pleasant

Hill Road, and Old Tunnel Road. Service is provided once each morning (between 7:00 a.m. and 8:00 a.m.) and afternoon (between 3:00 p.m. and 4:00 p.m.) periods for each route.

2.4 Bicycle Conditions

Bikeways are typically classified as Class I, Class II, or Class III facilities. Class I bikeways are bike paths with exclusive rights-of-way for use by bicyclists, with minimal cross flow by motorized vehicles. Class II bikeways are bike lanes striped within the paved areas of roadways and established for the exclusive use of bicyclists. Class III bikeways are signed bike routes that allow bicycles to share streets with vehicles.

In the vicinity of the Project site, there are both Class I and Class II bike facilities along Pleasant Hill Road in each direction. A Class I bike path on Pleasant Hill Road runs between Mt. Diablo Boulevard and Olympic Boulevard and serves as a multi-purpose path for both bicyclists and pedestrians. The City of Lafayette Bicycle Plan shows that there are proposed Class III bike routes along Old Tunnel Road and Condit Road east of Pleasant Hill Road.

Based on bicycle counts during the weekday AM (7:00 a.m. to 9:00 a.m.) and PM (4:00 p.m. to 6:00 p.m.) peak periods on Thursday, June 2, 2016, Pleasant Hill Road, Old Tunnel Road, Leland Drive and Condit Road experienced very low bicycle volumes at the study intersections. The highest bicycle volumes occurred at the Pleasant Hill Road and Old Tunnel Road intersection with approximately 11 bicyclists during the AM peak hour and at the Pleasant Hill Road and Mt. Diablo Road intersection with approximately five bicyclists during the PM peak hour. **Appendix A** includes bicycle counts.

2.5 Pedestrian Conditions

In the vicinity of the Project site, there are low pedestrian volumes and pedestrian amenities are limited. There are multi-purpose paths along Pleasant Hill Road on both sides of the street that are shared among bicyclists and pedestrians. The sidewalks are approximately four feet wide. Pedestrian sidewalks are provided on the east side of Leland Drive except for approximately 2,400-foot segment located 270 feet south of Old Tunnel Road, and on the south side of Condit Road. There are generally no pedestrian sidewalks along Old Tunnel Road except for 600-foot segment between Pleasant Hill Road and Caselton Place, or along Windsor Drive. In the vicinity of the Project site, there are marked crosswalks on Leland Drive near the Meher School parking lot, approximately 1,200 feet south of the reservoir access road.

Based on pedestrian counts during the weekday AM (7:00 a.m. to 9:00 a.m.) and PM (4:00 p.m. to 6:00 p.m.) peak periods on Thursday, June 2, 2016, pedestrian volumes are generally low in the Project vicinity due to residential uses, and limited sidewalks and crosswalks. The highest pedestrian volumes occurred at the Pleasant Hill Road and Mt. Diablo Road intersection with approximately 25 and five pedestrians during the AM and PM peak hours, respectively. **Appendix A** includes pedestrian counts.

2.6 Parking Conditions

The Project site is located in a residential area, and on-street parking is generally allowed on both sides of the street where curb space is provided, except for the south side of Condit Road between Windsor Drive and Leland Drive. In order to assess parking availability and utilization surrounding the Project site, an on-street parking survey was conducted on Tuesday, July 12, 2016 during the midday period between 1:00 p.m. and 3:00 p.m. The survey area included Leland Drive between Old Tunnel Road and Condit Road, Condit Road between Leland Drive and Windsor Drive, and Windsor Drive between Old Tunnel Road and Leland Drive. Parking supply and occupancy information is provided in **Table 4**. There are a total of 229 publicly available on-street parking spaces in the study area, and most of the spaces were available with an average occupancy rate of less than ten percent during the midday period.

There is a 44-space off-street parking lot on Leland Drive across from Meek Place, which is exclusively used by Meher School teachers and parents. The off-street parking spaces were generally well utilized with approximately 61 percent occupancy ratio during the midday period. There are a few weekdays during the summer when there is high parking demand due to swim meets at the Sun Valley Swimming Pool, which is located on Leland Drive south of the reservoir site.

Table 4 – Parking Supply and Occupancy during Weekday Midday Period

Street	From	To	Supply (spaces)	Occupancy (spaces)	Occupancy (percent)
On-Street					
Leland Drive	Old Tunnel Road	Project Access Road	63	0	0%
	Project Access Road	Condit Road	47	9	19%
Condit Road	Leland Drive	Windsor Drive	15	0	0%
Windsor Drive	Condit Road	Windsor Court	46	5	11%
	Windsor Court	Mars Court	30	4	13%
	Mars Court	Maryola Court	14	2	14%
	Maryola Court	Old Tunnel Road	14	0	0%
Subtotal			229	20	9%
Off-Street					
West of Leland Drive Adjacent to Meher School			44	27	61%
Total			**273**	**47**	**17%**

Source: CHS Consulting Group, July 12, 2016.

Notes: Due to the residential uses in the Project area, most on-street parking spaces are unmarked open spaces. Total number of parking spaces represents a rough estimate of publicly available parking spaces, assuming about 20 feet per vehicle for parallel parking.

2.7 Local Regulatory Setting

There are no federal or state regulations that pertain to traffic and transportation in the Project area. The only policies that apply to the Project are Contra Costa Transportation Authority (CCTA)'s Congestion Management Plan (CMP) and EBMUD's Standard Construction Specifications.

2.7.1 Routes of Regional Significance

The CCTA is responsible for preparing and regularly updating a CMP for the County. The CMP establishes Level of Service Standards for all state highways and those roadways in the County that are designated as "principal arterials", which are defined as arterials that are at least four lanes wide for a mile in length, carry at least 20,000 vehicles each day, and have been designated by the appropriate regional transportation planning committee. In the project area SR-24 is the only route of regional significance identified in the CMP that would be directly affected by the proposed project.

2.7.2 EBMUD Standard Construction Specification 01 55 26

Traffic Control Plan

The proposed project would be required to comply with the *EBMUD's Standard Construction Specification 01 55 26 and the California Manual on Uniform Traffic Control Devices (CA MUTCD)*. The Specification requires preparation of a Traffic Control Plan, which may require implementation of different measures, depending on the project-specific construction impacts; the characteristics of the existing transportation network; and daily and peak-hour vehicle, pedestrian, and bicycle volumes. The TCP would include, but is not necessarily limited to, the following measures:

- *Circulation and detour plans to minimize impacts to local street circulation and use of haul routes to minimize truck traffic on local roadways to the extent possible. (Part 1.2 A.1)*
- *Description of emergency response vehicle access. If the road or area is completely blocked, preventing access by an emergency responder, a contingency plan must be included (Part 1.2 A.2)*
- *Construction area signs for street closure and detours shall be posted a minimum of forty-eight hours prior to the commencement of street closure. Contractor shall maintain safe access around the Project limit at all times. (Part 1.1 C).*
- *Flaggers shall perform their duties and shall be provided with the necessary equipment in accordance with the current "Flagging Instruction Handbook" of Caltrans (Part 3.3 A.1).*
- *Where alternating one-way traffic has been authorized, the following shall be posted at each end of the one-way traffic section at least one week prior to start of work (Part 3.2 A):*
    - *The approximate beginning and ending dates that traffic delays will be encountered.*
    - *The maximum time that traffic will be delayed.*

- *Convenient access to driveways in the vicinity of work shall be maintained as much as possible. Temporary approaches to, and crossing of, intersecting traffic lanes shall be provided and kept in good condition (Part 3.1 B).*

- *Traffic signs, flashing lights, barricades and other traffic safety devices used to control traffic shall conform to the requirements of the most recently adopted edition of* California Manual on Uniform Traffic Control Devices *and the agency having jurisdiction (Part 2.1 A).*

- *All equipment and materials shall be stored in designated contractor staging areas on or adjacent to the work site, in a manner intended to minimize obstruction of traffic (Part 1.2 A.4).*

3.0 IMPACT ANALYSIS

This section estimates the travel demand to be generated by the Project.

3.1 Trip Generation

To evaluate potential impacts of the Project on the regional and local roadway system, Project trip generation was estimated based on the number of construction-related vehicle trips needed in each phase of the Project. Construction-related vehicle trips include trips made by construction workers traveling to and from the Project area, material and equipment deliveries, and hauling truck trips associated with excavation and transfer of soils. The number of Project-generated trips would vary on a daily basis, depending on the construction phase, planned activity, and material delivery needs. **Appendix C** includes detailed trip generation worksheets. Travel demand generated by the Project was estimated using the following design criteria:

<u>Construction Worker Trips</u>

The number of daily worker trips was estimated based on the number of daily construction workers assigned for each construction phase (see **Appendix C**). The number of workers would vary substantially from 2 to 24 workers a day depending on the phase of construction. Construction shifts would generally occur between 7:00 a.m. and 7:00 p.m. To provide a conservative assessment of potential traffic impacts, all construction workers were assumed to arrive and depart the Project site during the weekday AM (7:00 a.m. to 9:00 a.m.) and PM (5:00 p.m. to 7:00 p.m.) peak periods, respectively. Therefore, half of the daily construction worker trips were assumed to be inbound trips during the AM peak hour, and the remaining half were assumed to be outbound trips during the PM peak hour.

For the purpose of conservative traffic analyses, all workers are assumed to drive alone to the Project site and park their vehicles along the west side of Leland Drive adjacent to the reservoir site. As an analytical assumption, about half of the workers are assumed to originate from west of the Project site (via SR-24 eastbound) and the remaining half of the workers are assumed to originate from east of the Project site (via SR-24 westbound). It is anticipated that all workers would use the most direct access routes to the Project site from freeways via Pleasant Hill Road, Old Tunnel Road and Leland Drive. **Figures 5A** and **5B** present the most direct access routes between freeways and the Project site.

<u>Hauling Truck Trips</u>

Pipeline construction activities would involve the excavation of trenches and the transport of excavated spoil to off-site locations. Each linear foot of pipe trench is expected to generate 1.3 CY of excavated spoil, and the entire 3,650 linear feet of new pipeline construction (2,700 linear feet on public roadways

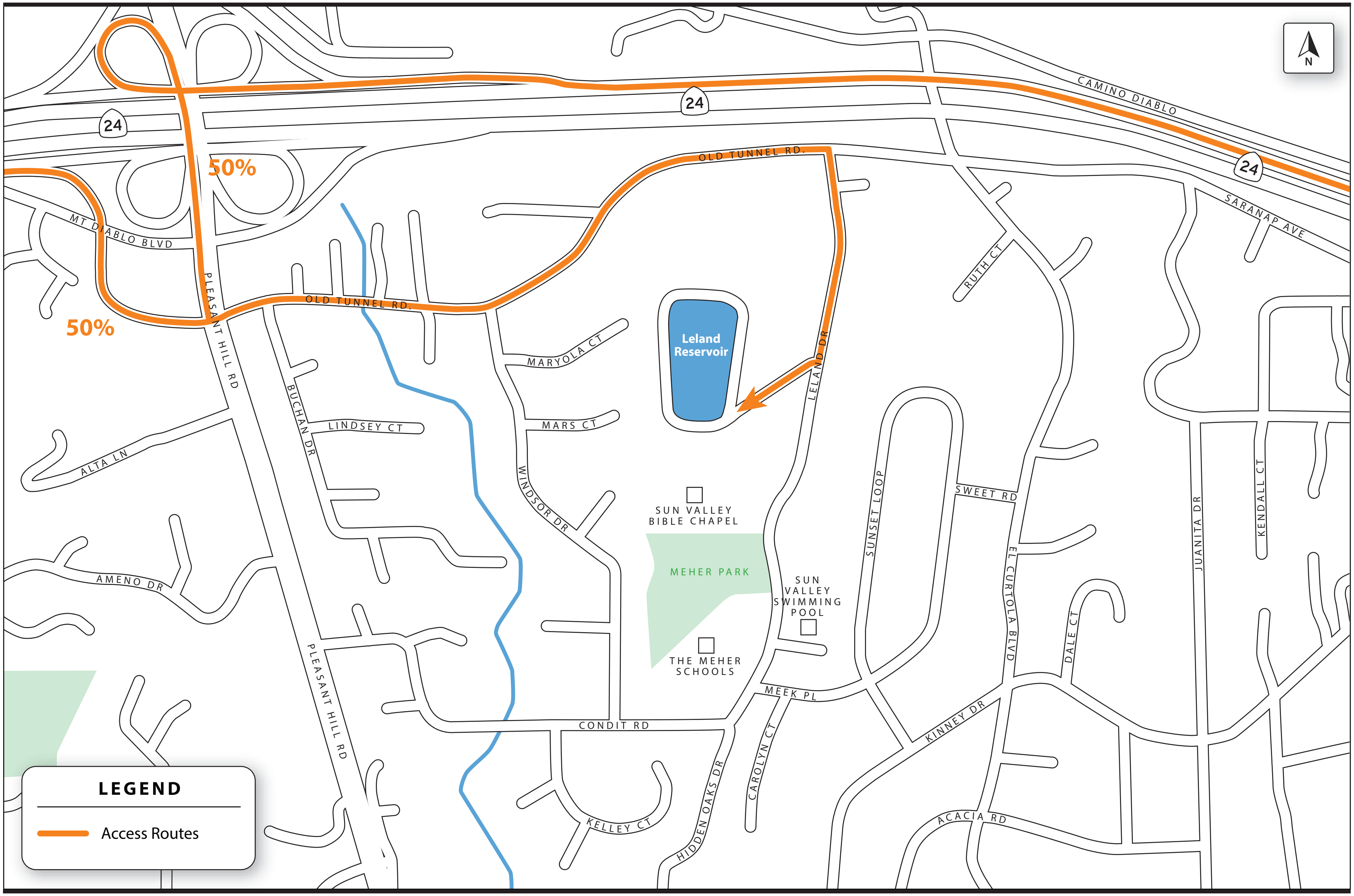

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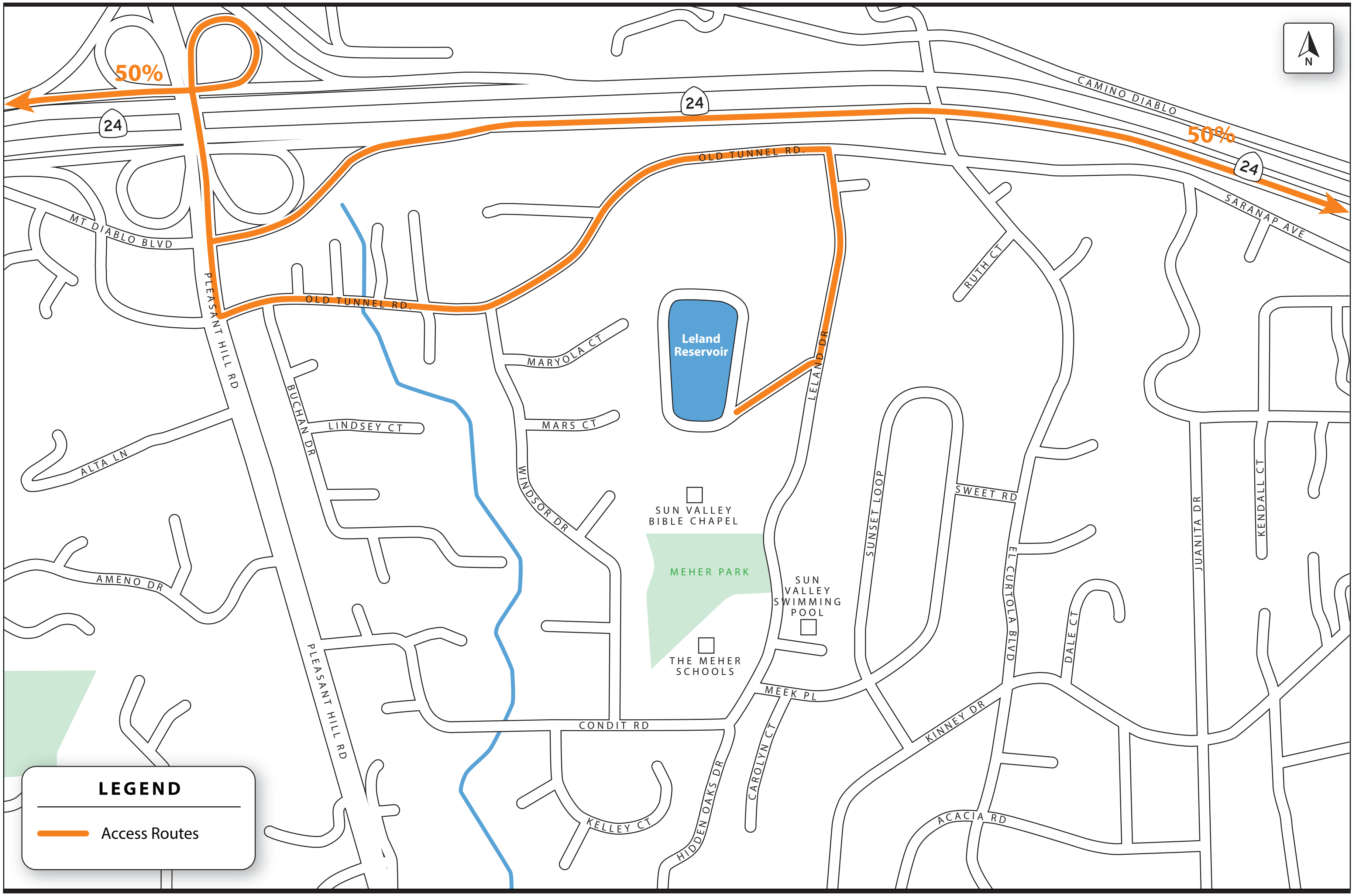
Figure 5A
Inbound Construction Access Routes



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EBMUD Leland Reservoir Replacement Project

Figure 5B
Outbound Construction Access Routes

and 950 feet within reservoir site) would generate a total of approximately 4,745 CY of excavated material (3,650 LF*1.3=4,745 CY). This would be equivalent to a total of 297 truckloads assuming 16 CY truck size (4,745 CY/16 CY) or a total of 594 hauling truck trips accounting for one inbound trip and one outbound trip for each truckload.

Reservoir construction activities would generate haul truck trips for soil disposal and transporting demolition debris. Constructing the reservoir would require transporting approximately 66,000 CY soil and demolition debris to off-site locations. Therefore, the Project would dispose of a total of 4,125 truckloads assuming 16 CY truck size (66,000 CY/16CY) or a total of 8,250 hauling truck trips accounting for one inbound and one outbound trip for each truckload. Hauling truck trips associated with reservoir construction would occur over the course of the demolition period.

Since the reservoir construction would start after the pipeline construction is completed on public roadways, there would be no overlap of hauling truck trips for the two Project components. The number of daily hauling truck trips would vary substantially throughout the entire Project duration from 0 to 70 truck trips a day depending on the phase of construction. Assuming the daily hauling trips are spread over a seven-hour period, the Project would generate 0 to 10 truck trips during the peak hour.

Excavated spoil would be transported from the Project site to various disposal sites that have been previously approved by EBMUD. Disposal facilities are located throughout California as well as in Nevada and Texas. As an analytical assumption, half of the hauling truck trips are assumed to travel east of the Project area (via SR-24 eastbound) and the remaining half of the hauling truck trips are assumed to travel west of the Project area (via SR-24 westbound). It is anticipated that haul trucks would use the most direct access routes from and to freeways via Pleasant Hill Road, Old Tunnel Road and Leland Drive (see **Figures 5A** and **5B**).

<u>Material and Equipment Delivery Trips</u>

Pipeline construction would generate an average of three daily material and equipment delivery trips including one for pipeline, one for appurtenances, and one for equipment. Material and equipment delivery trips for reservoir construction would include the transport of building materials, piping, paving, and general equipment delivery ranging from 0 to 106 material/equipment delivery trips on a daily basis depending on the phase of construction. Assuming the daily hauling trips are spread over a seven-hour period, the Project would generate 0 to 16 truck trips during the peak hour.

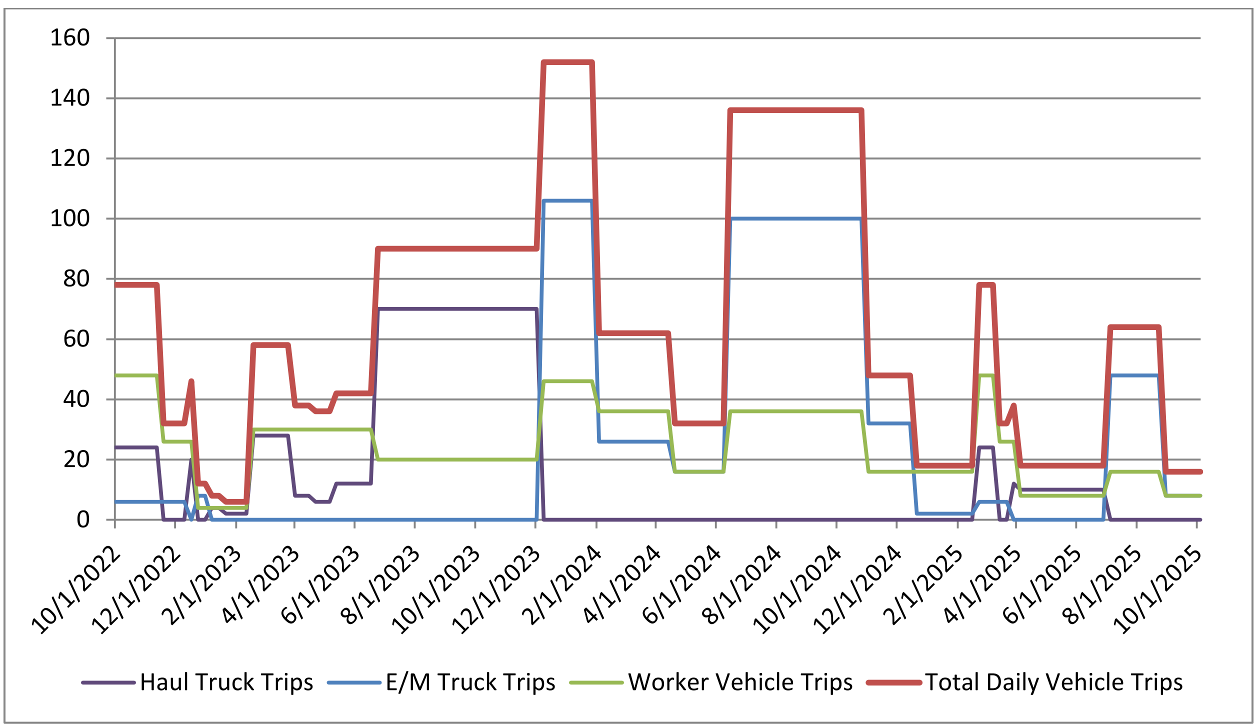
As an analytical assumption, half of the material and equipment delivery trips were assumed to come from the west of the Project area (via SR-24 eastbound) and the remaining half of the delivery trips were assumed to travel from east of the Project area (via SR-24 westbound). It is anticipated that haul trucks would use the most direct access routes to the Project site from freeways via Pleasant Hill Road, Old Tunnel Road and Leland Drive (see **Figures 5A** and **5B**).

Overall Project Trips

The Project construction activities would occur at varying levels of intensity over the course of three years from fall 2022 through fall 2025. The highest volume period for worker trips, hauling truck trips, and material/equipment delivery trips would differ depending on the phase of construction. For example, the highest volume of worker trips would occur around winter 2023 for the construction of the concrete foundation for the reservoir; whereas the highest volume of hauling truck trips would occur around summer 2023 during the demolition of the existing reservoir.

The total daily vehicle trips would range from 6 to 152 trips a day depending on the construction phase with an average of approximately 65 vehicle trips a day. Overall, the highest combined construction traffic volume including worker trips, hauling truck trips and material and equipment delivery trips would occur in winter 2023 and last for approximately eight weeks (five percent of the total construction period) during the construction of the concrete foundation for the reservoir. There would be no hauling truck trips during this period. It is noted that the highest volume of hauling truck trips would occur around summer 2023 during the demolition of the existing reservoir. The level of construction traffic outside of the highest-volume period would be substantially lower for the majority of the time. **Exhibit 1** presents the magnitude of Project trips and their respective durations throughout the three-year construction period.

Exhibit 1 – Project Vehicle Trip Generation by Phase



Source: CHS Consulting Group, 2017

Notes: E/M Trucks = Equipment and Material Delivery Truck Trips

In order to develop a conservative estimation of daily construction traffic volumes for traffic analyses, the highest combined volume of worker trips, hauling truck trips, and material/equipment delivery trips was used. The Project would generate a total of 152 daily vehicle trips during the highest-volume period, including 39 vehicle trips during both the AM and PM peak hours. Of the 39 vehicle trips generated during the AM and PM peak hours, approximately 62 percent would be construction worker trips and 38 percent would be truck trips. **Table 5** shows the daily and the peak hour Project trip generation by vehicle type during the highest volume period.

Table 5 – Project Vehicle Trip Generation

Vehicle Type	Daily			AM Peak Hour			PM Peak Hour		
	IB	OB	Total	IB	OB	Total	IB	OB	Total
Worker Vehicle Trips	23	23	46	23	0	23	0	23	23
Equipment/ Material Delivery Trips	53	53	106	8	8	16	8	8	16
Hauling Truck Trips[1]	0	0	0	0	0	0	0	0	0
Total	**76**	**76**	**152**	**31**	**8**	**39**	**8**	**31**	**39**

Source: CHS Consulting Group, 2017.
1. The highest volume of combined traffic volume included worker trips, hauling truck trips and material and equipment delivery trips would occur during the construction of concrete foundation for the reservoir. However, there would be no haling trips period.
IB = Inbound; OB = Outbound

3.2 Thresholds of Significance

Consistent with Appendix G of the CEQA Guidelines and impact on traffic and transportation would be significant if the Project would:

1. Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit.

2. Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways.

3. Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks.

4. Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).

5. Result in inadequate emergency access.

6. Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities.

The following are the relevant significance criteria and regulations used by the City of Lafayette for determination of impacts associated with the Project.[6]

The *General Plan* policy (C-1.2) considers LOS D with a delay of 33 seconds the lowest acceptable condition for signalized intersections outside of the downtown area.[7] For unsignalized intersections, LOS D is the lowest acceptable condition.

In the City of Lafayette, Pleasant Hill Road north of SR-24 is a Route of Regional Significance, which is subject to Traffic Service Objectives established as part of the CCTA's *Countywide Comprehensive Transportation Plan*. However, since the Project traffic would not contribute any trips to Pleasant Hill Road north of SR-24, study intersections along Pleasant Hill Road (Pleasant Hill Road / Mt. Diablo Boulevard and Pleasant Hill Road / Old Tunnel Road) were assessed using the HCM LOS calculation procedures.

According to the City of Lafayette Ordinance No. 646, vehicles weighing more than 10,000 pounds shall not travel on any street within the City other than designated truck routes except for commercial vehicles needed for the construction, installation or repair of a public utility. Designated truck routes in the City of Lafayette are Pleasant Hill Road, Deer Hill Road, First Street, Oak Hill Road, Mt. Diablo Boulevard, Olympic Boulevard, and Moraga Road. Because Project construction would involve construction of a public utility, Project-generated truck trips are exempt from this ordinance.

3.3 Criteria Requiring No Further Evaluation

Criteria listed above that are not applicable to actions associated with the project are identified below along with a supporting rationale as to why further consideration is unnecessary and a no-impact determination is appropriate.

Criterion 2. Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways. Construction of the proposed project would not conflict with established

[6] All study intersections are located within the City of Lafayette.
[7] As noted in Circulation Element, the downtown corridor is defined as the area along Mount Diablo Boulevard from the westerly to easterly limits of the downtown area. Downtown intersections are those that are located on Mt. Diablo Boulevard between Risa Road and Carol Lane, and the intersections of Moraga Road with Moraga Boulevard and Bro Street/School Street.

CCTA's standards for their congestion management program (LOS standards, Transportation Demand Management) for roads and highways. SR-24 is the only road in the project area that is included in the CMP network. The proposed project would not trigger an CCTA analysis on the CMP roadway network because it would not generate over 100 peak hour trips, as shown in Section 3.1. There would be no significant increase in traffic on a long-term basis as a result of the proposed project because the traffic generated by the proposed project is temporary. No impact would occur from conflicting with established Contra Costa County standards for their congestion management program.

Criterion 3. *Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks.* The Project involves construction of buried underground pipelines and replacement of an existing reservoir and would have no impacts on air traffic patterns.

3.4 Approach to Analysis

As discussed previously and summarized at the end of this section, there would be minimal changes in transportation effects related to the operations for the Leland Reservoir and the pipelines. Therefore, the discussion in this section is focused on the construction-related transportation impacts of the Project which include traffic operational levels at study intersections due to increased traffic associated with the addition of construction-related traffic and potential circulation and safety impacts due to temporary lane closures on public roadways during construction. Transit, bicycle and pedestrian impacts are discussed qualitatively.

Impact TR-1 (Criterion 1): Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?

Intersection Level of Service

Traffic conditions were evaluated at study intersections that would be directly affected by the Project construction traffic. **Table 6** presents the Projected LOS and delay data for the study intersections with the increase in traffic ("with Project") under the Existing plus Project condition. All study intersections would continue to operate satisfactorily at LOS D or better during the AM and PM peak hours, except for the intersection of Pleasant Hill Road and Mt. Diablo Boulevard during the PM peak hour. The intersection of Pleasant Hill Road and Mt. Diablo Boulevard currently operates at LOS E during the PM peak-hour due to extended delays along the eastbound through movement on Mt. Diablo Boulevard. With the addition of Project trips (about 40 vehicles), the intersection operating condition is expected to be similar because the project would add trips to an approach that is less capacity constrained than other approaches and the overall weighted average of delays would be lower.. **Appendix B** includes detailed LOS calculation sheets.

Table 6 – Intersection Level of Service: Existing Plus Project Weekday AM and PM Peak Hours

Intersection	Control 1	AM Peak Hour				PM Peak Hour			
		Existing		EPP		Existing		EPP	
		Delay 2	LOS2	Delay 2	LOS2	Delay 2	LOS2	Delay 2	LOS2
Pleasant Hill Road / Mt. Diablo Boulevard	Signal	16.8	B	16.7	B	**60.6**	**E**	**60.1**	**E**
Pleasant Hill Road / Old Tunnel Road	Signal	9.9	A	10.3	B	10.2	B	10.6	B
Old Tunnel Road / Windsor Drive	AWSC	8.1	A	8.3	A	8.0	A	8.1	A
Old Tunnel Road / Leland Drive	SSSC	10.1	B	10.5	B	9.9	A	10.6	B
Old Tunnel Road / El Curtola Boulevard	AWSC	8.1	A	8.1	A	8.3	A	8.3	A
Condit Road / Windsor Drive	AWSC	8.4	A	8.4	A	7.8	A	7.8	A

Source: CHS Consulting Group, 2017.

Notes:

1. Signal = signalized intersection; AWSC = all-way stop-controlled intersection; SSSC = side street stop-controlled intersection
2. The LOS and delay (in seconds per vehicle) for signalized intersections and all-way stop-controlled intersection represent conditions for the overall intersection; LOS and delay for side street stop-controlled intersection reports the worst approach on stop controlled approach.

EPP = Existing Plus Project

BOLD indicates unacceptable LOS conditions (LOS E or F).

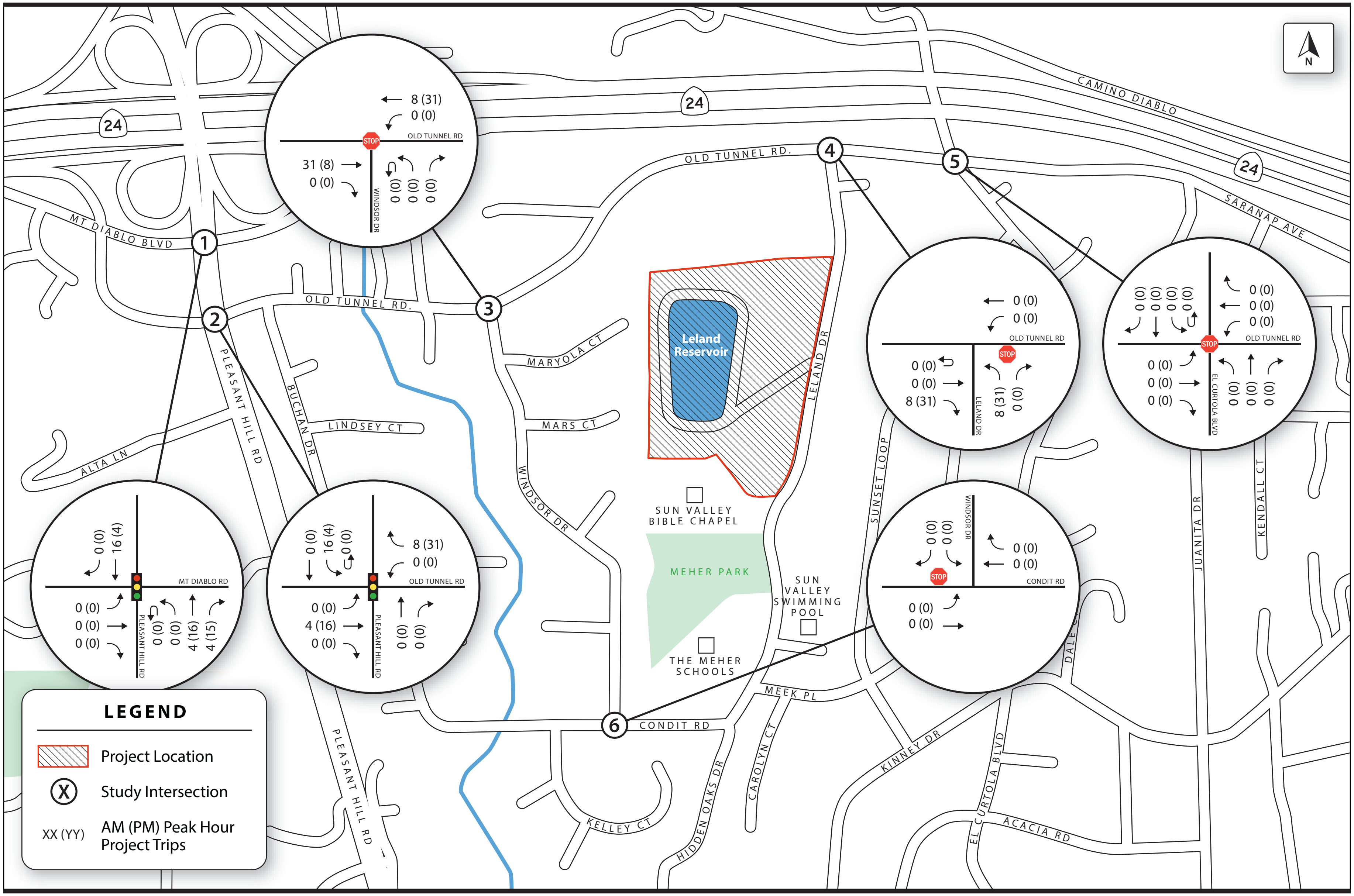
It is noted that the intersection operating conditions in years 2022 through 2025 during the Project construction period would not be substantially different from the Existing plus Project scenario presented above, because the Project vicinity encompassing the six study intersections is mostly built out with single family houses and there are no approved or funded plans that would affect roadway capacity at these study intersections. Therefore, the proposed project would not conflict with General Plan Policy C01.2, which regulates acceptable intersection LOS for locations outside the City's downtown corridor.

There are four approved development projects in the Project vicinity including three projects (i.e., six new single-family residences in Hoedel Court, Lafayette Park Terrace, which 18 condominium units at 3235 Mt. Diablo Court, and Byron Park Expansion, which includes a 33,649 square-foot residential care facility) south of SR 24 and one project (i.e., 44 single-family residences and a community park at 3233 and 3312 Deer Hill Road, also known as the Deer Hill) north of SR 24.[8] Given the size of the three projects located south of SR 24, they would not generate a significant amount of trips to deteriorate the operating conditions at study intersections, and the project located north of SR 24 would not likely contribute a significant amount of trips onto study intersections since its access routes do not overlap with the project access route.[9]

As presented above, the study intersections would operate at LOS A or B with the addition of Project trips, except for the Pleasant Hill Road and Mt. Diablo Boulevard intersection. The Pleasant Hill Road and Mt. Diablo Boulevard intersection currently operates at LOS E during the PM peak hour, and the intersection operating condition is expected to be similar with the addition of Project trips because the project would add trips to an approach that is less capacity constrained than other approaches and the overall weighted average of delays would be lower. Therefore, traffic operating conditions at study intersections in years 2022 through 2025 with the Project would not present substantial differences from the Existing plus Project condition.

The Project would generate a total of about 39 vehicle trips during the AM or PM peak hours. Trips would spread onto multiple streets in the vicinity of the Project site. **Figure 6** shows the estimated Project volumes at major intersections in the area. The Leland Drive / Old Tunnel Road intersection and Pleasant Hill Road / Mt. Diablo Boulevard intersection would experience the highest volume of Project traffic with up to 39 Project-generated vehicles travelling through the intersection during the AM and PM peak hours. This increase in volumes would represent approximately 14 percent of the existing volume at Leland Drive / Old Tunnel Road intersection and less than two percent of the existing volumes at Pleasant Hill Road / Mt. Diablo Boulevard intersection. Although the increases in volumes may be noticeable to local residents, the additional construction-related vehicles would not cause traffic volumes along local streets to exceed or approach the carrying capacity of the roadways or cause queuing issues along Leland Drive. [10] Therefore, potential Project impacts related to intersection level of service would be considered ***less than significant***.

[8] City of Lafayette, Major Development Projects Map, http://lafayette.icitywork.com/, Accessed May 22, 2017.
[9] Three development projects located south of SR 24 combined together are expected to generate approximately 25 vehicle trips during the PM peak hour, based on the *Institute of Transportation Engineers Trip Generation* rates (i.e., 1.01 trips for each single family residence, .52 trips for each dwelling unit in condominium, and .29 trips per each unit in residential care facility). These trips would disperse in different directions, and potential contribution to study intersections would be negligible.
[10] According to the *2000 Highway Capacity Manual,* the base saturation flow rate is estimated to be up to 950 passenger cars per hour per lane with 50/50 directional split.



EBMUD Leland Reservoir Replacement Project

Figure 6
Project Volumes

The proposed project would have no impact relative to Ordinance No. 646, which prohibits travel of vehicles over 10,000 pounds in weight on any road that is not a designated truck route. Because Project construction would involve construction of a public utility, Project-generated truck trips are exempt from this ordinance.

Project related impacts on pedestrians, bicyclists and users of mass transit are discussed below in Impact TRA-4.

Partial or full roadway closures due to construction activities would require the temporary prohibition of on-street parking along the affected roadways (Windsor Drive, Condit Road and Leland Drive). The removal of parking would allow adequate room for construction activities, and help to expedite construction activities. Construction workers would park along the eastern edge of the reservoir site on the shoulder of Leland Drive, where sufficient parking is available. Because on-street parking is typically underutilized, loss of parking is not expected to inconvenience local residents.

Impact TR-2 (Criterion 4): Substantially increase hazards due to a design feature or incompatible uses?

The presence of open trenches, construction equipment, construction workers, and vehicles in proximity to flowing traffic would create a potential temporary hazard for both workers and vehicular traffic. Roadways with open trenches would be partially or fully closed, which could result in a hazard for vehicular traffic associated with reduced travel lanes, confusion in identifying detours, and the potential for a vehicle to accidently collide with cones or equipment. Proposed pipeline construction would install a total of 3,650 linear feet of new pipelines including 2,700 feet in public right-of-ways and 950 feet along the east side of the reservoir site. The new pipelines would be constructed using an open trench or "cut and cover" construction method and would proceed at a rate of about 80 feet per day. The open trench would be a minimum 56 inches wide, and a minimum construction easement width of 25 feet would be required to accommodate pipeline storage and trucks and equipment access along the trench. In some areas where the pipeline would need to be installed at a greater depth to avoid other utilities, a wider trench and construction easement of up to 40 feet would be required. It is anticipated that the construction of 2,700 feet of pipelines in Windsor Drive, Condit Road and Leland Drive would last approximately seven weeks (not including construction mobilization activities). Construction on local roadways would occur between 7:00 a.m. and 7:00 p.m., Monday through Friday.

During proposed pipeline construction activities requiring full closures, the affected roadway segments would be closed to through-traffic except emergency vehicles, garbage collection, and the U.S. Postal Service. Access for local residences would generally be maintained with controlled access to and from their locations. Only the roadway segments under construction would be closed. Upon completion of construction for a specific segment, access to that segment would be restored. Open trenches would be covered with plates during non-construction hours and road closures would be removed to allows for access during non-work periods. It is likely that some construction equipment may be left in the work area and/or staging areas. Potential circulation and safety impacts along affected roadways are described in detail below.

Windsor Drive

Pipeline construction on Windsor Drive would occur along the entire approximately 1,900-foot-long roadway between Old Tunnel Road and Condit Road (see **Figure 2A**). Windsor Drive is approximately 35 feet wide and provides one travel lane and on-street parking in each direction. Since the proposed pipeline construction would require a construction easement of 25 to 40 feet in width, it would require a closure of at least one travel lane or full road closure to through traffic.[11] The construction zone would move along Windsor Drive by about 80 feet per day.

Windsor Drive currently carries approximately 407 vehicle trips throughout the day, and during the peak hour (1:15 p.m. to 2:15 p.m.) there are approximately 40 vehicle trips including 15 vehicle trips in the northbound direction and 25 vehicle trips in the southbound direction. Although the volumes are low, a temporary reduction in roadway capacity from two to one travel lane for both directions of traffic would create potential safety hazards for vehicles. Per EBMUD's *Standard Construction Specification 01 55 26*, the proposed project would require preparation of a traffic control plan and would include flaggers to control traffic where alternating one-way traffic is necessary. The use of flaggers would provide guidance to motorists as to when and how to safely move through the Project site during construction. Additionally, the contractors would be required to post at each end of the one-way traffic section at least one week prior to start of work the approximately beginning and ending dates that traffic delays will be encountered and the maximum time that traffic will be delayed. The EBMUD Practices and Procedures Monitoring and Reporting Plan lists the applicable standards specification language. **Mitigation Measure TR-1** includes specific measures that would be implemented for the streets in the Project area. The maximum queue length on either end of the construction zone on Windsor Road when alternating one-way traffic would be approximately 28 feet (two car lengths) with no more than 28 seconds of delays and would not cause any substantial delays. **Appendix D** includes detailed queuing analyses.

In the event of full road closure to through traffic, residents or visitors accessing Windsor Drive north of the construction zone from the south would need to be redirected to use Old Tunnel Road (via Leland Drive), and those traveling to the south of construction zone from the north would be redirected to Condit Road (via Leland Drive) as an alternative travel path during the construction period. The closure would affect approximately 407 daily vehicles currently traveling along Windsor Drive between Old Tunnel Road and Condit Road (about 40 of which occur during the peak hour). While the detour would be an inconvenience for motorists and bicyclists, detour routes would represent minimal additional

[11] A minimum of 10-foot-wide right-of-way is typically required for one-way traffic.

travel time for affected vehicles. Old Tunnel Road, Condit Road, and Leland Drive have sufficient capacity to accommodate diverted traffic without substantial effects on local street traffic circulation. Per EBMUD's *Standard Construction Specification 01 55 26*, the proposed project would require preparation of a traffic control plan and include installation of warning and detour signs advising motorists to follow appropriate detour routes well in advance of the Windsor Drive closure to through traffic. Use of these warning and detour signs would provide guidance to motorists as to how to most efficiently move through the Project site during construction. The EBMUD Practices and Procedures Monitoring and Reporting Plan lists the applicable standards specifications language. Details regarding warning and detour signs are specified in **Mitigation Measures TR-1**.

Condit Road

Pipeline construction on Condit Road would occur along an approximately 500-foot-long segment of Condit Road between Windsor Drive and Leland Drive (see **Figure 2A**). The construction along Condit Road would last approximately seven working days. Condit Road is approximately 35 feet wide and provides one travel lane in each direction. On-street parking is prohibited on the south side of the street. Since the proposed pipeline construction would require a construction easement of 25 to 40 feet in width, the plan would require a closure of at least one travel lane or full road closure to through traffic.[12] The construction zone would move along Condit Road by about 80 feet. Condit Road currently carries approximately 1,861 vehicle trips throughout the day, and during the peak hour (8:00 a.m. to 9:00 a.m.), there are approximately 242 vehicle trips including 100 vehicle trips in the eastbound direction and 142 vehicle trips in the westbound direction. A temporary reduction in roadway capacity from two to one travel lane for both directions of traffic would create potential safety hazards for vehicles. Per EBMUD's *Standard Construction Specification 01 55 26*, the proposed project would require preparation of a traffic control plan and **Mitigation Measure TR-1** would require flaggers at both ends of the construction zone on Condit Road directing and alternating one direction of traffic at a time. The use of flaggers would provide guidance to motorists as to when and how to safely move through the Project site during construction. Additionally, the contractors would be required to post at each end of the one-way traffic section at least one week prior to start of work the approximately beginning and ending dates that traffic delays will be encountered and the maximum time that traffic will be delayed. The maximum queue length on either end of the construction zone on Condit Road when alternating one-way traffic would be approximately 105 feet (six car lengths) with no more than 35 seconds of delay and which would not be considered a substantial delay. **Appendix D** includes detailed queuing analyses. The EBMUD Practices and Procedures Monitoring and Reporting Plan lists the applicable standard specifications language.

In the event of full road closure to through traffic, residents or visitors accessing Condit Road west of the construction zone from the east would need to be redirected to use Pleasant Hill Road (via Old Tunnel

[12] Ibid.

Road), and those traveling to the east of construction zone from the west would be redirected to Leland Drive (via Old Tunnel Road) as an alternative travel path during the construction period. The closure would affect approximately 1,618 vehicles currently traveling along Condit Road between Windsor Drive and Leland Drive between 7:00 a.m. and 7:00 p.m. (about 242 of which occur during the peak hour). While the detour would be an inconvenience for motorists and bicyclists, detour routes would represent minimal additional travel time for affected vehicles. Old Tunnel Road, Leland Drive, and Pleasant Hill Road generally have sufficient capacity to accommodate diverted traffic without substantial effects on local street traffic circulation. Per EBMUD's Standard Construction *Specification 01 55 26*, the proposed project would require preparation of a traffic control plan would include installation of warning and detour signs advising motorists to follow appropriate detour routes well in advance of the Windsor Drive closure to through traffic. Use of these warning and detour signs would provide guidance to motorists as to how to most efficiently move through the Project site during construction. The EBMUD Practices and Procedures Monitoring and Reporting Plan lists the applicable standards specifications language.

Leland Drive

Pipeline construction on Leland Drive would occur along an approximately 300-foot-long segment of Leland Drive between Condit Road and Meek Place (see **Figure 2A**). The construction along Leland Drive would last for approximately four working days. Leland Drive is approximately 30 feet wide and provides one travel lane in each direction. On-street parking is prohibited on the east side of the street in the Project area. Since the proposed pipeline construction would require a minimum construction easement of 25 feet, it would likely require full road closure to through traffic during construction.[13] The construction zone would move along Leland Drive by about 80 feet. In addition to pipeline construction on Leland Drive, EBMUD would construct a 30-inch drain line crossing Leland Drive from Patty Way directly across Leland Drive. The construction of the drain line would require a closure of Leland Drive to through traffic for one additional day. The residents or visitors accessing Leland Drive north of construction zone from the south would need to be redirected to use Old Tunnel Road, and those traveling to the south of construction zone from the north would be redirected to Condit Road as an alternative travel path during this period. The closure would affect approximately 576 vehicles currently traveling along Leland Drive between Old Tunnel Road and Condit Road between 7:00 a.m. and 7:00 p.m. (about 102 of which occur during the peak hour). While the detour would be an inconvenience for motorists and bicyclists, detour routes would represent minimal additional travel time for affected vehicles and would last for a short duration (one to four working days). Both Old Tunnel Road and Condit Road have sufficient capacity to accommodate diverted traffic without substantial effects on local street traffic circulation Per EBMUD's *Standard Construction Specification 01 55 26*, the proposed project would require preparation of a traffic control plan and would include installation of warning and detour signs advising motorists to follow appropriate detour routes well in advance of the Leland Drive closure. Use of these warning and detour signs would provide guidance to motorists as to how to most

[13] Ibid.

efficiently move through the Project site during construction. The EBMUD Practices and Procedures Monitoring and Reporting Plan lists the applicable standard specifications language.

The parking lot for Meher School is located on the west side of Leland Drive adjacent to the construction zone, and access to the parking lot may be affected during construction. Meher School is generally open between the hours of 8:00 a.m. and 6:40 p.m., with peak drop-off and pick-up activities occurring from 8:00 a.m. to 9:00 a.m. and from 1:45 p.m. to 2:45 p.m., respectively.[14] Due to its proximity, pipeline construction on Leland Drive may affect access to the parking lot and create a potential conflict with school traffic. The Sun Valley Swimming Pool is located just north of the pipeline construction area, and its access would not be directly affected during construction. Per EBMUD's *Standard Construction Specification 01 55 26*, the proposed project would require preparation of a traffic control plan and **Mitigation Measure TR-1** would include adjusting construction hours to avoid drop-off and pick-up hours for The Meher Schools. Adjustment of construction hours in this manner would allow for safer and more efficient movement of people picking up and dropping kids off at school, given that construction personnel and equipment would not be presents. Not adjusting construction hours would result in unsafe and congested circulation conditions if all parties are on-site concurrently. The EBMUD Practices and Procedures Monitoring and Reporting Plan lists the applicable standards specifications language.

Overall, Project construction would not substantially affect traffic operations along nearby streets or permanently reduce roadway capacity because alternate routes of travel through locations in the vicinity of the Project site would be possible, and traffic operations would return to their current state after the end of construction activities.

A temporary reduction in roadway capacity would create potential safety hazards for motorists, given that travel on these roadways would be constrained and modified in a manner that could present challenges to drivers unaccustomed to these changes. However, with the implementation of *Standard Construction Specification 01 55 26* and **Mitigation Measure TR-1**, the Project impacts on traffic hazards would be ***less-than-significant***.

Mitigation Measure TR-1: Traffic Control Measures for Windsor Drive, Condit Road and Leland Drive
The following measures will be implemented throughout the entire duration of the Project construction, to reduce the Project's temporary impacts to traffic circulation through the Project site:

- *When construction activities occur on Windsor Drive, Condit Road, or Leland Drive, construction contractor shall provide advance warning signs and flaggers at both ends of construction zone on Windsor Drive and Condit Road to alternate one-way traffic through the construction zone.*

[14] Source: The Meher Schools Parent Handbook 2016-2017.

- *When Windsor Drive, Condit Road, or Leland Drive is closed to through traffic, the construction contractor shall provide advance warning signs and detour signs along Pleasant Hill Road, Old Tunnel Road, and other affected roadways to advise motorists and bicyclists to follow appropriate detour routes well in advance of the roadway closure to through traffic.*

- *During the entire period of Project construction (including both reservoir and pipeline construction), truck trips shall be avoided during the typical school drop-off and pick-up hours for The Meher Schools along a portion of Leland Drive within approximately 300 feet radius from the entrance to the school. Typically, the school is open between 7:00 a.m. and 6:30 p.m. and the peak drop-off and pick-up hours occur from 8:00 a.m. to 9:00 a.m. and from 1:45 p.m. to 2:45 p.m., respectively. The construction contractor shall confirm the start and dismissal times prior to the beginning of each school year. If avoiding drop-off and pick-up hours is infeasible, the construction contractor shall provide additional flaggers during school drop-off and pick-up hours near the construction zone on Leland Drive to manage traffic flow and maintain traffic safety.*

- *When construction activities occur on Windsor Drive, Condit Road, or Leland Drive, roadside safety protocols shall be implemented. Advance "Road Work Ahead" warning signs and speed control (including signs informing drivers of state-legislated double fines for speed infractions in a construction zone) shall be provided to achieve required speed reductions for safer traffic flow through Leland Drive, Condit Road, and Windsor Drive.*

- *The roadway right-of-way on Windsor Drive, Condit Road, and Leland Drive shall be restored to its original conditions upon completion of construction.*

- *When construction activities occur on Windsor Drive, Condit Road, or Leland Drive, advance warning signs (e.g., "Truck Crossing") shall be installed along Leland Drive, advising motorists and bicyclists of construction traffic to minimize hazards associated with truck traffic on the residential road.*

- *Pedestrian and bicycle access and circulation shall be maintained during Project construction where safe to do so.*

- Construction contractor shall notify LSBTA of roadway closures along Leland Drive or Windsor Drive and facilitate school bus access as much as possible or provide detour routes during the construction period. Additionally, the contractor shall provide flaggers at active school bus stops in the vicinity of construction area to ensure safe student pick-up and drop-off activities where safe to do so.

Impact TR-3: Result in inadequate emergency access (Criterion 5)

Construction of the proposed project would require the full and partial closures of roadways within the City of Lafayette and could result in inadequate emergency access Implementation of *EBMUD Standard Construction Specification 01 55 26*, would require a contingency plan for emergency access and **Mitigation Measure TR-2** requires (1) notification of and coordination with emergency response services as well as notification of businesses, commercial offices, and residents located within 300 feet of construction areas prior to road closures; (2) the use of easily removed, temporary barricades; and (3) the removal of barricades and closure of open trenches at the end of the day. Impacts to emergency access would be ***less than significant*** after implementation of *EBMUD Standard Construction Specification 01 55 26* and **Mitigation Measure TR-2** because the measures outlined above would notify first responders of roadway closures and would facilitate access as much as possible during the construction period. The EBMUD Practices and Procedures Monitoring and Reporting Plan lists the applicable standards specifications language.

Mitigation Measure TR-2 – Maintain Emergency Access

Emergency responders (i.e., local police, fire, and ambulance services) shall be notified at least seven days in advance of any activities requiring full or partial roadway closures. Emergency access detour routes shall be determined in consultation with emergency responders as part of the notification process. The Meher Schools, Sun Valley Pool and residents located within 300 feet of construction shall be notified at least seven days in advance of activities requiring roadway closures, outlining the proposed project schedule and the duration of construction activities. EBMUD will send notices to the individuals and organizations on the proposed project's mailing list to update them prior to any roadway closures. Temporary barricades and directional cones that can be readily removed shall be used during full or partial roadway closures. Road barricades shall be removed and open trenches shall be covered (plated) at the end of the day on a daily basis to provide access. A portion of the on-street parking zones may be retained to allow for storage and/or staging of construction equipment

Impact TR-4 (Criterion 6): Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?

Transit Impacts

As discussed above, County Connection operates one bus route (Route 25) in the vicinity of the Project site. Route 25 operates between Lafayette BART Station and Walnut Creek BART Station via Mt. Diablo Boulevard, Pleasant Hill Boulevard, and Olympic Boulevard, and the nearest bus stop to the Project site is located at the intersection of Old Tunnel Road and Pleasant Hill Road, approximately 2,000 feet west of the Project site. The Project would add approximately 39 vehicle trips to this intersection during the AM and PM peak hours, and the intersection would continue to operate with the same LOS with the addition of Project-generated trips. The bus stop and its operation would not be affected by the Project construction because the Project would not result in a lower LOS at the intersection of Old Tunnel Road and Pleasant Hill Road compared to existing conditions.

The LSBTA operates three Lamorinda school bus routes (i.e., Routes 21, 25, and 28) in the vicinity of the Project site. These routes operate along Pleasant Hill Road, Mt. Diablo Boulevard, Old Tunnel Road, Windsor Drive and Leland Drive during morning (between 7:00 a.m. and 8:00 a.m.) and afternoon (between 3:00 p.m. and 4:00 p.m.) periods. Due to the overlap in school bus routes and pipeline construction areas on Windsor Drive and Leland Drive, there may be potential conflicts with school bus traffic and construction activities. Impacts to transit would be ***less than significant*** after implementation of *EBMUD Standard Construction Specification 01 55 26* and **Mitigation Measure TR-1** because the measures outlined above would notify LSBTA of roadway closures and would facilitate school bus access as much as possible or provide detour routes during the construction period. Additionally, the contractors would be required to provide flaggers at active school bus stops in the vicinity of construction area to ensure safe student pick-up and drop-off activities where safe to do so. The EBMUD Practices and Procedures Monitoring and Reporting Plan lists the applicable standards specifications language.

Pedestrian and Bicycle Impacts

Based on the counts collected during the AM and PM peak periods on Tuesday, June 2, 2016, there are very few pedestrian and bicycle trips in the vicinity of the Project site. Pleasant Hill Road has the highest volumes of pedestrian and bicyclist traffic with up to 25 pedestrians and 11 bicyclists during the peak hour. Residential streets such as Leland Drive have substantially fewer pedestrian and bicycle traffic with up to four pedestrians or bicyclists during the peak hour. While the existing bicycle and pedestrian volumes are low in the vicinity of the Project site, the anticipated construction activities on public roadways along Windsor Drive, Condit Road and Leland Drive could create potentially hazardous conditions for pedestrians and bicyclists due to a temporary reduction in roadway capacity. Implementation of *EBMUD Standard Specification 01 55 26* and **Mitigation Measure TR-1**, which require the preparation of a traffic control plan, would include flaggers at each end of construction zones along Windsor Drive, Condit Road, and Leland Drive to facilitate traffic movements and ensure safe passage of pedestrians and bicyclists through construction zones. Advance warning signs would also inform the pedestrians and bicyclists about construction activities and provide alternate routes when any street is closed to through traffic. Use of these warning signs would provide guidance to pedestrians and bicyclists as to how most efficiently to move through the Project site during construction. The EBMUD Practices and Procedures Monitoring and Reporting Plan lists the applicable standards specifications language. Therefore, the Project impacts on pedestrians and bicycles would be ***less than significant***.

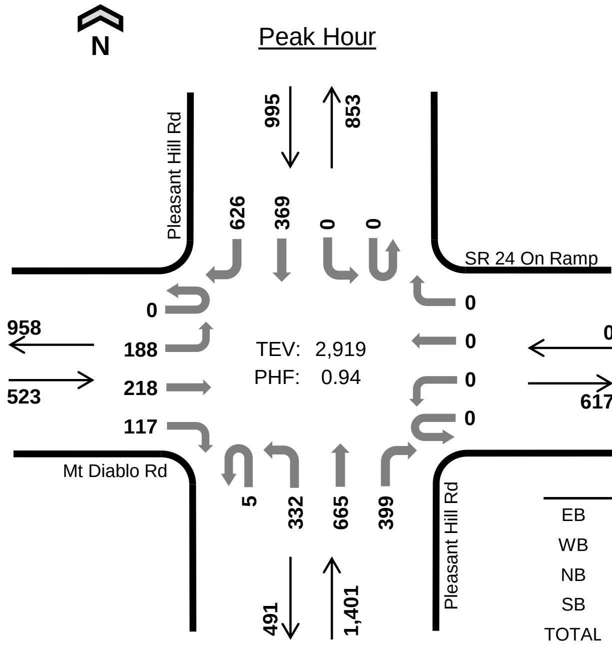
Appendix A

Intersection Turning Movement Counts

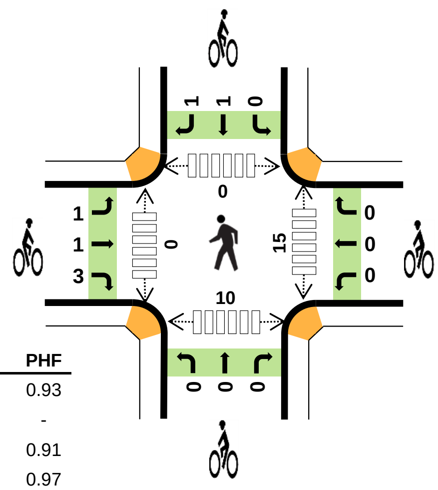
Daily Traffic Counts

Pleasant Hill Rd
Mt Diablo Rd

Date: 06/02/2016
Count Period: 7:00 AM to 9:00 AM
Peak Hour: 7:30 AM to 8:30 AM



	HV %:	PHF
EB	3.6%	0.93
WB	-	-
NB	1.1%	0.91
SB	2.5%	0.97
TOTAL	2.0%	0.94



Two-Hour Count Summaries

Interval Start		Mt Diablo Rd				SR 24 On Ramp				Pleasant Hill Rd				Pleasant Hill Rd				15-min Total	Rolling One Hour
		Eastbound				Westbound				Northbound				Southbound					
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM		0	15	37	12	0	0	0	0	0	33	102	55	0	0	65	112	431	0
7:15 AM		0	19	42	19	0	0	0	0	0	44	114	47	0	0	71	127	483	0
7:30 AM		**0**	**54**	**46**	**14**	**0**	**0**	**0**	**0**	**2**	**75**	**201**	**72**	**0**	**0**	**83**	**147**	**694**	0
7:45 AM		**0**	**71**	**48**	**17**	**0**	**0**	**0**	**0**	**1**	**92**	**188**	**103**	**0**	**0**	**92**	**165**	**777**	2,385
8:00 AM		**0**	**30**	**60**	**42**	**0**	**0**	**0**	**0**	**0**	**88**	**138**	**110**	**0**	**0**	**93**	**158**	**719**	2,673
8:15 AM		**0**	**33**	**64**	**44**	**0**	**0**	**0**	**0**	**2**	**77**	**138**	**114**	**0**	**0**	**101**	**156**	**729**	**2,919**
8:30 AM		0	37	72	35	0	0	0	0	0	72	101	103	0	0	106	165	691	2,916
8:45 AM		0	28	76	37	0	0	0	0	0	56	121	104	0	0	120	163	705	2,844
Count Total		0	287	445	220	0	0	0	0	5	537	1,103	708	0	0	731	1,193	5,229	0
Peak Hour	**All**	**0**	**188**	**218**	**117**	**0**	**0**	**0**	**0**	**5**	**332**	**665**	**399**	**0**	**0**	**369**	**626**	**2,919**	**0**
	HV	**0**	**3**	**10**	**6**	**0**	**0**	**0**	**0**	**0**	**10**	**3**	**2**	**0**	**0**	**10**	**15**	**59**	**0**
	HV%	**-**	**2%**	**5%**	**5%**	**-**	**-**	**-**	**-**	**0%**	**3%**	**0%**	**1%**	**-**	**-**	**3%**	**2%**	**2%**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 AM	2	0	2	7	*11*	0	0	0	0	*0*	1	0	0	0	*1*
7:15 AM	2	0	3	7	*12*	0	0	0	2	*2*	4	0	1	2	*7*
7:30 AM	**9**	**0**	**3**	**10**	***22***	**0**	**0**	**0**	**0**	***0***	**5**	**0**	**0**	**5**	*10*
7:45 AM	**5**	**0**	**7**	**6**	***18***	**2**	**0**	**0**	**1**	***3***	**8**	**0**	**0**	**5**	*13*
8:00 AM	**2**	**0**	**3**	**5**	***10***	**0**	**0**	**0**	**1**	***1***	**0**	**0**	**0**	**0**	*0*
8:15 AM	**3**	**0**	**2**	**4**	***9***	**3**	**0**	**0**	**0**	***3***	**2**	**0**	**0**	**0**	***2***
8:30 AM	5	0	1	5	*11*	0	0	0	0	*0*	2	2	0	0	*4*
8:45 AM	2	0	4	4	*10*	0	0	0	0	*0*	0	0	0	0	*0*
Count Total	30	0	25	48	*103*	5	0	0	4	*9*	22	2	1	12	*37*
Peak Hour	**19**	**0**	**15**	**25**	***59***	**5**	**0**	**0**	**2**	***7***	**15**	**0**	**0**	**10**	***25***

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Two-Hour Count Summaries - Heavy Vehicles

Interval Start	Mt Diablo Rd Eastbound UT	LT	TH	RT	SR 24 On Ramp Westbound UT	LT	TH	RT	Pleasant Hill Rd Northbound UT	LT	TH	RT	Pleasant Hill Rd Southbound UT	LT	TH	RT	15-min Total	Rolling One Hour
7:00 AM	0	0	2	0	0	0	0	0	0	2	0	0	0	0	3	4	11	0
7:15 AM	0	1	1	0	0	0	0	0	0	3	0	0	0	0	2	5	12	0
7:30 AM	**0**	**3**	**2**	**4**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**1**	**0**	**0**	**2**	**8**	**22**	0
7:45 AM	**0**	**0**	**4**	**1**	**0**	**0**	**0**	**0**	**0**	**5**	**1**	**1**	**0**	**0**	**3**	**3**	**18**	63
8:00 AM	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**0**	**0**	**0**	**0**	**4**	**1**	**10**	62
8:15 AM	**0**	**0**	**2**	**1**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**0**	**0**	**0**	**1**	**3**	**9**	**59**
8:30 AM	0	2	1	2	0	0	0	0	0	0	0	1	0	0	2	3	11	48
8:45 AM	0	1	1	0	0	0	0	0	0	1	1	2	0	0	1	3	10	40
Count Total	0	7	15	8	0	0	0	0	0	16	4	5	0	0	18	30	103	0
Peak Hour	**0**	**3**	**10**	**6**	**0**	**0**	**0**	**0**	**0**	**10**	**3**	**2**	**0**	**0**	**10**	**15**	**59**	**0**

Two-Hour Count Summaries - Bikes

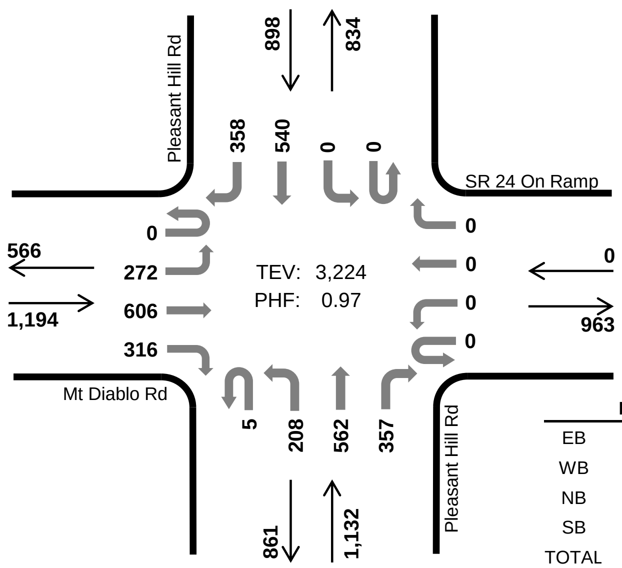
Interval Start	Mt Diablo Rd Eastbound LT	TH	RT	SR 24 On Ramp Westbound LT	TH	RT	Pleasant Hill Rd Northbound LT	TH	RT	Pleasant Hill Rd Southbound LT	TH	RT	15-min Total	Rolling One Hour
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	1	1	2	0
7:30 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
7:45 AM	**1**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**3**	5
8:00 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**1**	6
8:15 AM	**0**	**0**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**7**
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	7
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	4
Count Total	1	1	3	0	0	0	0	0	0	0	2	2	9	0
Peak Hour	**1**	**1**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**7**	**0**

Note: U-Turn volumes for bikes are included in Left-Turn, if any.

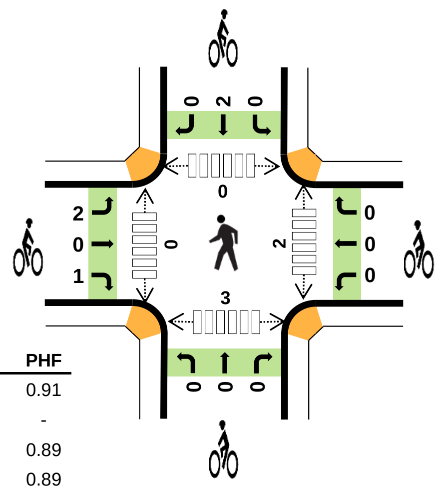
Pleasant Hill Rd
Mt Diablo Rd

Date: 06/02/2016
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 4:45 PM to 5:45 PM

Peak Hour



	HV %:	PHF
EB	0.3%	0.91
WB	-	-
NB	0.8%	0.89
SB	1.0%	0.89
TOTAL	0.7%	0.97



Two-Hour Count Summaries

Interval Start		Mt Diablo Rd Eastbound UT	LT	TH	RT	SR 24 On Ramp Westbound UT	LT	TH	RT	Pleasant Hill Rd Northbound UT	LT	TH	RT	Pleasant Hill Rd Southbound UT	LT	TH	RT	15-min Total	Rolling One Hour
4:00 PM		0	55	104	76	0	0	0	0	0	64	139	90	0	0	119	85	732	0
4:15 PM		0	65	123	64	0	0	0	0	0	56	139	82	0	0	97	77	703	0
4:30 PM		0	58	124	76	0	0	0	0	1	42	150	93	0	0	103	87	734	0
4:45 PM		**0**	**66**	**112**	**79**	**0**	**0**	**0**	**0**	**1**	**53**	**166**	**97**	**0**	**0**	**120**	**86**	**780**	2,949
5:00 PM		**0**	**68**	**179**	**82**	**0**	**0**	**0**	**0**	**2**	**49**	**147**	**102**	**0**	**0**	**115**	**90**	**834**	3,051
5:15 PM		**0**	**66**	**142**	**73**	**0**	**0**	**0**	**0**	**1**	**55**	**121**	**85**	**0**	**0**	**149**	**85**	**777**	3,125
5:30 PM		**0**	**72**	**173**	**82**	**0**	**0**	**0**	**0**	**1**	**51**	**128**	**73**	**0**	**0**	**156**	**97**	**833**	**3,224**
5:45 PM		0	48	124	89	0	0	0	0	0	61	123	69	0	0	108	73	695	3,139
Count Total		0	498	1,081	621	0	0	0	0	6	431	1,113	691	0	0	967	680	6,088	0
Peak Hour	**All**	**0**	**272**	**606**	**316**	**0**	**0**	**0**	**0**	**5**	**208**	**562**	**357**	**0**	**0**	**540**	**358**	**3,224**	**0**
	HV	**0**	**1**	**1**	**2**	**0**	**0**	**0**	**0**	**0**	**1**	**5**	**3**	**0**	**0**	**3**	**6**	**22**	**0**
	HV%	**-**	**0%**	**0%**	**1%**	**-**	**-**	**-**	**-**	**0%**	**0%**	**1%**	**1%**	**-**	**-**	**1%**	**2%**	**1%**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals EB	WB	NB	SB	Total	Bicycles EB	WB	NB	SB	Total	Pedestrians (Crossing Leg) East	West	North	South	Total
4:00 PM	1	0	3	0	*4*	0	0	0	0	*0*	1	0	0	1	*2*
4:15 PM	1	0	1	0	*2*	0	0	0	0	*0*	1	0	0	1	*2*
4:30 PM	2	0	2	0	*4*	0	0	0	0	*0*	1	0	0	1	*2*
4:45 PM	**1**	**0**	**2**	**0**	***3***	**2**	**0**	**0**	**1**	***3***	**1**	**0**	**0**	**1**	*2*
5:00 PM	**1**	**0**	**3**	**3**	***7***	**1**	**0**	**0**	**0**	***1***	**0**	**0**	**0**	**0**	*0*
5:15 PM	**1**	**0**	**3**	**3**	***7***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
5:30 PM	**1**	**0**	**1**	**3**	***5***	**0**	**0**	**0**	**1**	***1***	**1**	**0**	**0**	**2**	***3***
5:45 PM	2	0	1	1	*4*	1	0	0	0	*1*	3	0	0	3	*6*
Count Total	10	0	16	10	*36*	4	0	0	2	*6*	8	0	0	9	*17*
Peak Hour	**4**	**0**	**9**	**9**	***22***	**3**	**0**	**0**	**2**	***5***	**2**	**0**	**0**	**3**	***5***

Two-Hour Count Summaries - Heavy Vehicles

Interval Start	Mt Diablo Rd				SR 24 On Ramp				Pleasant Hill Rd				Pleasant Hill Rd				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	0	1	0	0	0	0	0	0	1	1	1	0	0	0	0	4	0
4:15 PM	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2	0
4:30 PM	0	1	0	1	0	0	0	0	0	0	2	0	0	0	0	0	4	0
4:45 PM	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**3**	13
5:00 PM	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**1**	**2**	**0**	**0**	**0**	**1**	**2**	**7**	16
5:15 PM	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**1**	**0**	**0**	**0**	**3**	**7**	21
5:30 PM	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**2**	**1**	**5**	**22**
5:45 PM	0	0	2	0	0	0	0	0	0	0	0	1	0	0	0	1	4	23
Count Total	0	3	4	3	0	0	0	0	0	2	9	5	0	0	3	7	36	0
Peak Hour	**0**	**1**	**1**	**2**	**0**	**0**	**0**	**0**	**0**	**1**	**5**	**3**	**0**	**0**	**3**	**6**	**22**	**0**

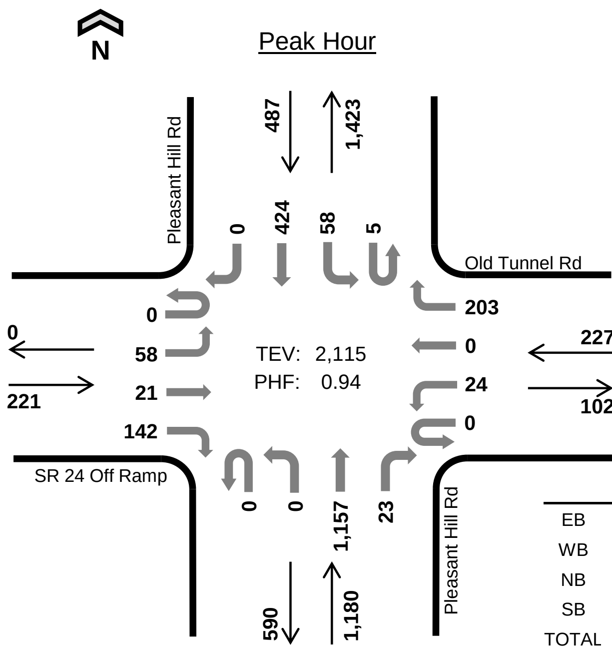
Two-Hour Count Summaries - Bikes

Interval Start	Mt Diablo Rd			SR 24 On Ramp			Pleasant Hill Rd			Pleasant Hill Rd			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**3**	3
5:00 PM	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	4
5:15 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	4
5:30 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**1**	**5**
5:45 PM	0	0	1	0	0	0	0	0	0	0	0	0	1	3
Count Total	2	0	2	0	0	0	0	0	0	0	2	0	6	0
Peak Hour	**2**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**5**	**0**

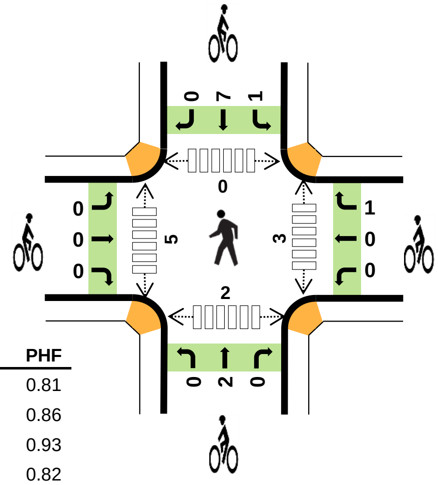
Note: U-Turn volumes for bikes are included in Left-Turn, if any.

Pleasant Hill Rd
Old Tunnel Rd

Date: 06/02/2016
Count Period: 7:00 AM to 9:00 AM
Peak Hour: 7:30 AM to 8:30 AM



	HV %:	PHF
EB	1.8%	0.81
WB	1.8%	0.86
NB	0.8%	0.93
SB	3.7%	0.82
TOTAL	1.7%	0.94



Two-Hour Count Summaries

Interval Start	SR 24 Off Ramp Eastbound UT	LT	TH	RT	Old Tunnel Rd Westbound UT	LT	TH	RT	Pleasant Hill Rd Northbound UT	LT	TH	RT	Pleasant Hill Rd Southbound UT	LT	TH	RT	15-min Total	Rolling One Hour
7:00 AM	0	6	3	22	0	1	0	21	0	0	165	0	2	3	71	0	294	0
7:15 AM	0	14	2	24	0	1	0	27	0	0	174	0	1	11	79	0	333	0
7:30 AM	**0**	**9**	**1**	**30**	**0**	**5**	**0**	**60**	**0**	**0**	**294**	**5**	**1**	**8**	**82**	**0**	**495**	0
7:45 AM	**0**	**16**	**7**	**38**	**0**	**5**	**0**	**61**	**0**	**0**	**315**	**3**	**2**	**15**	**98**	**0**	**560**	1,682
8:00 AM	**0**	**14**	**6**	**32**	**0**	**13**	**0**	**44**	**0**	**0**	**267**	**10**	**2**	**17**	**113**	**0**	**518**	1,906
8:15 AM	**0**	**19**	**7**	**42**	**0**	**1**	**0**	**38**	**0**	**0**	**281**	**5**	**0**	**18**	**131**	**0**	**542**	**2,115**
8:30 AM	0	19	6	27	0	2	0	25	0	0	236	5	2	17	123	0	462	2,082
8:45 AM	0	9	7	43	0	4	0	38	0	0	227	2	4	6	141	0	481	2,003
Count Total	0	106	39	258	0	32	0	314	0	0	1,959	30	14	95	838	0	3,685	0
Peak Hour All	**0**	**58**	**21**	**142**	**0**	**24**	**0**	**203**	**0**	**0**	**1,157**	**23**	**5**	**58**	**424**	**0**	**2,115**	**0**
Peak Hour HV	**0**	**2**	**0**	**2**	**0**	**1**	**0**	**3**	**0**	**0**	**10**	**0**	**1**	**2**	**15**	**0**	**36**	**0**
Peak Hour HV%	**-**	**3%**	**0%**	**1%**	**-**	**4%**	**-**	**1%**	**-**	**-**	**1%**	**0%**	**20%**	**3%**	**4%**	**-**	**2%**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals EB	WB	NB	SB	Total	Bicycles EB	WB	NB	SB	Total	Pedestrians (Crossing Leg) East	West	North	South	Total
7:00 AM	1	1	0	3	*5*	0	0	0	0	*0*	0	1	0	0	*1*
7:15 AM	3	0	1	2	*6*	0	0	0	1	*1*	1	2	0	2	*5*
7:30 AM	**0**	**1**	**3**	**6**	***10***	**0**	**1**	**1**	**1**	***3***	**1**	**0**	**0**	**2**	*3*
7:45 AM	**1**	**2**	**3**	**4**	***10***	**0**	**0**	**1**	**1**	***2***	**2**	**0**	**0**	**0**	*2*
8:00 AM	**2**	**1**	**1**	**4**	***8***	**0**	**0**	**0**	**2**	***2***	**0**	**4**	**0**	**0**	*4*
8:15 AM	**1**	**0**	**3**	**4**	***8***	**0**	**0**	**0**	**4**	***4***	**0**	**1**	**0**	**0**	***1***
8:30 AM	1	0	1	4	*6*	0	2	0	0	*2*	2	2	0	1	*5*
8:45 AM	0	1	3	1	*5*	0	0	1	0	*1*	0	1	0	1	*2*
Count Total	9	6	15	28	*58*	0	3	3	9	*15*	6	11	0	6	*23*
Peak Hour	**4**	**4**	**10**	**18**	***36***	**0**	**1**	**2**	**8**	***11***	**3**	**5**	**0**	**2**	***10***

Two-Hour Count Summaries - Heavy Vehicles

Interval Start	SR 24 Off Ramp Eastbound				Old Tunnel Rd Westbound				Pleasant Hill Rd Northbound				Pleasant Hill Rd Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	0	0	1	0	0	0	1	0	0	0	0	0	0	3	0	5	0
7:15 AM	0	3	0	0	0	0	0	0	0	0	1	0	0	1	1	0	6	0
7:30 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**3**	**0**	**0**	**1**	**5**	**0**	**10**	0
7:45 AM	**0**	**0**	**0**	**1**	**0**	**1**	**0**	**1**	**0**	**0**	**3**	**0**	**1**	**0**	**3**	**0**	**10**	31
8:00 AM	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**1**	**0**	**0**	**0**	**4**	**0**	**8**	34
8:15 AM	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**0**	**0**	**1**	**3**	**0**	**8**	**36**
8:30 AM	0	1	0	0	0	0	0	0	0	0	1	0	0	1	3	0	6	32
8:45 AM	0	0	0	0	0	1	0	0	0	0	3	0	0	0	1	0	5	27
Count Total	0	6	0	3	0	2	0	4	0	0	15	0	1	4	23	0	58	0
Peak Hour	**0**	**2**	**0**	**2**	**0**	**1**	**0**	**3**	**0**	**0**	**10**	**0**	**1**	**2**	**15**	**0**	**36**	**0**

Two-Hour Count Summaries - Bikes

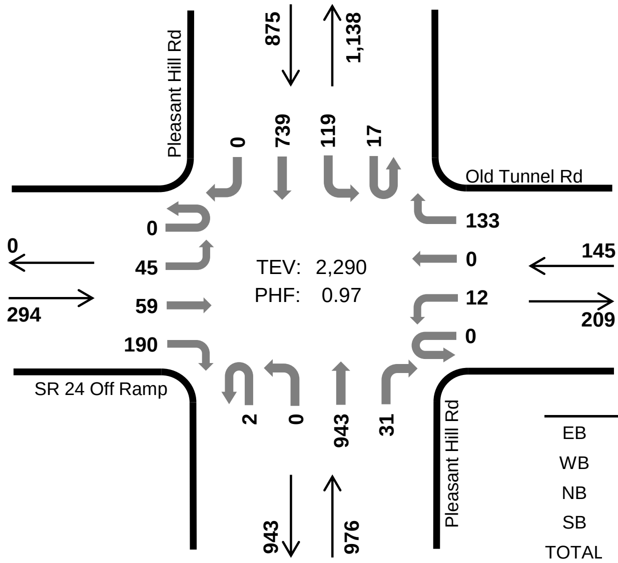
Interval Start	SR 24 Off Ramp Eastbound			Old Tunnel Rd Westbound			Pleasant Hill Rd Northbound			Pleasant Hill Rd Southbound			15-min Total	Rolling One Hour
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	0
7:30 AM	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**1**	**0**	**0**	**1**	**0**	**3**	0
7:45 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**1**	**0**	**2**	6
8:00 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**2**	8
8:15 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**3**	**0**	**4**	**11**
8:30 AM	0	0	0	1	0	1	0	0	0	0	0	0	2	10
8:45 AM	0	0	0	0	0	0	0	1	0	0	0	0	1	9
Count Total	0	0	0	1	0	2	0	3	0	1	8	0	15	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**2**	**0**	**1**	**7**	**0**	**11**	**0**

Note: U-Turn volumes for bikes are included in Left-Turn, if any.

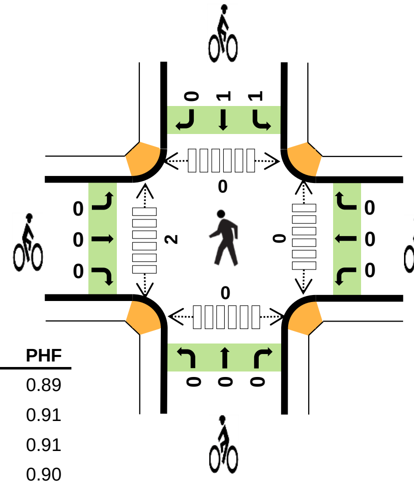
Pleasant Hill Rd
Old Tunnel Rd

Date: 06/02/2016
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 4:45 PM to 5:45 PM

Peak Hour



	HV %:	PHF
EB	0.3%	0.89
WB	0.7%	0.91
NB	0.7%	0.91
SB	0.7%	0.90
TOTAL	0.7%	0.97



Two-Hour Count Summaries

Interval Start	SR 24 Off Ramp Eastbound UT	LT	TH	RT	Old Tunnel Rd Westbound UT	LT	TH	RT	Pleasant Hill Rd Northbound UT	LT	TH	RT	Pleasant Hill Rd Southbound UT	LT	TH	RT	15-min Total	Rolling One Hour
4:00 PM	0	9	14	50	0	4	0	32	0	0	245	5	2	20	174	0	555	0
4:15 PM	0	10	11	54	0	3	0	26	0	0	246	4	4	18	135	0	511	0
4:30 PM	0	11	12	38	0	3	0	26	0	0	252	9	0	22	160	0	533	0
4:45 PM	**0**	**14**	**17**	**52**	**0**	**4**	**0**	**35**	**0**	**0**	**263**	**5**	**3**	**27**	**168**	**0**	**588**	2,187
5:00 PM	**0**	**12**	**19**	**42**	**0**	**2**	**0**	**37**	**2**	**0**	**249**	**5**	**5**	**27**	**172**	**0**	**572**	2,204
5:15 PM	**0**	**9**	**12**	**46**	**0**	**3**	**0**	**37**	**0**	**0**	**213**	**10**	**5**	**33**	**191**	**0**	**559**	2,252
5:30 PM	**0**	**10**	**11**	**50**	**0**	**3**	**0**	**24**	**0**	**0**	**218**	**11**	**4**	**32**	**208**	**0**	**571**	**2,290**
5:45 PM	0	9	24	72	0	3	0	26	0	0	219	1	6	30	159	0	549	2,251
Count Total	0	84	120	404	0	25	0	243	2	0	1,905	50	29	209	1,367	0	4,438	0
Peak Hour All	**0**	**45**	**59**	**190**	**0**	**12**	**0**	**133**	**2**	**0**	**943**	**31**	**17**	**119**	**739**	**0**	**2,290**	**0**
Peak Hour HV	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**1**	**0**	**0**	**7**	**0**	**0**	**0**	**6**	**0**	**15**	**0**
Peak Hour HV%	**-**	**0%**	**0%**	**1%**	**-**	**0%**	**-**	**1%**	**0%**	**-**	**1%**	**0%**	**0%**	**0%**	**1%**	**-**	**1%**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals EB	WB	NB	SB	Total	Bicycles EB	WB	NB	SB	Total	Pedestrians (Crossing Leg) East	West	North	South	Total
4:00 PM	0	0	3	0	*3*	0	0	1	0	*1*	0	0	0	0	*0*
4:15 PM	0	0	1	0	*1*	0	0	0	0	*0*	0	0	0	0	*0*
4:30 PM	0	0	2	1	*3*	0	0	0	0	*0*	0	2	0	0	*2*
4:45 PM	**0**	**0**	**1**	**0**	***1***	**0**	**0**	**0**	**1**	***1***	**0**	**2**	**0**	**0**	*2*
5:00 PM	**0**	**0**	**3**	**3**	***6***	**0**	**0**	**0**	**1**	***1***	**0**	**0**	**0**	**0**	*0*
5:15 PM	**0**	**0**	**2**	**0**	***2***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
5:30 PM	**1**	**1**	**1**	**3**	***6***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***
5:45 PM	0	0	1	0	*1*	0	0	1	1	*2*	0	0	0	0	*0*
Count Total	1	1	14	7	*23*	0	0	2	3	*5*	0	4	0	0	*4*
Peak Hour	**1**	**1**	**7**	**6**	***15***	**0**	**0**	**0**	**2**	***2***	**0**	**2**	**0**	**0**	***2***

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Two-Hour Count Summaries - Heavy Vehicles

Interval Start	SR 24 Off Ramp Eastbound				Old Tunnel Rd Westbound				Pleasant Hill Rd Northbound				Pleasant Hill Rd Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	3	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	2	0	0	0	1	0	3	0
4:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**1**	8
5:00 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**0**	**0**	**0**	**3**	**0**	**6**	11
5:15 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**2**	12
5:30 PM	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**1**	**0**	**0**	**1**	**0**	**0**	**0**	**3**	**0**	**6**	**15**
5:45 PM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	15
Count Total	0	0	0	1	0	0	0	1	0	0	14	0	0	0	7	0	23	0
Peak Hour	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**1**	**0**	**0**	**7**	**0**	**0**	**0**	**6**	**0**	**15**	**0**

Two-Hour Count Summaries - Bikes

Interval Start	SR 24 Off Ramp Eastbound			Old Tunnel Rd Westbound			Pleasant Hill Rd Northbound			Pleasant Hill Rd Southbound			15-min Total	Rolling One Hour
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
4:00 PM	0	0	0	0	0	0	0	0	1	0	0	0	1	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**1**	2
5:00 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**1**	2
5:15 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	2
5:30 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**
5:45 PM	0	0	0	0	0	0	0	1	0	1	0	0	2	3
Count Total	0	0	0	0	0	0	0	1	1	2	1	0	5	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**0**	**2**	**0**

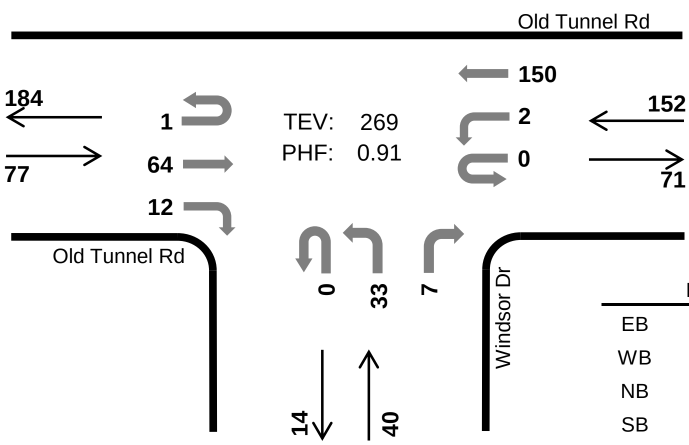
Note: U-Turn volumes for bikes are included in Left-Turn, if any.

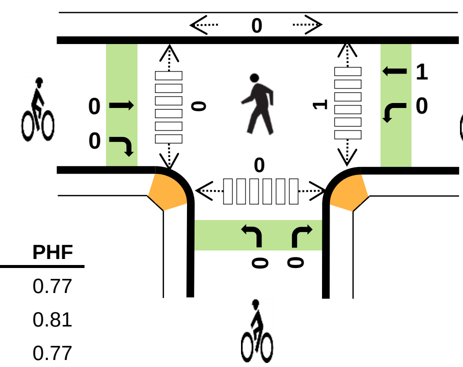
Windsor Dr
Old Tunnel Rd

N

Peak Hour

Date: 06/02/2016
Count Period: 7:00 AM to 9:00 AM
Peak Hour: 7:30 AM to 8:30 AM





	HV %:	PHF
EB	2.6%	0.77
WB	2.0%	0.81
NB	2.5%	0.77
SB	-	-
TOTAL	2.2%	0.91

Two-Hour Count Summaries

Interval Start		Old Tunnel Rd Eastbound UT	LT	TH	RT	Old Tunnel Rd Westbound UT	LT	TH	RT	Windsor Dr Northbound UT	LT	TH	RT	0 Southbound UT	LT	TH	RT	15-min Total	Rolling One Hour
7:00 AM		0	0	0	3	0	0	11	0	0	4	0	0	0	0	0	0	18	0
7:15 AM		0	0	11	3	0	0	21	0	0	1	0	0	0	0	0	0	36	0
7:30 AM		**0**	**0**	**12**	**0**	**0**	**2**	**45**	**0**	**0**	**10**	**0**	**3**	**0**	**0**	**0**	**0**	**72**	0
7:45 AM		**0**	**0**	**17**	**3**	**0**	**0**	**44**	**0**	**0**	**8**	**0**	**2**	**0**	**0**	**0**	**0**	**74**	200
8:00 AM		**1**	**0**	**20**	**4**	**0**	**0**	**38**	**0**	**0**	**7**	**0**	**2**	**0**	**0**	**0**	**0**	**72**	254
8:15 AM		**0**	**0**	**15**	**5**	**0**	**0**	**23**	**0**	**0**	**8**	**0**	**0**	**0**	**0**	**0**	**0**	**51**	**269**
8:30 AM		0	0	16	4	0	2	18	0	0	5	0	1	0	0	0	0	46	243
8:45 AM		0	0	10	2	0	1	25	0	0	8	0	0	0	0	0	0	46	215
Count Total		1	0	101	24	0	5	225	0	0	51	0	8	0	0	0	0	415	0
Peak Hour	**All**	**1**	**0**	**64**	**12**	**0**	**2**	**150**	**0**	**0**	**33**	**0**	**7**	**0**	**0**	**0**	**0**	**269**	**0**
	HV	**0**	**0**	**2**	**0**	**0**	**0**	**3**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**6**	**0**
	HV%	**0%**	**-**	**3%**	**0%**	**-**	**0%**	**2%**	**-**	**-**	**3%**	**-**	**0%**	**-**	**-**	**-**	**-**	**2%**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals EB	WB	NB	SB	Total	Bicycles EB	WB	NB	SB	Total	Pedestrians (Crossing Leg) East	West	North	South	Total
7:00 AM	0	0	0	0	*0*	0	0	0	0	*0*	0	0	0	0	*0*
7:15 AM	1	0	0	0	*1*	0	0	0	0	*0*	0	0	0	0	*0*
7:30 AM	**1**	**2**	**0**	**0**	***3***	**0**	**0**	**0**	**0**	***0***	**1**	**0**	**0**	**0**	*1*
7:45 AM	**0**	**0**	**1**	**0**	***1***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
8:00 AM	**0**	**1**	**0**	**0**	***1***	**0**	**1**	**0**	**0**	***1***	**0**	**0**	**0**	**0**	*0*
8:15 AM	**1**	**0**	**0**	**0**	***1***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***
8:30 AM	0	0	0	0	*0*	0	0	0	0	*0*	0	0	0	0	*0*
8:45 AM	0	0	0	0	*0*	0	0	0	0	*0*	0	0	0	0	*0*
Count Total	3	3	1	0	*7*	0	1	0	0	*1*	1	0	0	0	*1*
Peak Hr	**2**	**3**	**1**	**0**	***6***	**0**	**1**	**0**	**0**	***1***	**1**	**0**	**0**	**0**	***1***

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Two-Hour Count Summaries - Heavy Vehicles

Interval Start	Old Tunnel Rd Eastbound				Old Tunnel Rd Westbound				Windsor Dr Northbound				0 Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0
7:30 AM	**0**	**0**	**1**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	0
7:45 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	5
8:00 AM	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	6
8:15 AM	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**6**
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Count Total	0	0	2	1	0	0	3	0	0	1	0	0	0	0	0	0	7	0
Peak Hour	**0**	**0**	**2**	**0**	**0**	**0**	**3**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**6**	**0**

Two-Hour Count Summaries - Bikes

Interval Start	Old Tunnel Rd Eastbound			Old Tunnel Rd Westbound			Windsor Dr Northbound			0 Southbound			15-min Total	Rolling One Hour
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
7:45 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
8:00 AM	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	1
8:15 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Count Total	0	0	0	0	1	0	0	0	0	0	0	0	1	0
Peak Hour	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**

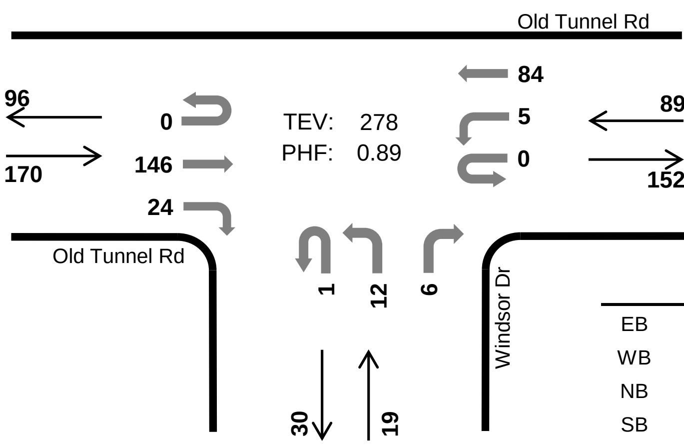
Note: U-Turn volumes for bikes are included in Left-Turn, if any.

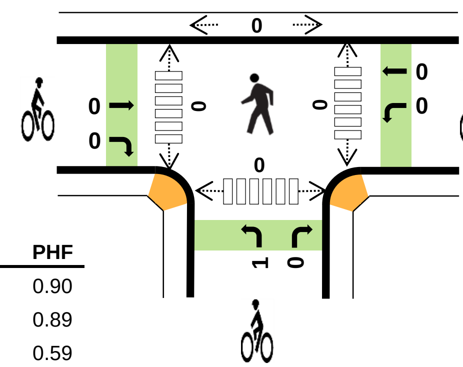
Windsor Dr
Old Tunnel Rd

N

Peak Hour

Date: 06/02/2016
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 5:00 PM to 6:00 PM





	HV %:	PHF
EB	0.0%	0.90
WB	1.1%	0.89
NB	0.0%	0.59
SB	-	-
TOTAL	0.4%	0.89

Two-Hour Count Summaries

Interval Start	Old Tunnel Rd Eastbound				Old Tunnel Rd Westbound				Windsor Dr Northbound				0 Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	1	0	20	7	0	0	20	0	0	4	0	0	0	0	0	0	52	0
4:15 PM	0	0	16	4	0	1	13	0	0	5	0	0	0	0	0	0	39	0
4:30 PM	0	0	27	3	0	1	9	0	0	7	0	0	0	0	0	0	47	0
4:45 PM	0	0	32	5	0	1	21	0	0	4	0	1	0	0	0	0	64	202
5:00 PM	**0**	**0**	**41**	**3**	**0**	**1**	**20**	**0**	**0**	**3**	**0**	**1**	**0**	**0**	**0**	**0**	**69**	219
5:15 PM	**0**	**0**	**34**	**8**	**0**	**1**	**23**	**0**	**1**	**6**	**0**	**1**	**0**	**0**	**0**	**0**	**74**	254
5:30 PM	**0**	**0**	**32**	**5**	**0**	**1**	**18**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**57**	264
5:45 PM	**0**	**0**	**39**	**8**	**0**	**2**	**23**	**0**	**0**	**3**	**0**	**3**	**0**	**0**	**0**	**0**	**78**	**278**
Count Total	1	0	241	43	0	8	147	0	1	32	0	7	0	0	0	0	480	0
Peak Hour All	**0**	**0**	**146**	**24**	**0**	**5**	**84**	**0**	**1**	**12**	**0**	**6**	**0**	**0**	**0**	**0**	**278**	**0**
Peak Hour HV	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**
Peak Hour HV%	**-**	**-**	**0%**	**0%**	**-**	**20%**	**0%**	**-**	**0%**	**0%**	**-**	**0%**	**-**	**-**	**-**	**-**	**0%**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	0	0	0	0	*0*	1	0	0	0	*1*	0	0	0	0	*0*
4:15 PM	0	0	0	0	*0*	0	0	0	0	*0*	0	0	0	0	*0*
4:30 PM	0	0	0	0	*0*	0	0	0	0	*0*	0	0	0	0	*0*
4:45 PM	0	0	0	0	*0*	0	0	0	0	*0*	0	0	0	0	*0*
5:00 PM	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
5:15 PM	**0**	**1**	**0**	**0**	***1***	**0**	**0**	**1**	**0**	***1***	**0**	**0**	**0**	**0**	*0*
5:30 PM	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
5:45 PM	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***
Count Total	0	1	0	0	*1*	1	0	1	0	*2*	0	0	0	0	*0*
Peak Hr	**0**	**1**	**0**	**0**	***1***	**0**	**0**	**1**	**0**	***1***	**0**	**0**	**0**	**0**	***0***

Deon Fouche: 415 - 757 - 7714 deon.fouche@idaxdata.com

Two-Hour Count Summaries - Heavy Vehicles

Interval Start	Old Tunnel Rd				Old Tunnel Rd				Windsor Dr				0				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
5:15 PM	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	1
5:30 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	1
5:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**
Count Total	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**

Two-Hour Count Summaries - Bikes

Interval Start	Old Tunnel Rd			Old Tunnel Rd			Windsor Dr			0			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
4:00 PM	0	0	1	0	0	0	0	0	0	0	0	0	1	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5:00 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
5:15 PM	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**1**	1
5:30 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	1
5:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**
Count Total	0	0	1	0	0	0	1	0	0	0	0	0	2	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**1**	**0**

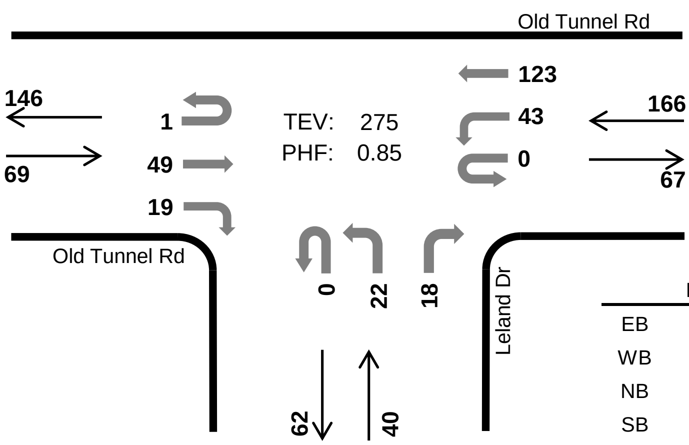
Note: U-Turn volumes for bikes are included in Left-Turn, if any.

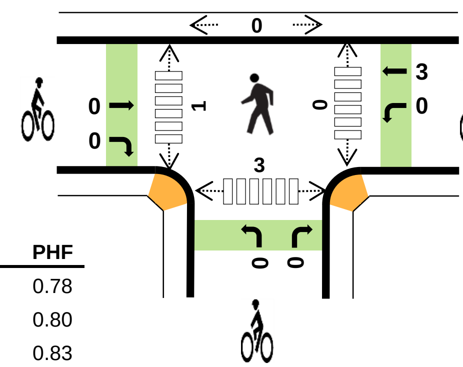
Leland Dr
Old Tunnel Rd

N

Peak Hour

Date: 06/02/2016
Count Period: 7:00 AM to 9:00 AM
Peak Hour: 7:30 AM to 8:30 AM





	HV %:	PHF
EB	1.4%	0.78
WB	1.2%	0.80
NB	5.0%	0.83
SB	-	-
TOTAL	1.8%	0.85

Two-Hour Count Summaries

Interval Start		Old Tunnel Rd Eastbound UT	LT	TH	RT	Old Tunnel Rd Westbound UT	LT	TH	RT	Leland Dr Northbound UT	LT	TH	RT	0 Southbound UT	LT	TH	RT	15-min Total	Rolling One Hour
7:00 AM		0	0	0	0	0	4	11	0	0	0	0	1	0	0	0	0	16	0
7:15 AM		0	0	8	2	0	3	20	0	0	4	0	0	0	0	0	0	37	0
7:30 AM		**1**	**0**	**16**	**0**	**0**	**7**	**39**	**0**	**0**	**5**	**0**	**7**	**0**	**0**	**0**	**0**	**75**	0
7:45 AM		**0**	**0**	**11**	**5**	**0**	**10**	**34**	**0**	**0**	**5**	**0**	**5**	**0**	**0**	**0**	**0**	**70**	198
8:00 AM		**0**	**0**	**16**	**6**	**0**	**19**	**33**	**0**	**0**	**4**	**0**	**3**	**0**	**0**	**0**	**0**	**81**	263
8:15 AM		**0**	**0**	**6**	**8**	**0**	**7**	**17**	**0**	**0**	**8**	**0**	**3**	**0**	**0**	**0**	**0**	**49**	**275**
8:30 AM		1	0	13	4	1	8	16	0	0	3	0	5	0	0	0	0	51	251
8:45 AM		0	0	8	3	0	6	14	0	0	6	0	3	0	0	0	0	40	221
Count Total		2	0	78	28	1	64	184	0	0	35	0	27	0	0	0	0	419	0
Peak Hour	**All**	**1**	**0**	**49**	**19**	**0**	**43**	**123**	**0**	**0**	**22**	**0**	**18**	**0**	**0**	**0**	**0**	**275**	**0**
	HV	**0**	**0**	**0**	**1**	**0**	**1**	**1**	**0**	**0**	**1**	**0**	**1**	**0**	**0**	**0**	**0**	**5**	**0**
	HV%	**0%**	**-**	**0%**	**5%**	**-**	**2%**	**1%**	**-**	**-**	**5%**	**-**	**6%**	**-**	**-**	**-**	**-**	**2%**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals EB	WB	NB	SB	Total	Bicycles EB	WB	NB	SB	Total	Pedestrians (Crossing Leg) East	West	North	South	Total
7:00 AM	0	0	0	0	*0*	0	0	0	0	*0*	1	0	0	1	*2*
7:15 AM	0	0	0	0	*0*	0	0	0	0	*0*	0	0	0	0	*0*
7:30 AM	**0**	**1**	**1**	**0**	***2***	**0**	**2**	**0**	**0**	***2***	**0**	**1**	**0**	**1**	*2*
7:45 AM	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
8:00 AM	**0**	**1**	**1**	**0**	***2***	**0**	**1**	**0**	**0**	***1***	**0**	**0**	**0**	**0**	*0*
8:15 AM	**1**	**0**	**0**	**0**	***1***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**2**	***2***
8:30 AM	0	0	0	0	*0*	0	0	0	0	*0*	0	0	0	2	*2*
8:45 AM	0	0	0	0	*0*	0	0	0	0	*0*	0	0	0	0	*0*
Count Total	1	2	2	0	*5*	0	3	0	0	*3*	1	1	0	6	*8*
Peak Hr	**1**	**2**	**2**	**0**	***5***	**0**	**3**	**0**	**0**	***3***	**0**	**1**	**0**	**3**	***4***

Deon Fouche: 415 - 757 - 7714

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Two-Hour Count Summaries - Heavy Vehicles

Interval Start	Old Tunnel Rd				Old Tunnel Rd				Leland Dr				0				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**2**	0
7:45 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	2
8:00 AM	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	4
8:15 AM	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**5**
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
Count Total	0	0	0	1	0	1	1	0	0	1	0	1	0	0	0	0	5	0
Peak Hour	**0**	**0**	**0**	**1**	**0**	**1**	**1**	**0**	**0**	**1**	**0**	**1**	**0**	**0**	**0**	**0**	**5**	**0**

Two-Hour Count Summaries - Bikes

Interval Start	Old Tunnel Rd			Old Tunnel Rd			Leland Dr			0			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	0
7:45 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	2
8:00 AM	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	3
8:15 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Count Total	0	0	0	0	3	0	0	0	0	0	0	0	3	0
Peak Hour	**0**	**0**	**0**	**0**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**0**

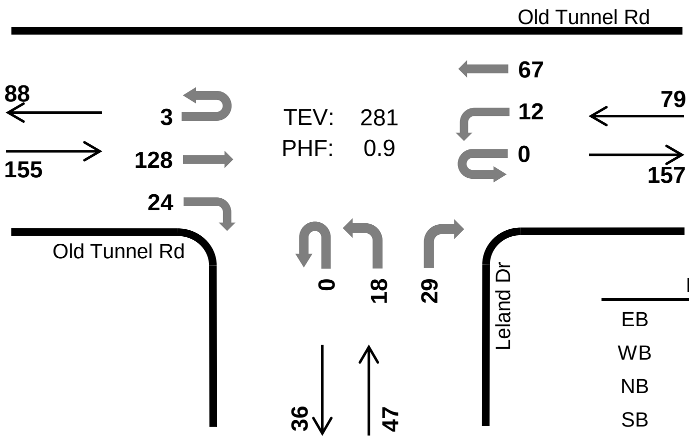
Note: U-Turn volumes for bikes are included in Left-Turn, if any.

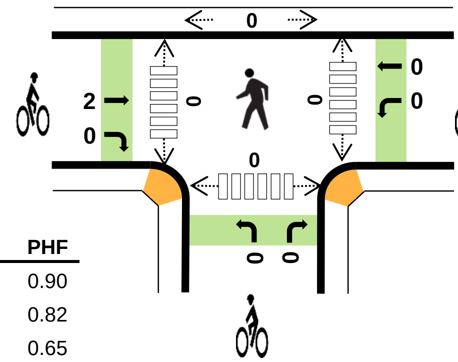
Leland Dr
Old Tunnel Rd

N

Peak Hour

Date: 06/02/2016
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 5:00 PM to 6:00 PM





	HV %:	PHF
EB	0.6%	0.90
WB	1.3%	0.82
NB	2.1%	0.65
SB	-	-
TOTAL	1.1%	0.90

Two-Hour Count Summaries

Interval Start	Old Tunnel Rd Eastbound UT	LT	TH	RT	Old Tunnel Rd Westbound UT	LT	TH	RT	Leland Dr Northbound UT	LT	TH	RT	0 Southbound UT	LT	TH	RT	15-min Total	Rolling One Hour
4:00 PM	0	0	19	1	0	3	17	0	0	2	0	6	0	0	0	0	48	0
4:15 PM	0	0	13	2	0	5	13	0	0	3	0	3	0	0	0	0	39	0
4:30 PM	0	0	23	4	0	3	9	0	0	1	0	6	0	0	0	0	46	0
4:45 PM	0	0	27	3	0	2	17	0	0	2	0	7	0	0	0	0	58	191
5:00 PM	**0**	**0**	**39**	**4**	**0**	**1**	**13**	**0**	**0**	**6**	**0**	**6**	**0**	**0**	**0**	**0**	**69**	212
5:15 PM	**2**	**0**	**26**	**8**	**0**	**4**	**20**	**0**	**0**	**5**	**0**	**3**	**0**	**0**	**0**	**0**	**68**	241
5:30 PM	**0**	**0**	**26**	**8**	**0**	**7**	**16**	**0**	**0**	**4**	**0**	**5**	**0**	**0**	**0**	**0**	**66**	261
5:45 PM	**1**	**0**	**37**	**4**	**0**	**0**	**18**	**0**	**0**	**3**	**0**	**15**	**0**	**0**	**0**	**0**	**78**	**281**
Count Total	3	0	210	34	0	25	123	0	0	26	0	51	0	0	0	0	472	0
Peak Hour All	**3**	**0**	**128**	**24**	**0**	**12**	**67**	**0**	**0**	**18**	**0**	**29**	**0**	**0**	**0**	**0**	**281**	**0**
Peak Hour HV	**0**	**0**	**0**	**1**	**0**	**0**	**1**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**0**
Peak Hour HV%	**0%**	**-**	**0%**	**4%**	**-**	**0%**	**1%**	**-**	**-**	**6%**	**-**	**0%**	**-**	**-**	**-**	**-**	**1%**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals EB	WB	NB	SB	Total	Bicycles EB	WB	NB	SB	Total	Pedestrians (Crossing Leg) East	West	North	South	Total
4:00 PM	0	0	0	0	*0*	0	0	0	0	*0*	0	0	0	0	*0*
4:15 PM	0	0	0	0	*0*	0	0	0	0	*0*	0	0	0	0	*0*
4:30 PM	0	0	0	0	*0*	0	0	0	0	*0*	0	0	0	0	*0*
4:45 PM	0	0	0	0	*0*	0	0	0	0	*0*	0	0	0	0	*0*
5:00 PM	**0**	**0**	**0**	**0**	***0***	**1**	**0**	**0**	**0**	***1***	**0**	**0**	**0**	**0**	*0*
5:15 PM	**1**	**1**	**1**	**0**	***3***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
5:30 PM	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
5:45 PM	**0**	**0**	**0**	**0**	***0***	**1**	**0**	**0**	**0**	***1***	**0**	**0**	**0**	**0**	***0***
Count Total	1	1	1	0	*3*	2	0	0	0	*2*	0	0	0	0	*0*
Peak Hr	**1**	**1**	**1**	**0**	***3***	**2**	**0**	**0**	**0**	***2***	**0**	**0**	**0**	**0**	***0***

Two-Hour Count Summaries - Heavy Vehicles

Interval Start	Old Tunnel Rd				Old Tunnel Rd				Leland Dr				0				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
5:15 PM	**0**	**0**	**0**	**1**	**0**	**0**	**1**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	3
5:30 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	3
5:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**
Count Total	0	0	0	1	0	0	1	0	0	1	0	0	0	0	0	0	3	0
Peak Hour	**0**	**0**	**0**	**1**	**0**	**0**	**1**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**0**

Two-Hour Count Summaries - Bikes

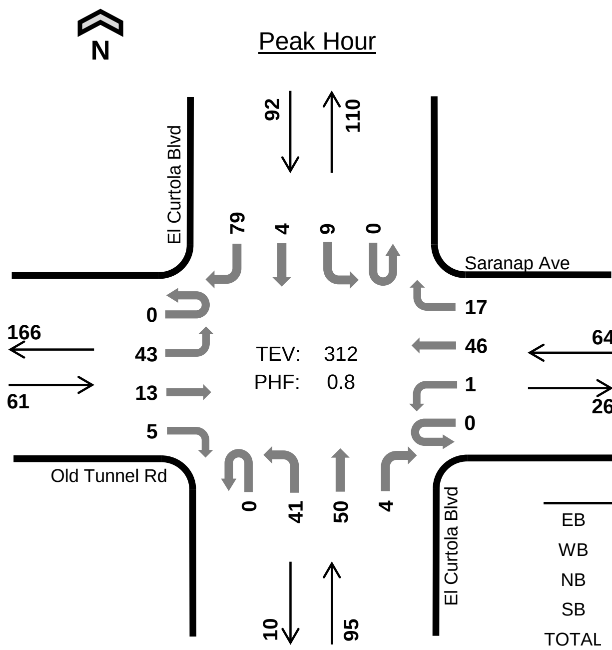
Interval Start	Old Tunnel Rd			Old Tunnel Rd			Leland Dr			0			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	1
5:15 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	1
5:30 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	1
5:45 PM	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**2**
Count Total	0	2	0	0	0	0	0	0	0	0	0	0	2	0
Peak Hour	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**

Note: U-Turn volumes for bikes are included in Left-Turn, if any.

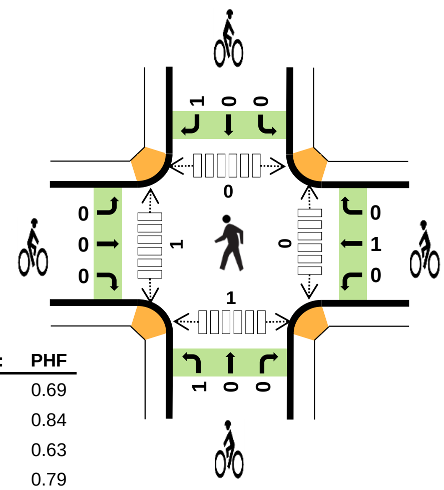
El Curtola Blvd
Old Tunnel Rd

Date: 06/02/2016
Count Period: 7:00 AM to 9:00 AM
Peak Hour: 7:30 AM to 8:30 AM

Peak Hour



	HV %:	PHF
EB	3.3%	0.69
WB	4.7%	0.84
NB	1.1%	0.63
SB	1.1%	0.79
TOTAL	2.2%	0.80



Two-Hour Count Summaries

Interval Start	Old Tunnel Rd Eastbound UT	LT	TH	RT	Saranap Ave Westbound UT	LT	TH	RT	El Curtola Blvd Northbound UT	LT	TH	RT	El Curtola Blvd Southbound UT	LT	TH	RT	15-min Total	Rolling One Hour
7:00 AM	0	1	0	1	0	0	3	2	0	5	2	0	0	1	1	7	23	0
7:15 AM	0	2	4	1	0	0	6	3	0	7	2	0	0	1	1	10	37	0
7:30 AM	**0**	**15**	**5**	**2**	**0**	**1**	**13**	**4**	**0**	**11**	**17**	**2**	**0**	**0**	**0**	**22**	**92**	0
7:45 AM	**0**	**12**	**2**	**2**	**0**	**0**	**13**	**6**	**0**	**11**	**26**	**1**	**0**	**4**	**1**	**20**	**98**	250
8:00 AM	**0**	**11**	**3**	**0**	**0**	**0**	**13**	**3**	**0**	**13**	**2**	**0**	**0**	**3**	**0**	**26**	**74**	301
8:15 AM	**0**	**5**	**3**	**1**	**0**	**0**	**7**	**4**	**0**	**6**	**5**	**1**	**0**	**2**	**3**	**11**	**48**	**312**
8:30 AM	0	10	6	3	0	0	6	3	0	6	2	0	0	5	0	14	55	275
8:45 AM	0	6	5	0	0	0	8	2	0	7	5	0	0	1	2	5	41	218
Count Total	0	62	28	10	0	1	69	27	0	66	61	4	0	17	8	115	468	0
Peak Hour All	**0**	**43**	**13**	**5**	**0**	**1**	**46**	**17**	**0**	**41**	**50**	**4**	**0**	**9**	**4**	**79**	**312**	**0**
Peak Hour HV	**0**	**1**	**1**	**0**	**0**	**1**	**1**	**1**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**1**	**7**	**0**
Peak Hour HV%	**-**	**2%**	**8%**	**0%**	**-**	**100%**	**2%**	**6%**	**-**	**0%**	**0%**	**25%**	**-**	**0%**	**0%**	**1%**	**2%**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals EB	WB	NB	SB	Total	Bicycles EB	WB	NB	SB	Total	Pedestrians (Crossing Leg) East	West	North	South	Total
7:00 AM	0	0	0	0	*0*	0	0	0	0	*0*	0	0	0	1	*1*
7:15 AM	0	0	0	0	*0*	0	0	0	0	*0*	2	0	0	2	*4*
7:30 AM	**2**	**1**	**0**	**1**	***4***	**0**	**1**	**1**	**0**	***2***	**0**	**1**	**0**	**1**	*2*
7:45 AM	**0**	**0**	**1**	**0**	***1***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
8:00 AM	**0**	**2**	**0**	**0**	***2***	**0**	**0**	**0**	**1**	***1***	**0**	**0**	**0**	**0**	*0*
8:15 AM	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***
8:30 AM	0	0	0	0	*0*	0	0	0	0	*0*	0	2	3	0	*5*
8:45 AM	0	0	0	0	*0*	0	0	0	0	*0*	0	0	0	0	*0*
Count Total	2	3	1	1	*7*	0	1	1	1	*3*	2	3	3	4	*12*
Peak Hour	**2**	**3**	**1**	**1**	***7***	**0**	**1**	**1**	**1**	***3***	**0**	**1**	**0**	**1**	***2***

Two-Hour Count Summaries - Heavy Vehicles

Interval Start	Old Tunnel Rd Eastbound				Saranap Ave Westbound				El Curtola Blvd Northbound				El Curtola Blvd Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	**0**	**1**	**1**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**4**	0
7:45 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**1**	5
8:00 AM	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	7
8:15 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**7**
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Count Total	0	1	1	0	0	1	1	1	0	0	0	1	0	0	0	1	7	0
Peak Hour	**0**	**1**	**1**	**0**	**0**	**1**	**1**	**1**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**1**	**7**	**0**

Two-Hour Count Summaries - Bikes

Interval Start	Old Tunnel Rd Eastbound			Saranap Ave Westbound			El Curtola Blvd Northbound			El Curtola Blvd Southbound			15-min Total	Rolling One Hour
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	**0**	**0**	**0**	**0**	**1**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**2**	0
7:45 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	2
8:00 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	3
8:15 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Count Total	0	0	0	0	1	0	1	0	0	0	0	1	3	0
Peak Hour	**0**	**0**	**0**	**0**	**1**	**0**	**1**	**0**	**0**	**0**	**0**	**1**	**3**	**0**

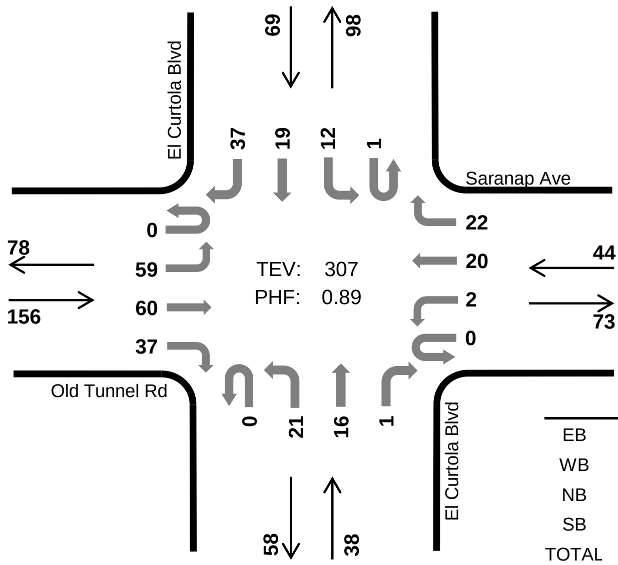
Note: U-Turn volumes for bikes are included in Left-Turn, if any.

El Curtola Blvd
Old Tunnel Rd

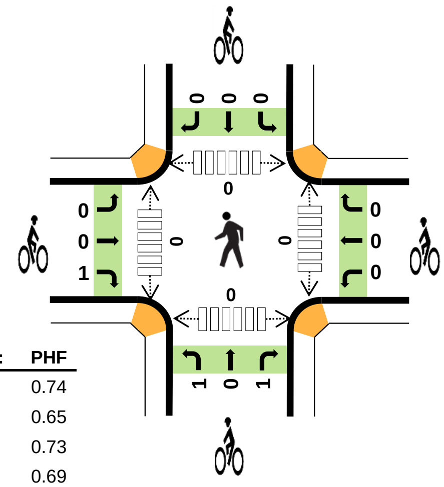
Date: 06/02/2016
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 5:00 PM to 6:00 PM

N

Peak Hour



	HV %:	PHF
EB	0.0%	0.74
WB	2.3%	0.65
NB	5.3%	0.73
SB	0.0%	0.69
TOTAL	1.0%	0.89



Two-Hour Count Summaries

Interval Start	Old Tunnel Rd Eastbound UT	LT	TH	RT	Saranap Ave Westbound UT	LT	TH	RT	El Curtola Blvd Northbound UT	LT	TH	RT	El Curtola Blvd Southbound UT	LT	TH	RT	15-min Total	Rolling One Hour
4:00 PM	0	9	12	4	0	0	5	8	0	8	2	0	0	6	1	7	62	0
4:15 PM	0	5	8	3	1	1	2	12	0	4	5	2	0	2	3	12	60	0
4:30 PM	0	5	18	5	0	0	3	3	0	4	3	0	0	3	8	5	57	0
4:45 PM	0	13	14	6	0	1	6	7	0	3	4	0	0	3	12	10	79	258
5:00 PM	**0**	**19**	**18**	**8**	**0**	**0**	**4**	**3**	**0**	**4**	**3**	**0**	**1**	**1**	**4**	**6**	**71**	267
5:15 PM	**0**	**12**	**9**	**8**	**0**	**1**	**3**	**7**	**0**	**7**	**3**	**0**	**0**	**2**	**0**	**14**	**66**	273
5:30 PM	**0**	**10**	**12**	**7**	**0**	**1**	**7**	**9**	**0**	**6**	**7**	**0**	**0**	**6**	**10**	**9**	**84**	300
5:45 PM	**0**	**18**	**21**	**14**	**0**	**0**	**6**	**3**	**0**	**4**	**3**	**1**	**0**	**3**	**5**	**8**	**86**	**307**
Count Total	0	91	112	55	1	4	36	52	0	40	30	3	1	26	43	71	565	0
Peak Hour All	**0**	**59**	**60**	**37**	**0**	**2**	**20**	**22**	**0**	**21**	**16**	**1**	**1**	**12**	**19**	**37**	**307**	**0**
Peak Hour HV	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**1**	**1**	**0**	**0**	**0**	**0**	**0**	**3**	**0**
Peak Hour HV%	**-**	**0%**	**0%**	**0%**	**-**	**0%**	**0%**	**5%**	**-**	**5%**	**6%**	**0%**	**0%**	**0%**	**0%**	**0%**	**1%**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals EB	WB	NB	SB	Total	Bicycles EB	WB	NB	SB	Total	Pedestrians (Crossing Leg) East	West	North	South	Total
4:00 PM	0	0	0	0	*0*	0	0	0	0	*0*	0	0	0	0	*0*
4:15 PM	0	1	0	0	*1*	0	0	0	0	*0*	0	0	0	0	*0*
4:30 PM	0	0	0	0	*0*	0	0	0	0	*0*	0	0	0	0	*0*
4:45 PM	0	0	0	1	*1*	0	0	0	0	*0*	0	0	0	0	*0*
5:00 PM	**0**	**0**	**0**	**0**	***0***	**1**	**0**	**0**	**0**	***1***	**0**	**0**	**0**	**0**	*0*
5:15 PM	**0**	**0**	**1**	**0**	***1***	**0**	**0**	**1**	**0**	***1***	**0**	**0**	**0**	**0**	*0*
5:30 PM	**0**	**0**	**1**	**0**	***1***	**0**	**0**	**1**	**0**	***1***	**0**	**0**	**0**	**0**	*0*
5:45 PM	**0**	**1**	**0**	**0**	***1***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***
Count Total	0	2	2	1	*5*	1	0	2	0	*3*	0	0	0	0	*0*
Peak Hour	**0**	**1**	**2**	**0**	***3***	**1**	**0**	**2**	**0**	***3***	**0**	**0**	**0**	**0**	***0***

Two-Hour Count Summaries - Heavy Vehicles

Interval Start	Old Tunnel Rd Eastbound UT	LT	TH	RT	Saranap Ave Westbound UT	LT	TH	RT	El Curtola Blvd Northbound UT	LT	TH	RT	El Curtola Blvd Southbound UT	LT	TH	RT	15-min Total	Rolling One Hour
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	2
5:00 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	2
5:15 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	2
5:30 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**1**	3
5:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**3**
Count Total	0	0	0	0	0	0	0	2	0	1	1	0	0	1	0	0	5	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**1**	**1**	**0**	**0**	**0**	**0**	**0**	**3**	**0**

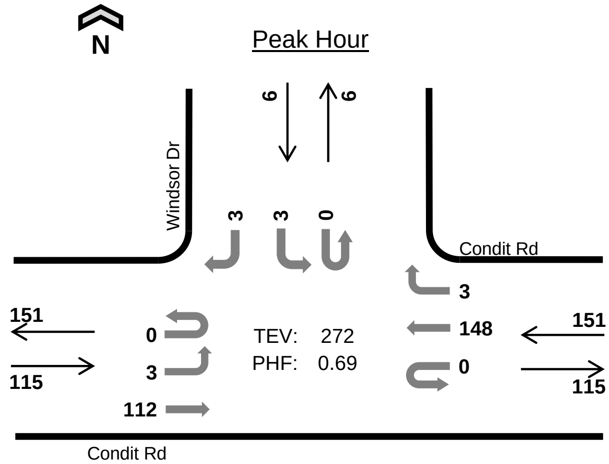
Two-Hour Count Summaries - Bikes

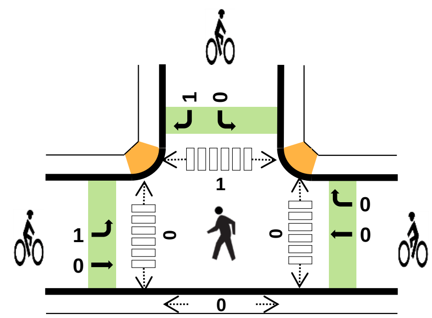
Interval Start	Old Tunnel Rd Eastbound LT	TH	RT	Saranap Ave Westbound LT	TH	RT	El Curtola Blvd Northbound LT	TH	RT	El Curtola Blvd Southbound LT	TH	RT	15-min Total	Rolling One Hour
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	1
5:15 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**1**	2
5:30 PM	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**1**	3
5:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**
Count Total	0	0	1	0	0	0	1	0	1	0	0	0	3	0
Peak Hour	**0**	**0**	**1**	**0**	**0**	**0**	**1**	**0**	**1**	**0**	**0**	**0**	**3**	**0**

Note: U-Turn volumes for bikes are included in Left-Turn, if any.

Windsor Dr
Condit Rd

Date: 06/02/2016
Count Period: 7:00 AM to 9:00 AM
Peak Hour: 8:00 AM to 9:00 AM





	HV %:	PHF
EB	0.0%	0.65
WB	0.7%	0.70
NB	-	-
SB	0.0%	0.38
TOTAL	0.4%	0.69

Two-Hour Count Summaries

Interval Start		Condit Rd Eastbound				Condit Rd Westbound				0 Northbound				Windsor Dr Southbound				15-min Total	Rolling One Hour
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM		0	0	5	0	0	0	16	1	0	0	0	0	0	1	0	0	23	0
7:15 AM		0	0	7	0	0	0	13	2	0	0	0	0	0	1	0	1	24	0
7:30 AM		0	0	8	0	0	0	34	0	0	0	0	0	0	2	0	4	48	0
7:45 AM		0	0	10	0	0	0	24	5	0	0	0	0	0	0	0	1	40	135
8:00 AM		**0**	**0**	**27**	**0**	**0**	**0**	**37**	**1**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**67**	179
8:15 AM		**0**	**2**	**42**	**0**	**0**	**0**	**53**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**98**	253
8:30 AM		**0**	**1**	**24**	**0**	**0**	**0**	**25**	**1**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**3**	**55**	260
8:45 AM		**0**	**0**	**19**	**0**	**0**	**0**	**33**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**52**	**272**
Count Total		0	3	142	0	0	0	235	11	0	0	0	0	0	7	0	9	407	0
Peak Hour	**All**	**0**	**3**	**112**	**0**	**0**	**0**	**148**	**3**	**0**	**0**	**0**	**0**	**0**	**3**	**0**	**3**	**272**	**0**
	HV	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**
	HV%	**-**	**0%**	**0%**	**-**	**-**	**-**	**1%**	**0%**	**-**	**-**	**-**	**-**	**-**	**0%**	**-**	**0%**	**0%**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals EB	WB	NB	SB	Total	Bicycles EB	WB	NB	SB	Total	Pedestrians (Crossing Leg) East	West	North	South	Total
7:00 AM	0	0	0	0	*0*	0	0	0	1	*1*	0	0	0	0	*0*
7:15 AM	0	0	0	0	*0*	0	0	0	0	*0*	0	0	0	0	*0*
7:30 AM	1	0	0	1	*2*	0	2	0	0	*2*	0	2	0	0	*2*
7:45 AM	0	2	0	0	*2*	0	1	0	0	*1*	0	0	0	0	*0*
8:00 AM	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**1**	**0**	*1*
8:15 AM	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**1**	***1***	**0**	**0**	**0**	**0**	*0*
8:30 AM	**0**	**1**	**0**	**0**	***1***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
8:45 AM	**0**	**0**	**0**	**0**	***0***	**1**	**0**	**0**	**0**	***1***	**0**	**0**	**0**	**0**	***0***
Count Total	1	3	0	1	*5*	1	3	0	2	*6*	0	2	1	0	*3*
Peak Hr	**0**	**1**	**0**	**0**	***1***	**1**	**0**	**0**	**1**	***2***	**0**	**0**	**1**	**0**	***1***

Two-Hour Count Summaries - Heavy Vehicles

Interval Start	Condit Rd				Condit Rd				0				Windsor Dr				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	2	0
7:45 AM	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	2	4
8:00 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	4
8:15 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	4
8:30 AM	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	3
8:45 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**
Count Total	0	0	1	0	0	0	2	1	0	0	0	0	0	1	0	0	5	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**

Two-Hour Count Summaries - Bikes

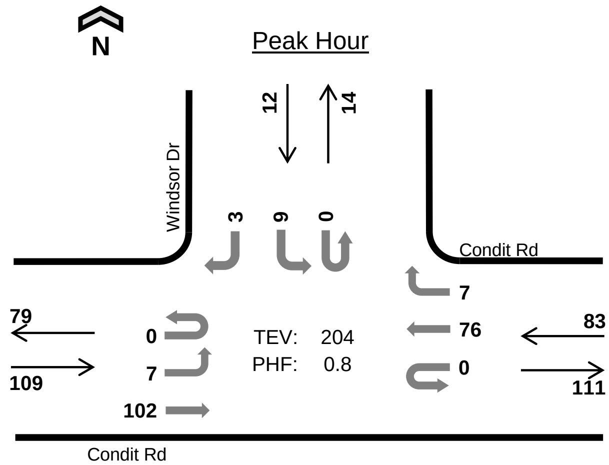
Interval Start	Condit Rd			Condit Rd			0			Windsor Dr			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	1	1	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	2	0	0	0	0	0	0	0	2	0
7:45 AM	0	0	0	0	1	0	0	0	0	0	0	0	1	4
8:00 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	3
8:15 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	4
8:30 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	2
8:45 AM	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**2**
Count Total	1	0	0	0	3	0	0	0	0	0	0	2	6	0
Peak Hour	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**2**	**0**

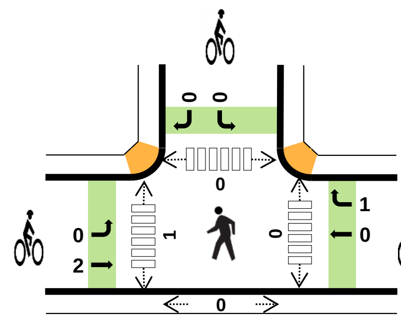
Note: U-Turn volumes for bikes are included in Left-Turn, if any.

Windsor Dr
Condit Rd

idax

Date: 06/02/2016
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 5:00 PM to 6:00 PM





	HV %:	PHF
EB	1.8%	0.80
WB	2.4%	0.69
NB	-	-
SB	16.7%	0.60
TOTAL	2.9%	0.80

Two-Hour Count Summaries

Interval Start	Condit Rd Eastbound UT	LT	TH	RT	Condit Rd Westbound UT	LT	TH	RT	0 Northbound UT	LT	TH	RT	Windsor Dr Southbound UT	LT	TH	RT	15-min Total	Rolling One Hour
4:00 PM	0	1	28	0	0	0	17	1	0	0	0	0	0	2	0	0	49	0
4:15 PM	0	2	12	0	0	0	11	1	0	0	0	0	0	0	0	0	26	0
4:30 PM	0	2	15	0	0	0	14	4	0	0	0	0	0	2	0	0	37	0
4:45 PM	0	1	23	0	0	0	8	0	0	0	0	0	0	2	0	2	36	148
5:00 PM	**0**	**1**	**22**	**0**	**0**	**0**	**19**	**4**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**47**	146
5:15 PM	**0**	**2**	**23**	**0**	**0**	**0**	**5**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**1**	**32**	152
5:30 PM	**0**	**2**	**32**	**0**	**0**	**0**	**25**	**0**	**0**	**0**	**0**	**0**	**0**	**4**	**0**	**1**	**64**	179
5:45 PM	**0**	**2**	**25**	**0**	**0**	**0**	**27**	**3**	**0**	**0**	**0**	**0**	**0**	**3**	**0**	**1**	**61**	**204**
Count Total	0	13	180	0	0	0	126	13	0	0	0	0	0	15	0	5	352	0
Peak Hour All	**0**	**7**	**102**	**0**	**0**	**0**	**76**	**7**	**0**	**0**	**0**	**0**	**0**	**9**	**0**	**3**	**204**	**0**
Peak Hour HV	**0**	**1**	**1**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**6**	**0**
Peak Hour HV%	**-**	**14%**	**1%**	**-**	**-**	**-**	**3%**	**0%**	**-**	**-**	**-**	**-**	**-**	**22%**	**-**	**0%**	**3%**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals EB	WB	NB	SB	Total	Bicycles EB	WB	NB	SB	Total	Pedestrians (Crossing Leg) East	West	North	South	Total
4:00 PM	0	0	0	0	*0*	0	0	0	0	*0*	0	0	0	0	*0*
4:15 PM	0	0	0	0	*0*	0	0	0	0	*0*	0	1	1	0	*2*
4:30 PM	0	0	0	0	*0*	0	0	0	0	*0*	1	0	0	0	*1*
4:45 PM	0	0	0	0	*0*	0	1	0	0	*1*	0	0	0	0	*0*
5:00 PM	**1**	**0**	**0**	**0**	***1***	**0**	**0**	**0**	**0**	***0***	**0**	**1**	**0**	**0**	*1*
5:15 PM	**0**	**1**	**0**	**0**	***1***	**0**	**1**	**0**	**0**	***1***	**0**	**0**	**0**	**0**	*0*
5:30 PM	**1**	**0**	**0**	**1**	***2***	**1**	**0**	**0**	**0**	***1***	**0**	**0**	**0**	**0**	*0*
5:45 PM	**0**	**1**	**0**	**1**	***2***	**1**	**0**	**0**	**0**	***1***	**0**	**0**	**0**	**0**	***0***
Count Total	2	2	0	2	*6*	2	2	0	0	*4*	1	2	1	0	*4*
Peak Hr	**2**	**2**	**0**	**2**	***6***	**2**	**1**	**0**	**0**	***3***	**0**	**1**	**0**	**0**	***1***

Deon Fouche: 415 - 757 - 7714
deon.fouche@idaxdata.com

Two-Hour Count Summaries - Heavy Vehicles

Interval Start	Condit Rd				Condit Rd				0				Windsor Dr				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	1
5:15 PM	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	2
5:30 PM	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**2**	4
5:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**2**	**6**
Count Total	0	1	1	0	0	0	2	0	0	0	0	0	0	2	0	0	6	0
Peak Hour	**0**	**1**	**1**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**6**	**0**

Two-Hour Count Summaries - Bikes

Interval Start	Condit Rd			Condit Rd			0			Windsor Dr			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	1	0	0	0	0	0	0	0	1	1
5:00 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	1
5:15 PM	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	2
5:30 PM	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	3
5:45 PM	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**3**
Count Total	0	2	0	0	1	1	0	0	0	0	0	0	4	0
Peak Hour	**0**	**2**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**0**

Note: U-Turn volumes for bikes are included in Left-Turn, if any.

IDAX 24-HOUR ADT COUNT SUMMARY

CLIENT: CHS Consulting Group
PROJECT: Lafayette_Mt Diablo
LOCATION: Old Tunnel Rd

NODE: 01
DATE: June 09, 2016

DIRECTION:		EB			
TIME	00-15	15-30	30-45	45-60	HOUR TOTALS
0:00	0	1	0	1	2
1:00	2	3	0	0	5
2:00	1	0	1	0	2
3:00	0	0	0	0	0
4:00	0	0	0	0	0
5:00	0	0	0	0	0
6:00	2	3	5	6	16
7:00	6	17	9	14	46
8:00	16	20	20	19	75
9:00	15	13	15	9	52
10:00	17	16	14	13	60
11:00	12	17	14	20	63
12:00	26	24	28	19	97
13:00	16	35	20	32	103
14:00	23	24	20	32	99
15:00	28	20	28	36	112
16:00	27	17	26	38	108
17:00	22	32	28	40	122
18:00	30	35	24	19	108
19:00	14	26	23	18	81
20:00	17	16	7	14	54
21:00	16	17	17	7	57
22:00	9	6	10	4	29
23:00	5	4	2	2	13
				TOTAL	1,304
AM PEAK				11:45 AM	
VOLUME				98	
PM PEAK				5:30 PM	
VOLUME				133	

DIRECTION:		WB			
TIME	00-15	15-30	30-45	45-60	HOUR TOTALS
0:00	0	1	3	0	4
1:00	0	0	0	0	0
2:00	0	0	0	0	0
3:00	0	1	2	2	5
4:00	3	0	0	1	4
5:00	7	2	4	4	17
6:00	3	3	11	13	30
7:00	13	19	53	43	128
8:00	39	36	25	26	126
9:00	23	15	14	23	75
10:00	17	14	14	16	61
11:00	13	20	25	25	83
12:00	23	28	40	23	114
13:00	19	15	21	19	74
14:00	19	15	17	18	69
15:00	22	23	29	24	98
16:00	13	18	29	34	94
17:00	28	14	11	16	69
18:00	15	17	9	7	48
19:00	17	12	13	9	51
20:00	12	5	10	6	33
21:00	8	7	1	9	25
22:00	6	2	7	2	17
23:00	2	4	1	0	7
				TOTAL	1,232
AM PEAK HOUR				7:30 AM	
VOLUME				171	
PM PEAK HOUR				12:00 PM	
VOLUME				114	

TOTAL BI-DIRECTIONAL VOLUME	2,536

IDAX 24-HOUR ADT COUNT SUMMARY

CLIENT: CHS Consulting Group
PROJECT: Lafayette_Mt Diablo
LOCATION: Old Tunnel Rd

NODE: 01
DATE: June 10, 2016

DIRECTION:		EB			
TIME	00-15	15-30	30-45	45-60	HOUR TOTALS
0:00	0	0	2	0	2
1:00	0	0	2	1	3
2:00	0	1	0	1	2
3:00	0	0	0	0	0
4:00	0	0	0	0	0
5:00	0	1	0	0	1
6:00	0	5	2	8	15
7:00	6	7	19	11	43
8:00	23	11	16	13	63
9:00	12	21	22	20	75
10:00	17	19	24	20	80
11:00	25	14	13	15	67
12:00	20	34	24	18	96
13:00	19	17	27	17	80
14:00	23	21	22	33	99
15:00	33	30	31	23	117
16:00	28	37	41	34	140
17:00	52	38	41	46	177
18:00	26	23	26	17	92
19:00	26	19	17	14	76
20:00	15	15	4	12	46
21:00	3	7	12	12	34
22:00	16	16	17	22	71
23:00	14	6	5	5	30
				TOTAL	1,409
AM PEAK				11:45 AM	
VOLUME				93	
PM PEAK				5:00 PM	
VOLUME				177	

DIRECTION:		WB			
TIME	00-15	15-30	30-45	45-60	HOUR TOTALS
0:00	0	0	1	1	2
1:00	1	1	2	0	4
2:00	0	0	0	0	0
3:00	0	0	0	1	1
4:00	1	0	1	4	6
5:00	5	0	2	7	14
6:00	6	5	14	11	36
7:00	18	29	26	42	115
8:00	25	29	25	37	116
9:00	23	21	16	27	87
10:00	26	12	30	29	97
11:00	20	16	17	24	77
12:00	28	22	27	19	96
13:00	21	20	27	17	85
14:00	19	19	13	17	68
15:00	32	22	26	19	99
16:00	19	11	17	20	67
17:00	28	24	24	15	91
18:00	22	12	8	12	54
19:00	19	17	26	18	80
20:00	13	6	7	5	31
21:00	9	4	7	11	31
22:00	5	2	6	6	19
23:00	7	2	2	3	14
				TOTAL	1,290
AM PEAK HOUR				7:15 AM	
VOLUME				122	
PM PEAK HOUR				3:00 PM	
VOLUME				99	

TOTAL BI-DIRECTIONAL VOLUME	2,699

IDAX 24-HOUR ADT COUNT SUMMARY

CLIENT: CHS Consulting Group
PROJECT: Lafayette_Mt Diablo
LOCATION: Old Tunnel Rd

NODE: 01
DATE: June 11, 2016

DIRECTION:		EB			
TIME	00-15	15-30	30-45	45-60	HOUR TOTALS
0:00	2	2	5	3	12
1:00	6	2	0	0	8
2:00	0	1	0	1	2
3:00	0	1	1	0	2
4:00	1	3	1	2	7
5:00	0	0	1	0	1
6:00	2	2	0	2	6
7:00	3	7	2	8	20
8:00	6	4	11	8	29
9:00	10	13	14	17	54
10:00	8	16	16	17	57
11:00	16	13	16	17	62
12:00	24	15	16	18	73
13:00	19	15	10	17	61
14:00	15	21	22	15	73
15:00	17	25	11	22	75
16:00	26	23	16	23	88
17:00	19	19	11	19	68
18:00	14	14	15	11	54
19:00	14	15	8	15	52
20:00	12	9	10	7	38
21:00	10	7	10	10	37
22:00	9	7	9	4	29
23:00	3	5	3	4	15
				TOTAL	923
AM PEAK				11:30 AM	
VOLUME				72	
PM PEAK				4:00 PM	
VOLUME				88	

DIRECTION:		WB			
TIME	00-15	15-30	30-45	45-60	HOUR TOTALS
0:00	1	2	1	4	8
1:00	2	0	0	0	2
2:00	1	0	0	0	1
3:00	0	0	0	0	0
4:00	1	2	1	0	4
5:00	0	1	3	1	5
6:00	2	1	3	10	16
7:00	7	10	10	9	36
8:00	8	7	12	16	43
9:00	22	9	13	23	67
10:00	16	24	27	18	85
11:00	23	23	15	12	73
12:00	18	24	16	20	78
13:00	16	18	7	25	66
14:00	11	22	14	14	61
15:00	11	12	17	16	56
16:00	17	9	16	18	60
17:00	13	18	13	12	56
18:00	12	6	15	16	49
19:00	13	7	11	10	41
20:00	13	14	8	4	39
21:00	5	11	4	5	25
22:00	3	6	3	4	16
23:00	4	3	1	3	11
				TOTAL	898
AM PEAK HOUR				10:15 AM	
VOLUME				92	
PM PEAK HOUR				12:00 PM	
VOLUME				78	

TOTAL BI-DIRECTIONAL VOLUME	1,821

IDAX 24-HOUR ADT COUNT SUMMARY

CLIENT: CHS Consulting Group
PROJECT: Lafayette_Mt Diablo
LOCATION: Old Tunnel Rd

NODE: 01
DATE: June 12, 2016

DIRECTION:	EB				
TIME	00-15	15-30	30-45	45-60	HOUR TOTALS
0:00	1	2	3	2	8
1:00	4	3	0	3	10
2:00	0	1	0	1	2
3:00	1	2	0	1	4
4:00	0	0	0	0	0
5:00	0	0	0	0	0
6:00	1	1	0	2	4
7:00	1	2	1	5	9
8:00	4	4	4	6	18
9:00	8	14	10	18	50
10:00	17	11	15	11	54
11:00	11	13	11	11	46
12:00	9	15	11	15	50
13:00	20	10	13	16	59
14:00	21	15	18	15	69
15:00	24	17	14	19	74
16:00	9	21	13	19	62
17:00	12	18	22	12	64
18:00	23	15	13	10	61
19:00	17	8	9	12	46
20:00	7	15	9	8	39
21:00	10	12	7	5	34
22:00	5	3	2	4	14
23:00	3	4	4	4	15
				TOTAL	792
AM PEAK				9:45 AM	
VOLUME				61	
PM PEAK				5:15 PM	
VOLUME				75	

DIRECTION:	WB				
TIME	00-15	15-30	30-45	45-60	HOUR TOTALS
0:00	1	4	1	2	8
1:00	2	1	1	1	5
2:00	1	1	0	0	2
3:00	0	0	0	0	0
4:00	0	0	0	0	0
5:00	1	1	0	0	2
6:00	1	3	5	1	10
7:00	3	7	3	8	21
8:00	6	5	13	11	35
9:00	17	15	12	20	64
10:00	15	26	16	11	68
11:00	16	16	13	14	59
12:00	17	23	8	21	69
13:00	18	15	20	12	65
14:00	13	19	17	17	66
15:00	13	12	27	14	66
16:00	15	9	10	10	44
17:00	17	16	8	16	57
18:00	12	13	6	6	37
19:00	8	11	13	6	38
20:00	5	10	6	2	23
21:00	9	13	6	2	30
22:00	2	4	2	2	10
23:00	1	1	1	0	3
				TOTAL	782
AM PEAK HOUR				9:45 AM	
VOLUME				77	
PM PEAK HOUR				12:45 PM	
VOLUME				74	

TOTAL BI-DIRECTIONAL VOLUME	1,574

IDAX 24-HOUR ADT COUNT SUMMARY

CLIENT: CHS Consulting Group
PROJECT: Lafayette_Mt Diablo
LOCATION: Old Tunnel Rd

NODE: 01
DATE: June 13, 2016

DIRECTION:		EB			
TIME	00-15	15-30	30-45	45-60	HOUR TOTALS
0:00	1	0	3	0	4
1:00	0	1	1	0	2
2:00	0	0	1	0	1
3:00	0	0	0	0	0
4:00	0	0	0	0	0
5:00	0	0	1	0	1
6:00	2	4	5	12	23
7:00	8	15	6	16	45
8:00	14	18	17	21	70
9:00	21	9	15	13	58
10:00	14	15	9	12	50
11:00	28	13	14	18	73
12:00	28	22	24	13	87
13:00	13	20	24	20	77
14:00	20	21	20	19	80
15:00	31	30	19	25	105
16:00	19	27	31	36	113
17:00	44	44	44	39	171
18:00	44	31	24	19	118
19:00	15	8	18	16	57
20:00	6	14	5	8	33
21:00	12	8	6	9	35
22:00	7	6	3	6	22
23:00	2	4	1	5	12
				TOTAL	1,237
AM PEAK				11:45 AM	
VOLUME				92	
PM PEAK				5:00 PM	
VOLUME				171	

DIRECTION:		WB			
TIME	00-15	15-30	30-45	45-60	HOUR TOTALS
0:00	0	1	0	1	2
1:00	2	0	0	0	2
2:00	0	0	0	1	1
3:00	0	0	0	1	1
4:00	2	1	2	2	7
5:00	7	6	1	7	21
6:00	6	8	8	13	35
7:00	14	26	31	32	103
8:00	30	24	37	25	116
9:00	28	20	14	15	77
10:00	18	23	13	25	79
11:00	15	26	39	24	104
12:00	16	28	23	33	100
13:00	22	21	19	25	87
14:00	16	11	25	17	69
15:00	17	27	15	20	79
16:00	25	18	16	30	89
17:00	20	18	9	17	64
18:00	20	21	13	14	68
19:00	14	7	9	2	32
20:00	8	5	9	11	33
21:00	13	5	8	7	33
22:00	3	4	8	5	20
23:00	6	4	2	0	12
				TOTAL	1,234
AM PEAK HOUR				7:45 AM	
VOLUME				123	
PM PEAK HOUR				12:15 PM	
VOLUME				106	

TOTAL BI-DIRECTIONAL VOLUME	2,471

IDAX 24-HOUR ADT COUNT SUMMARY

CLIENT: CHS Consulting Group
PROJECT: Lafayette_Mt Diablo
LOCATION: Leland Dr

NODE: 02
DATE: June 09, 2016

DIRECTION:	NB				
TIME	00-15	15-30	30-45	45-60	HOUR TOTALS
0:00	0	2	0	0	2
1:00	0	0	0	0	0
2:00	0	0	0	0	0
3:00	0	0	1	0	1
4:00	1	0	0	0	1
5:00	1	1	0	0	2
6:00	0	0	0	0	0
7:00	0	4	9	6	19
8:00	8	11	10	8	37
9:00	2	6	4	4	16
10:00	3	0	6	2	11
11:00	2	7	3	3	15
12:00	6	6	6	6	24
13:00	3	2	5	3	13
14:00	5	2	5	3	15
15:00	5	11	10	14	40
16:00	5	4	12	7	28
17:00	7	7	4	6	24
18:00	10	7	2	2	21
19:00	1	1	3	3	8
20:00	0	11	6	0	17
21:00	1	0	1	0	2
22:00	1	1	4	0	6
23:00	1	1	0	0	2
				TOTAL	304
AM PEAK				8:00 AM	
VOLUME				37	
PM PEAK				3:00 PM	
VOLUME				40	

DIRECTION:	SB				
TIME	00-15	15-30	30-45	45-60	HOUR TOTALS
0:00	0	1	0	0	1
1:00	1	0	0	0	1
2:00	0	0	0	0	0
3:00	0	0	0	0	0
4:00	0	0	0	0	0
5:00	0	0	0	0	0
6:00	1	0	3	1	5
7:00	4	6	8	16	34
8:00	15	21	14	4	54
9:00	11	4	3	3	21
10:00	2	0	0	1	3
11:00	2	3	3	6	14
12:00	7	3	7	6	23
13:00	3	3	2	7	15
14:00	3	9	8	6	26
15:00	6	4	2	13	25
16:00	6	4	0	3	13
17:00	9	3	6	5	23
18:00	5	6	1	10	22
19:00	2	1	3	5	11
20:00	4	2	2	2	10
21:00	0	3	2	4	9
22:00	3	0	0	1	4
23:00	1	0	0	0	1
				TOTAL	315
AM PEAK HOUR				7:45 AM	
VOLUME				66	
PM PEAK HOUR				2:15 PM	
VOLUME				29	

TOTAL BI-DIRECTIONAL VOLUME	619

IDAX 24-HOUR ADT COUNT SUMMARY

CLIENT: CHS Consulting Group
PROJECT: Lafayette_Mt Diablo
LOCATION: Leland Dr

NODE: 02
DATE: June 10, 2016

DIRECTION:	NB				
TIME	00-15	15-30	30-45	45-60	HOUR TOTALS
0:00	0	0	0	0	0
1:00	1	0	0	0	1
2:00	0	0	0	0	0
3:00	0	0	0	0	0
4:00	1	0	0	0	1
5:00	0	1	0	1	2
6:00	0	1	0	2	3
7:00	0	1	5	15	21
8:00	6	11	10	15	42
9:00	8	4	5	6	23
10:00	5	3	3	6	17
11:00	3	4	3	6	16
12:00	6	10	7	4	27
13:00	4	3	6	2	15
14:00	3	7	12	3	25
15:00	5	11	9	7	32
16:00	4	8	16	21	49
17:00	7	5	12	12	36
18:00	10	5	4	3	22
19:00	3	5	2	2	12
20:00	5	1	1	0	7
21:00	3	1	1	4	9
22:00	2	1	0	1	4
23:00	1	0	3	0	4
				TOTAL	368
AM PEAK				8:15 AM	
VOLUME				44	
PM PEAK				4:15 PM	
VOLUME				52	

DIRECTION:	SB				
TIME	00-15	15-30	30-45	45-60	HOUR TOTALS
0:00	0	0	0	0	0
1:00	0	0	0	0	0
2:00	0	0	0	0	0
3:00	0	0	0	0	0
4:00	0	0	0	0	0
5:00	0	0	0	0	0
6:00	0	1	1	2	4
7:00	2	8	8	19	37
8:00	19	20	8	6	53
9:00	4	3	3	4	14
10:00	2	0	10	12	24
11:00	4	2	3	4	13
12:00	5	5	2	2	14
13:00	5	3	1	7	16
14:00	6	11	9	4	30
15:00	5	6	5	10	26
16:00	4	10	6	8	28
17:00	6	9	12	4	31
18:00	3	4	1	0	8
19:00	2	2	3	5	12
20:00	6	1	2	2	11
21:00	0	0	1	2	3
22:00	1	1	2	2	6
23:00	1	2	2	0	5
				TOTAL	335
AM PEAK HOUR				7:30 AM	
VOLUME				66	
PM PEAK HOUR				4:45 PM	
VOLUME				35	

TOTAL BI-DIRECTIONAL VOLUME	703

IDAX 24-HOUR ADT COUNT SUMMARY

CLIENT: CHS Consulting Group
PROJECT: Lafayette_Mt Diablo
LOCATION: Leland Dr

NODE: 02
DATE: June 11, 2016

DIRECTION:	NB				
TIME	00-15	15-30	30-45	45-60	HOUR TOTALS
0:00	0	0	0	1	1
1:00	0	0	0	0	0
2:00	0	0	0	0	0
3:00	0	0	0	1	1
4:00	0	0	1	0	1
5:00	0	0	1	0	1
6:00	0	1	1	4	6
7:00	1	0	1	2	4
8:00	1	2	4	2	9
9:00	0	5	3	2	10
10:00	3	2	2	3	10
11:00	2	7	17	3	29
12:00	6	5	2	2	15
13:00	5	1	5	4	15
14:00	1	4	2	3	10
15:00	3	3	2	4	12
16:00	1	1	5	5	12
17:00	1	2	0	2	5
18:00	2	0	3	2	7
19:00	2	2	2	1	7
20:00	3	2	0	0	5
21:00	0	1	3	1	5
22:00	0	0	1	1	2
23:00	1	0	0	1	2
				TOTAL	169
AM PEAK				11:15 AM	
VOLUME				33	
PM PEAK				12:00 PM	
VOLUME				15	

DIRECTION:	SB				
TIME	00-15	15-30	30-45	45-60	HOUR TOTALS
0:00	0	0	1	0	1
1:00	2	0	0	0	2
2:00	0	0	0	0	0
3:00	0	0	0	0	0
4:00	0	1	0	0	1
5:00	0	0	0	0	0
6:00	0	2	1	1	4
7:00	1	2	1	2	6
8:00	6	2	1	3	12
9:00	6	5	3	11	25
10:00	4	1	5	3	13
11:00	1	0	4	3	8
12:00	0	3	1	2	6
13:00	5	3	2	2	12
14:00	3	3	1	6	13
15:00	1	2	5	1	9
16:00	3	1	3	4	11
17:00	2	0	1	6	9
18:00	4	2	0	2	8
19:00	1	4	1	0	6
20:00	0	1	1	2	4
21:00	3	3	2	2	10
22:00	0	2	2	0	4
23:00	0	0	1	0	1
				TOTAL	165
AM PEAK HOUR				9:00 AM	
VOLUME				25	
PM PEAK HOUR				2:45 PM	
VOLUME				14	

TOTAL BI-DIRECTIONAL VOLUME	334

IDAX 24-HOUR ADT COUNT SUMMARY

CLIENT: CHS Consulting Group
PROJECT: Lafayette_Mt Diablo
LOCATION: Leland Dr

NODE: 02
DATE: June 12, 2016

DIRECTION:	NB				
TIME	00-15	15-30	30-45	45-60	HOUR TOTALS
0:00	0	0	1	0	1
1:00	0	0	0	1	1
2:00	0	0	0	0	0
3:00	0	0	0	0	0
4:00	0	0	1	0	1
5:00	1	0	0	0	1
6:00	0	0	2	0	2
7:00	0	2	0	1	3
8:00	3	1	1	5	10
9:00	1	0	0	3	4
10:00	4	3	2	3	12
11:00	0	4	4	2	10
12:00	7	9	2	1	19
13:00	2	3	2	5	12
14:00	1	3	1	4	9
15:00	3	2	8	2	15
16:00	4	2	2	2	10
17:00	2	2	2	3	9
18:00	1	3	1	2	7
19:00	1	3	0	2	6
20:00	0	4	2	0	6
21:00	3	2	1	2	8
22:00	1	1	0	1	3
23:00	0	0	0	0	0
				TOTAL	149
AM PEAK				11:30 AM	
VOLUME				22	
PM PEAK				12:00 PM	
VOLUME				19	

DIRECTION:	SB				
TIME	00-15	15-30	30-45	45-60	HOUR TOTALS
0:00	0	0	0	1	1
1:00	0	0	0	1	1
2:00	0	0	0	0	0
3:00	0	0	0	1	1
4:00	0	0	0	0	0
5:00	0	0	0	0	0
6:00	0	0	1	0	1
7:00	1	0	1	0	2
8:00	2	0	0	3	5
9:00	3	2	5	1	11
10:00	1	2	5	3	11
11:00	2	4	4	0	10
12:00	1	1	2	0	4
13:00	2	5	2	4	13
14:00	2	4	1	5	12
15:00	4	2	4	2	12
16:00	1	2	5	2	10
17:00	4	3	2	2	11
18:00	2	4	1	1	8
19:00	2	1	0	1	4
20:00	3	1	3	1	8
21:00	1	1	1	0	3
22:00	0	0	1	0	1
23:00	0	1	0	0	1
				TOTAL	130
AM PEAK HOUR				10:30 AM	
VOLUME				14	
PM PEAK HOUR				2:45 PM	
VOLUME				15	

TOTAL BI-DIRECTIONAL VOLUME	279

IDAX 24-HOUR ADT COUNT SUMMARY

CLIENT: CHS Consulting Group
PROJECT: Lafayette_Mt Diablo
LOCATION: Leland Dr

NODE: 02
DATE: June 13, 2016

DIRECTION:	NB				
TIME	00-15	15-30	30-45	45-60	HOUR TOTALS
0:00	0	0	0	0	0
1:00	0	0	0	0	0
2:00	0	0	0	1	1
3:00	0	0	0	0	0
4:00	0	1	0	0	1
5:00	0	0	0	0	0
6:00	0	1	0	1	2
7:00	3	3	5	4	15
8:00	3	16	14	7	40
9:00	11	5	4	1	21
10:00	8	5	4	3	20
11:00	5	9	3	2	19
12:00	11	9	9	14	43
13:00	4	2	7	6	19
14:00	4	3	8	3	18
15:00	3	7	7	5	22
16:00	1	9	7	5	22
17:00	7	10	7	3	27
18:00	4	6	2	2	14
19:00	3	1	1	1	6
20:00	0	2	10	2	14
21:00	2	1	1	0	4
22:00	1	2	2	0	5
23:00	6	0	0	0	6
				TOTAL	319
AM PEAK				8:15 AM	
VOLUME				48	
PM PEAK				12:00 PM	
VOLUME				43	

DIRECTION:	SB				
TIME	00-15	15-30	30-45	45-60	HOUR TOTALS
0:00	0	1	0	0	1
1:00	0	0	0	0	0
2:00	0	0	0	0	0
3:00	0	0	0	0	0
4:00	0	0	0	0	0
5:00	0	0	0	1	1
6:00	0	0	1	2	3
7:00	5	10	5	8	28
8:00	20	21	9	7	57
9:00	6	6	1	6	19
10:00	6	5	4	1	16
11:00	7	3	1	13	24
12:00	8	3	5	0	16
13:00	5	5	3	6	19
14:00	3	7	8	3	21
15:00	5	3	6	4	18
16:00	8	5	6	8	27
17:00	9	8	6	3	26
18:00	7	7	3	6	23
19:00	8	3	1	0	12
20:00	1	1	1	1	4
21:00	2	1	1	1	5
22:00	1	1	0	0	2
23:00	1	0	0	0	1
				TOTAL	323
AM PEAK HOUR				7:45 AM	
VOLUME				58	
PM PEAK HOUR				4:30 PM	
VOLUME				31	

TOTAL BI-DIRECTIONAL VOLUME	642

IDAX 24-HOUR ADT COUNT SUMMARY

CLIENT: CHS Consulting Group
PROJECT: Lafayette_Mt Diablo
LOCATION: Condit Rd

NODE: 03
DATE: June 09, 2016

DIRECTION:	EB				
TIME	00-15	15-30	30-45	45-60	HOUR TOTALS
0:00	3	1	0	0	4
1:00	1	0	0	0	1
2:00	0	0	0	1	1
3:00	0	0	1	0	1
4:00	0	0	0	0	0
5:00	0	0	0	2	2
6:00	0	0	2	1	3
7:00	7	9	7	8	31
8:00	31	35	31	11	108
9:00	22	10	16	5	53
10:00	6	9	7	10	32
11:00	7	10	8	17	42
12:00	16	24	22	12	74
13:00	21	13	12	20	66
14:00	19	15	13	23	70
15:00	16	26	11	23	76
16:00	20	12	25	22	79
17:00	16	17	19	20	72
18:00	23	23	16	19	81
19:00	12	7	19	11	49
20:00	7	6	5	6	24
21:00	6	11	7	5	29
22:00	3	5	7	3	18
23:00	8	2	1	1	12
				TOTAL	928
AM PEAK				8:00 AM	
VOLUME				108	
PM PEAK				5:30 PM	
VOLUME				85	

DIRECTION:	WB				
TIME	00-15	15-30	30-45	45-60	HOUR TOTALS
0:00	1	2	0	0	3
1:00	0	0	0	1	1
2:00	0	0	0	1	1
3:00	0	1	0	2	3
4:00	1	1	2	0	4
5:00	2	1	3	4	10
6:00	4	3	7	5	19
7:00	14	18	31	28	91
8:00	42	42	36	36	156
9:00	29	23	19	10	81
10:00	2	11	6	10	29
11:00	11	9	22	14	56
12:00	17	20	20	11	68
13:00	7	7	7	6	27
14:00	26	9	28	9	72
15:00	26	21	21	18	86
16:00	27	20	22	19	88
17:00	18	22	13	15	68
18:00	12	17	13	9	51
19:00	2	7	6	11	26
20:00	1	5	5	3	14
21:00	3	1	2	4	10
22:00	3	2	5	3	13
23:00	3	1	1	2	7
				TOTAL	984
AM PEAK HOUR				8:00 AM	
VOLUME				156	
PM PEAK HOUR				4:00 PM	
VOLUME				88	

TOTAL BI-DIRECTIONAL VOLUME	1,912

IDAX 24-HOUR ADT COUNT SUMMARY

CLIENT: CHS Consulting Group
PROJECT: Lafayette_Mt Diablo
LOCATION: Condit Rd

NODE: 03
DATE: June 10, 2016

DIRECTION:	EB				
TIME	00-15	15-30	30-45	45-60	HOUR TOTALS
0:00	0	1	0	0	1
1:00	1	0	1	1	3
2:00	0	1	0	0	1
3:00	0	0	0	0	0
4:00	2	0	0	0	2
5:00	0	0	1	2	3
6:00	0	0	0	5	5
7:00	8	7	8	11	34
8:00	29	33	21	12	95
9:00	19	3	8	13	43
10:00	7	11	25	34	77
11:00	17	7	7	7	38
12:00	15	11	16	6	48
13:00	16	22	9	18	65
14:00	18	16	20	14	68
15:00	16	27	28	28	99
16:00	26	29	20	18	93
17:00	26	17	21	22	86
18:00	18	15	11	7	51
19:00	11	7	14	10	42
20:00	6	5	3	3	17
21:00	6	6	8	3	23
22:00	7	4	2	4	17
23:00	5	8	1	2	16
				TOTAL	927
AM PEAK				8:00 AM	
VOLUME				95	
PM PEAK				3:30 PM	
VOLUME				111	

DIRECTION:	WB				
TIME	00-15	15-30	30-45	45-60	HOUR TOTALS
0:00	0	0	1	0	1
1:00	0	0	1	0	1
2:00	0	0	0	0	0
3:00	0	0	1	0	1
4:00	0	2	3	0	5
5:00	4	2	1	3	10
6:00	4	1	8	6	19
7:00	15	18	20	18	71
8:00	27	37	39	27	130
9:00	21	21	12	8	62
10:00	9	8	14	20	51
11:00	11	5	12	12	40
12:00	26	14	24	25	89
13:00	10	11	21	10	52
14:00	21	11	22	15	69
15:00	18	18	19	22	77
16:00	23	24	22	12	81
17:00	9	20	13	18	60
18:00	9	7	3	9	28
19:00	7	6	7	0	20
20:00	6	7	3	5	21
21:00	8	4	3	2	17
22:00	7	8	0	1	16
23:00	0	1	1	1	3
				TOTAL	924
AM PEAK HOUR				8:00 AM	
VOLUME				130	
PM PEAK HOUR				3:45 PM	
VOLUME				91	

TOTAL BI-DIRECTIONAL VOLUME	1,851

IDAX 24-HOUR ADT COUNT SUMMARY

CLIENT: CHS Consulting Group
PROJECT: Lafayette_Mt Diablo
LOCATION: Condit Rd

NODE: 03
DATE: June 11, 2016

DIRECTION:	EB				
TIME	00-15	15-30	30-45	45-60	HOUR TOTALS
0:00	2	0	2	0	4
1:00	1	0	0	2	3
2:00	0	0	0	0	0
3:00	1	1	0	0	2
4:00	0	1	0	0	1
5:00	0	0	2	1	3
6:00	2	0	0	3	5
7:00	1	3	4	6	14
8:00	4	3	13	7	27
9:00	2	4	3	14	23
10:00	5	6	10	14	35
11:00	16	5	10	7	38
12:00	8	8	12	14	42
13:00	9	16	7	15	47
14:00	9	13	7	10	39
15:00	12	8	15	15	50
16:00	8	12	11	9	40
17:00	15	12	6	12	45
18:00	10	11	9	7	37
19:00	7	11	8	7	33
20:00	9	13	4	12	38
21:00	9	10	9	4	32
22:00	8	9	5	5	27
23:00	4	1	4	3	12
				TOTAL	597
AM PEAK				10:15 AM	
VOLUME				46	
PM PEAK				12:30 PM	
VOLUME				51	

DIRECTION:	WB				
TIME	00-15	15-30	30-45	45-60	HOUR TOTALS
0:00	1	1	1	0	3
1:00	1	0	0	0	1
2:00	1	0	0	0	1
3:00	0	0	0	0	0
4:00	0	2	0	1	3
5:00	1	0	3	1	5
6:00	2	2	4	5	13
7:00	2	6	7	6	21
8:00	7	11	15	6	39
9:00	13	13	9	10	45
10:00	12	13	10	9	44
11:00	7	6	8	8	29
12:00	10	9	13	7	39
13:00	9	15	6	7	37
14:00	5	4	10	11	30
15:00	4	9	12	14	39
16:00	5	3	9	11	28
17:00	12	3	9	9	33
18:00	13	11	5	5	34
19:00	14	5	6	7	32
20:00	4	7	6	9	26
21:00	10	9	5	2	26
22:00	2	4	5	7	18
23:00	1	3	3	1	8
				TOTAL	554
AM PEAK HOUR				8:30 AM	
VOLUME				47	
PM PEAK HOUR				12:30 PM	
VOLUME				44	

TOTAL BI-DIRECTIONAL VOLUME	1,151

IDAX 24-HOUR ADT COUNT SUMMARY

CLIENT: CHS Consulting Group
PROJECT: Lafayette_Mt Diablo
LOCATION: Condit Rd

NODE: 03
DATE: June 12, 2016

DIRECTION:	EB				
TIME	00-15	15-30	30-45	45-60	HOUR TOTALS
0:00	5	5	4	5	19
1:00	4	1	0	2	7
2:00	0	1	0	1	2
3:00	0	0	0	2	2
4:00	0	0	1	0	1
5:00	1	0	1	1	3
6:00	0	0	0	3	3
7:00	0	1	2	1	4
8:00	3	0	6	10	19
9:00	6	8	7	3	24
10:00	11	3	8	12	34
11:00	9	4	11	13	37
12:00	15	12	15	8	50
13:00	18	16	10	10	54
14:00	12	11	21	13	57
15:00	12	9	14	9	44
16:00	11	20	10	15	56
17:00	8	10	9	14	41
18:00	18	10	8	7	43
19:00	6	6	11	7	30
20:00	6	6	5	9	26
21:00	8	7	2	2	19
22:00	4	6	1	2	13
23:00	0	2	3	3	8
				TOTAL	596
AM PEAK				11:45 AM	
VOLUME				55	
PM PEAK				12:30 PM	
VOLUME				57	

DIRECTION:	WB				
TIME	00-15	15-30	30-45	45-60	HOUR TOTALS
0:00	3	2	6	2	13
1:00	4	1	0	0	5
2:00	0	0	2	0	2
3:00	0	0	0	2	2
4:00	0	1	0	0	1
5:00	0	0	2	4	6
6:00	1	2	3	0	6
7:00	0	4	5	11	20
8:00	7	7	13	13	40
9:00	16	10	5	8	39
10:00	11	4	5	10	30
11:00	14	9	9	8	40
12:00	12	15	8	7	42
13:00	10	17	12	15	54
14:00	9	8	8	15	40
15:00	10	13	8	19	50
16:00	10	10	14	7	41
17:00	14	10	6	7	37
18:00	4	4	8	4	20
19:00	5	10	2	6	23
20:00	6	4	4	3	17
21:00	3	5	2	0	10
22:00	3	5	2	1	11
23:00	0	1	1	0	2
				TOTAL	551
AM PEAK HOUR				8:30 AM	
VOLUME				52	
PM PEAK HOUR				1:00 PM	
VOLUME				54	

TOTAL BI-DIRECTIONAL VOLUME	1,147

IDAX 24-HOUR ADT COUNT SUMMARY

CLIENT: CHS Consulting Group
PROJECT: Lafayette_Mt Diablo
LOCATION: Condit Rd

NODE: 03
DATE: June 13, 2016

DIRECTION:		EB			
TIME	00-15	15-30	30-45	45-60	HOUR TOTALS
0:00	0	1	1	1	3
1:00	0	0	0	0	0
2:00	1	1	1	1	4
3:00	0	0	0	0	0
4:00	0	0	0	0	0
5:00	0	1	0	0	1
6:00	0	0	1	5	6
7:00	7	9	11	11	38
8:00	29	36	17	14	96
9:00	23	20	13	10	66
10:00	7	16	11	10	44
11:00	14	10	14	19	57
12:00	14	14	18	11	57
13:00	15	10	11	31	67
14:00	22	20	16	12	70
15:00	16	15	16	16	63
16:00	15	20	16	25	76
17:00	24	27	17	23	91
18:00	19	16	13	5	53
19:00	11	7	12	5	35
20:00	1	4	10	5	20
21:00	7	10	4	5	26
22:00	2	9	5	5	21
23:00	2	2	1	4	9
				TOTAL	903
AM PEAK				8:00 AM	
VOLUME				96	
PM PEAK				4:45 PM	
VOLUME				93	

DIRECTION:		WB			
TIME	00-15	15-30	30-45	45-60	HOUR TOTALS
0:00	0	0	2	0	2
1:00	0	0	0	0	0
2:00	0	0	0	0	0
3:00	0	1	0	1	2
4:00	1	0	2	1	4
5:00	1	2	3	1	7
6:00	9	6	6	5	26
7:00	12	18	22	13	65
8:00	28	45	37	31	141
9:00	24	23	15	19	81
10:00	12	10	7	15	44
11:00	13	11	12	14	50
12:00	20	24	15	19	78
13:00	13	9	14	7	43
14:00	23	16	28	16	83
15:00	9	17	15	16	57
16:00	14	17	12	23	66
17:00	14	17	21	12	64
18:00	17	10	5	7	39
19:00	5	3	2	2	12
20:00	1	1	10	2	14
21:00	3	6	5	3	17
22:00	3	3	1	2	9
23:00	7	4	1	0	12
				TOTAL	916
AM PEAK HOUR				8:00 AM	
VOLUME				141	
PM PEAK HOUR				2:00 PM	
VOLUME				83	

TOTAL BI-DIRECTIONAL VOLUME	1,819

IDAX 24-HOUR ADT COUNT SUMMARY

CLIENT: CHS Consulting Group
PROJECT: Lafayette_Mt Diablo
LOCATION: Windsor Dr

NODE: 04
DATE: June 09, 2016

DIRECTION:	NB				
TIME	00-15	15-30	30-45	45-60	HOUR TOTALS
0:00	0	0	0	0	0
1:00	0	0	0	0	0
2:00	0	0	0	0	0
3:00	0	2	0	0	2
4:00	0	0	0	0	0
5:00	1	0	0	0	1
6:00	1	0	4	3	8
7:00	3	4	7	6	20
8:00	2	5	5	3	15
9:00	1	3	4	2	10
10:00	3	4	1	5	13
11:00	3	6	4	0	13
12:00	0	4	9	1	14
13:00	2	2	3	3	10
14:00	4	4	1	1	10
15:00	5	3	4	5	17
16:00	1	6	5	2	14
17:00	0	4	4	2	10
18:00	3	4	4	2	13
19:00	1	0	2	2	5
20:00	4	2	0	2	8
21:00	4	0	0	2	6
22:00	1	3	1	0	5
23:00	0	1	0	0	1
				TOTAL	195
AM PEAK				7:00 AM	
VOLUME				20	
PM PEAK				3:00 PM	
VOLUME				17	

DIRECTION:	SB				
TIME	00-15	15-30	30-45	45-60	HOUR TOTALS
0:00	0	1	0	0	1
1:00	0	0	0	0	0
2:00	0	0	0	0	0
3:00	0	0	1	0	1
4:00	0	0	0	0	0
5:00	0	0	0	0	0
6:00	1	1	2	0	4
7:00	2	3	2	5	12
8:00	2	3	4	1	10
9:00	3	1	2	1	7
10:00	2	2	2	2	8
11:00	3	3	4	2	12
12:00	1	7	9	5	22
13:00	5	5	4	5	19
14:00	5	2	3	4	14
15:00	5	5	4	5	19
16:00	3	5	5	5	18
17:00	1	3	0	5	9
18:00	5	4	3	2	14
19:00	0	4	4	4	12
20:00	4	1	1	3	9
21:00	3	3	3	2	11
22:00	0	2	2	1	5
23:00	2	2	1	0	5
				TOTAL	212
AM PEAK HOUR				11:45 AM	
VOLUME				19	
PM PEAK HOUR				12:15 PM	
VOLUME				26	

TOTAL BI-DIRECTIONAL VOLUME	407

IDAX 24-HOUR ADT COUNT SUMMARY

CLIENT: CHS Consulting Group
PROJECT: Lafayette_Mt Diablo
LOCATION: Windsor Dr

NODE: 04
DATE: June 10, 2016

DIRECTION:	NB				
TIME	00-15	15-30	30-45	45-60	HOUR TOTALS
0:00	0	0	0	0	0
1:00	0	0	0	0	0
2:00	0	0	0	0	0
3:00	0	0	0	0	0
4:00	1	0	0	0	1
5:00	0	0	0	0	0
6:00	0	2	4	3	9
7:00	7	4	8	4	23
8:00	1	4	5	4	14
9:00	2	3	1	4	10
10:00	5	2	6	4	17
11:00	1	1	3	5	10
12:00	5	3	6	1	15
13:00	3	2	6	2	13
14:00	7	6	3	6	22
15:00	3	3	6	0	12
16:00	2	1	3	2	8
17:00	1	4	7	2	14
18:00	3	1	0	2	6
19:00	7	1	2	3	13
20:00	4	1	1	1	7
21:00	3	1	2	1	7
22:00	0	1	0	0	1
23:00	0	0	0	1	1
				TOTAL	203
AM PEAK				7:00 AM	
VOLUME				23	
PM PEAK				2:00 PM	
VOLUME				22	

DIRECTION:	SB				
TIME	00-15	15-30	30-45	45-60	HOUR TOTALS
0:00	0	1	0	0	1
1:00	0	0	1	0	1
2:00	0	0	0	0	0
3:00	0	0	0	0	0
4:00	1	0	0	0	1
5:00	0	0	0	1	1
6:00	0	2	0	2	4
7:00	2	0	3	1	6
8:00	3	1	1	3	8
9:00	2	3	3	0	8
10:00	2	4	9	2	17
11:00	1	2	2	2	7
12:00	4	3	4	2	13
13:00	3	11	8	5	27
14:00	3	6	3	5	17
15:00	3	3	5	3	14
16:00	4	2	4	5	15
17:00	5	4	4	3	16
18:00	7	6	6	1	20
19:00	5	4	2	7	18
20:00	6	1	0	1	8
21:00	2	1	4	2	9
22:00	0	0	1	0	1
23:00	4	1	0	1	6
				TOTAL	218
AM PEAK HOUR				10:00 AM	
VOLUME				17	
PM PEAK HOUR				1:00 PM	
VOLUME				27	

TOTAL BI-DIRECTIONAL VOLUME	421

IDAX 24-HOUR ADT COUNT SUMMARY

CLIENT: CHS Consulting Group
PROJECT: Lafayette_Mt Diablo
LOCATION: Windsor Dr

NODE: 04
DATE: June 11, 2016

DIRECTION:	NB				
TIME	00-15	15-30	30-45	45-60	HOUR TOTALS
0:00	0	0	0	0	0
1:00	2	0	0	0	2
2:00	0	0	0	0	0
3:00	0	0	0	0	0
4:00	0	3	0	0	3
5:00	0	1	0	0	1
6:00	2	1	1	1	5
7:00	3	2	0	2	7
8:00	1	0	0	3	4
9:00	6	2	2	5	15
10:00	3	4	2	3	12
11:00	5	2	2	2	11
12:00	2	6	3	7	18
13:00	1	2	1	2	6
14:00	1	3	1	6	11
15:00	4	6	2	4	16
16:00	5	1	4	2	12
17:00	5	5	1	1	12
18:00	4	2	1	1	8
19:00	4	2	2	1	9
20:00	2	1	0	2	5
21:00	2	5	1	0	8
22:00	1	1	0	2	4
23:00	1	0	0	0	1
				TOTAL	170
AM PEAK				9:00 AM	
VOLUME				15	
PM PEAK				12:00 PM	
VOLUME				18	

DIRECTION:	SB				
TIME	00-15	15-30	30-45	45-60	HOUR TOTALS
0:00	0	0	2	0	2
1:00	1	0	0	0	1
2:00	0	0	0	0	0
3:00	0	0	2	0	2
4:00	0	3	0	1	4
5:00	0	0	1	1	2
6:00	2	0	0	2	4
7:00	1	0	0	3	4
8:00	0	1	2	2	5
9:00	1	2	2	1	6
10:00	1	0	2	3	6
11:00	3	6	2	1	12
12:00	4	5	1	4	14
13:00	2	2	4	3	11
14:00	5	9	1	3	18
15:00	4	4	2	5	15
16:00	6	6	4	9	25
17:00	6	3	2	3	14
18:00	4	3	5	2	14
19:00	3	3	1	5	12
20:00	1	1	2	2	6
21:00	3	0	3	1	7
22:00	1	2	1	1	5
23:00	0	1	0	0	1
				TOTAL	190
AM PEAK HOUR				10:30 AM	
VOLUME				14	
PM PEAK HOUR				4:00 PM	
VOLUME				25	

TOTAL BI-DIRECTIONAL VOLUME	360

IDAX 24-HOUR ADT COUNT SUMMARY

CLIENT: CHS Consulting Group
PROJECT: Lafayette_Mt Diablo
LOCATION: Windsor Dr

NODE: 04
DATE: June 12, 2016

DIRECTION:	NB				
TIME	00-15	15-30	30-45	45-60	HOUR TOTALS
0:00	1	0	1	1	3
1:00	0	0	0	0	0
2:00	0	0	0	0	0
3:00	0	0	0	0	0
4:00	0	0	0	0	0
5:00	1	0	0	0	1
6:00	0	2	0	0	2
7:00	0	1	0	3	4
8:00	0	0	3	1	4
9:00	3	1	2	5	11
10:00	0	4	4	1	9
11:00	0	1	4	2	7
12:00	1	4	1	2	8
13:00	4	2	2	5	13
14:00	4	2	2	2	10
15:00	4	1	1	2	8
16:00	4	4	2	3	13
17:00	3	1	2	2	8
18:00	4	5	1	1	11
19:00	4	3	6	1	14
20:00	0	5	4	1	10
21:00	5	7	3	0	15
22:00	1	1	0	0	2
23:00	0	0	1	0	1
				TOTAL	154
AM PEAK				9:45 AM	
VOLUME				13	
PM PEAK				8:30 PM	
VOLUME				17	

DIRECTION:	SB				
TIME	00-15	15-30	30-45	45-60	HOUR TOTALS
0:00	2	2	1	3	8
1:00	0	0	0	1	1
2:00	0	0	0	0	0
3:00	0	0	0	0	0
4:00	0	0	0	0	0
5:00	1	0	0	0	1
6:00	0	0	0	0	0
7:00	0	0	0	1	1
8:00	0	0	2	2	4
9:00	1	5	2	3	11
10:00	4	1	1	0	6
11:00	4	0	1	3	8
12:00	2	4	3	3	12
13:00	5	1	1	7	14
14:00	4	3	4	3	14
15:00	5	2	5	3	15
16:00	4	6	5	2	17
17:00	6	4	9	10	29
18:00	7	5	6	3	21
19:00	2	2	2	2	8
20:00	0	3	0	5	8
21:00	1	3	0	1	5
22:00	1	2	1	1	5
23:00	1	1	0	1	3
				TOTAL	191
AM PEAK HOUR				9:15 AM	
VOLUME				14	
PM PEAK HOUR				5:30 PM	
VOLUME				31	

TOTAL BI-DIRECTIONAL VOLUME	345

IDAX 24-HOUR ADT COUNT SUMMARY

CLIENT: CHS Consulting Group
PROJECT: Lafayette_Mt Diablo
LOCATION: Windsor Dr

NODE: 04
DATE: June 13, 2016

DIRECTION:	NB				
TIME	00-15	15-30	30-45	45-60	HOUR TOTALS
0:00	0	0	1	0	1
1:00	0	0	0	0	0
2:00	0	0	1	0	1
3:00	0	0	0	0	0
4:00	0	0	0	0	0
5:00	1	0	0	1	2
6:00	1	1	2	3	7
7:00	3	4	4	4	15
8:00	1	3	5	5	14
9:00	4	3	5	4	16
10:00	9	4	2	3	18
11:00	1	2	6	4	13
12:00	3	2	3	2	10
13:00	4	3	2	7	16
14:00	2	4	4	2	12
15:00	2	5	3	3	13
16:00	4	2	0	5	11
17:00	6	2	3	4	15
18:00	2	2	0	1	5
19:00	2	2	1	1	6
20:00	2	1	1	2	6
21:00	8	2	3	3	16
22:00	0	0	2	0	2
23:00	0	2	0	0	2
				TOTAL	201
AM PEAK				9:30 AM	
VOLUME				22	
PM PEAK				1:45 PM	
VOLUME				17	

DIRECTION:	SB				
TIME	00-15	15-30	30-45	45-60	HOUR TOTALS
0:00	0	0	1	0	1
1:00	0	0	0	0	0
2:00	0	0	2	0	2
3:00	0	0	0	0	0
4:00	0	0	0	0	0
5:00	0	0	0	0	0
6:00	1	0	1	3	5
7:00	1	0	1	4	6
8:00	2	3	1	1	7
9:00	5	4	2	3	14
10:00	4	5	2	1	12
11:00	6	4	4	2	16
12:00	3	3	7	2	15
13:00	4	2	5	3	14
14:00	5	2	1	0	8
15:00	3	7	2	5	17
16:00	1	2	2	4	9
17:00	2	5	4	5	16
18:00	7	8	1	1	17
19:00	2	0	2	3	7
20:00	3	2	1	3	9
21:00	5	3	2	1	11
22:00	0	3	0	2	5
23:00	1	0	0	1	2
				TOTAL	193
AM PEAK HOUR				11:00 AM	
VOLUME				16	
PM PEAK HOUR				5:30 PM	
VOLUME				24	

TOTAL BI-DIRECTIONAL VOLUME	394

Appendix B

Intersection LOS Calculation

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	188	218	117	0	0	0	337	665	399	0	369	626
Future Volume (vph)	188	218	117	0	0	0	337	665	399	0	369	626
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.1	6.1					4.7	5.4	5.4		5.4	5.4
Lane Util. Factor	1.00	0.95					1.00	0.95	1.00		0.95	1.00
Frpb, ped/bikes	1.00	0.96					1.00	1.00	0.97		1.00	0.99
Flpb, ped/bikes	1.00	1.00					1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.95					1.00	1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00					0.95	1.00	1.00		1.00	1.00
Satd. Flow (prot)	1770	3212					1770	3539	1536		3539	1562
Flt Permitted	0.95	1.00					0.95	1.00	1.00		1.00	1.00
Satd. Flow (perm)	1770	3212					1770	3539	1536		3539	1562
Peak-hour factor, PHF	0.93	0.93	0.93	0.80	0.80	0.80	0.91	0.91	0.91	0.97	0.97	0.97
Adj. Flow (vph)	202	234	126	0	0	0	370	731	438	0	380	645
RTOR Reduction (vph)	0	104	0	0	0	0	0	0	79	0	0	386
Lane Group Flow (vph)	202	256	0	0	0	0	370	731	359	0	380	259
Confl. Peds. (#/hr)			10						15			
Confl. Bikes (#/hr)			5									2
Turn Type	Split	NA					Prot	NA	Perm		NA	Perm
Protected Phases	4	4					5	2			6	
Permitted Phases									2			6
Actuated Green, G (s)	12.4	12.4					17.9	46.1	46.1		23.5	23.5
Effective Green, g (s)	12.4	12.4					17.9	46.1	46.1		23.5	23.5
Actuated g/C Ratio	0.18	0.18					0.26	0.66	0.66		0.34	0.34
Clearance Time (s)	6.1	6.1					4.7	5.4	5.4		5.4	5.4
Vehicle Extension (s)	3.0	3.0					3.0	5.0	5.0		5.0	5.0
Lane Grp Cap (vph)	313	568					452	2330	1011		1188	524
v/s Ratio Prot	c0.11	0.08					c0.21	0.21			0.11	
v/s Ratio Perm									0.23			c0.17
v/c Ratio	0.65	0.45					0.82	0.31	0.36		0.32	0.49
Uniform Delay, d1	26.8	25.8					24.5	5.1	5.3		17.3	18.5
Progression Factor	1.00	1.00					0.86	0.65	0.43		1.00	1.00
Incremental Delay, d2	4.5	0.6					10.5	0.3	0.9		0.7	3.3
Delay (s)	31.3	26.3					31.5	3.7	3.2		18.0	21.8
Level of Service	C	C					C	A	A		B	C
Approach Delay (s)		28.1			0.0			10.2			20.4	
Approach LOS		C			A			B			C	

Intersection Summary			
HCM 2000 Control Delay	16.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	16.2
Intersection Capacity Utilization	65.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	58	21	142	24	0	203	0	1157	23	63	424	0
Future Volume (vph)	58	21	142	24	0	203	0	1157	23	63	424	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5	4.5	4.5		4.5		5.0	5.0		5.0	
Lane Util. Factor		1.00	1.00	1.00		1.00		0.91	1.00		0.95	
Frpb, ped/bikes		1.00	1.00	1.00		0.98		1.00	0.97		1.00	
Flpb, ped/bikes		1.00	1.00	1.00		1.00		1.00	1.00		1.00	
Frt		1.00	0.85	1.00		0.85		1.00	0.85		1.00	
Flt Protected		0.96	1.00	0.95		1.00		1.00	1.00		0.99	
Satd. Flow (prot)		1791	1583	1770		1555		5085	1544		3516	
Flt Permitted		0.96	1.00	0.69		1.00		1.00	1.00		0.70	
Satd. Flow (perm)		1791	1583	1292		1555		5085	1544		2479	
Peak-hour factor, PHF	0.81	0.81	0.81	0.86	0.86	0.86	0.93	0.93	0.93	0.82	0.82	0.82
Adj. Flow (vph)	72	26	175	28	0	236	0	1244	25	77	517	0
RTOR Reduction (vph)	0	0	151	0	0	204	0	0	7	0	0	0
Lane Group Flow (vph)	0	98	24	28	0	32	0	1244	18	0	594	0
Confl. Peds. (#/hr)	2					2			3			
Confl. Bikes (#/hr)						1			2			8
Turn Type	Perm	NA	Perm	Perm		Perm		NA	Perm	Prot	NA	
Protected Phases		8						2		1	6	
Permitted Phases	8		8	4		4			2			
Actuated Green, G (s)		9.5	9.5	9.5		9.5		51.0	51.0		51.0	
Effective Green, g (s)		9.5	9.5	9.5		9.5		51.0	51.0		51.0	
Actuated g/C Ratio		0.14	0.14	0.14		0.14		0.73	0.73		0.73	
Clearance Time (s)		4.5	4.5	4.5		4.5		5.0	5.0		5.0	
Vehicle Extension (s)		3.5	3.5	3.5		3.5		4.0	4.0		4.0	
Lane Grp Cap (vph)		243	214	175		211		3704	1124		1806	
v/s Ratio Prot								c0.24				
v/s Ratio Perm		0.05	0.02	0.02		0.02			0.01		0.24	
v/c Ratio		0.40	0.11	0.16		0.15		0.34	0.02		0.33	
Uniform Delay, d1		27.7	26.5	26.7		26.7		3.4	2.6		3.4	
Progression Factor		1.00	1.00	1.00		1.00		1.00	1.00		2.18	
Incremental Delay, d2		1.3	0.3	0.5		0.4		0.2	0.0		0.1	
Delay (s)		29.0	26.8	27.2		27.1		3.7	2.6		7.5	
Level of Service		C	C	C		C		A	A		A	
Approach Delay (s)		27.6			27.1			3.6			7.5	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	9.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	59.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	64	12	2	150	33	7
Future Volume (vph)	64	12	2	150	33	7
Peak Hour Factor	0.77	0.77	0.81	0.81	0.77	0.77
Hourly flow rate (vph)	83	16	2	185	43	9

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total (vph)	99	187	52
Volume Left (vph)	0	2	43
Volume Right (vph)	16	0	9
Hadj (s)	-0.06	0.04	0.10
Departure Headway (s)	4.2	4.2	4.6
Degree Utilization, x	0.11	0.22	0.07
Capacity (veh/h)	846	849	730
Control Delay (s)	7.7	8.3	7.9
Approach Delay (s)	7.7	8.3	7.9
Approach LOS	A	A	A

Intersection Summary			
Delay	8.1		
Level of Service	A		
Intersection Capacity Utilization	19.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	49	19	43	123	22	18
Future Volume (Veh/h)	49	19	43	123	22	18
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.78	0.78	0.80	0.80	0.83	0.83
Hourly flow rate (vph)	63	24	54	154	27	22
Pedestrians	1				3	
Lane Width (ft)	12.0				12.0	
Walking Speed (ft/s)	3.5				3.5	
Percent Blockage	0				0	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			90		341	78
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			90		341	78
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			96		96	98
cM capacity (veh/h)			1501		629	980

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	87	208	49
Volume Left	0	54	27
Volume Right	24	0	22
cSH	1700	1501	750
Volume to Capacity	0.05	0.04	0.07
Queue Length 95th (ft)	0	3	5
Control Delay (s)	0.0	2.2	10.1
Lane LOS		A	B
Approach Delay (s)	0.0	2.2	10.1
Approach LOS			B

Intersection Summary			
Average Delay	2.8		
Intersection Capacity Utilization	25.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	43	13	5	1	46	17	41	50	4	9	4	79
Future Volume (vph)	43	13	5	1	46	17	41	50	4	9	4	79
Peak Hour Factor	0.69	0.69	0.69	0.84	0.84	0.84	0.63	0.63	0.63	0.79	0.79	0.79
Hourly flow rate (vph)	62	19	7	1	55	20	65	79	6	11	5	100

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1
Volume Total (vph)	88	76	144	6	116
Volume Left (vph)	62	1	65	0	11
Volume Right (vph)	7	20	0	6	100
Hadj (s)	0.13	-0.12	0.12	-0.57	-0.46
Departure Headway (s)	4.7	4.5	4.5	3.2	4.0
Degree Utilization, x	0.11	0.09	0.18	0.01	0.13
Capacity (veh/h)	712	747	757	1121	852
Control Delay (s)	8.3	7.9	8.5	6.2	7.6
Approach Delay (s)	8.3	7.9	8.5		7.6
Approach LOS	A	A	A		A

Intersection Summary			
Delay	8.1		
Level of Service	A		
Intersection Capacity Utilization	29.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Stop	Stop		Stop	
Traffic Volume (vph)	3	112	148	3	3	3
Future Volume (vph)	3	112	148	3	3	3
Peak Hour Factor	0.65	0.65	0.70	0.70	0.38	0.38
Hourly flow rate (vph)	5	172	211	4	8	8

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total (vph)	177	215	16
Volume Left (vph)	5	0	8
Volume Right (vph)	0	4	8
Hadj (s)	0.04	0.02	-0.17
Departure Headway (s)	4.2	4.1	4.6
Degree Utilization, x	0.21	0.25	0.02
Capacity (veh/h)	846	859	720
Control Delay (s)	8.3	8.5	7.7
Approach Delay (s)	8.3	8.5	7.7
Approach LOS	A	A	A

Intersection Summary			
Delay	8.4		
Level of Service	A		
Intersection Capacity Utilization	18.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	272	606	316	0	0	0	213	562	357	0	540	358
Future Volume (vph)	272	606	316	0	0	0	213	562	357	0	540	358
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.1	6.1					4.7	5.4	5.4		5.4	5.4
Lane Util. Factor	1.00	0.95					1.00	0.95	1.00		0.95	1.00
Frpb, ped/bikes	1.00	0.98					1.00	1.00	0.99		1.00	0.99
Flpb, ped/bikes	1.00	1.00					1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.95					1.00	1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00					0.95	1.00	1.00		1.00	1.00
Satd. Flow (prot)	1770	3305					1770	3539	1560		3539	1562
Flt Permitted	0.95	1.00					0.95	1.00	1.00		1.00	1.00
Satd. Flow (perm)	1770	3305					1770	3539	1560		3539	1562
Peak-hour factor, PHF	0.91	0.91	0.91	0.80	0.80	0.80	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	299	666	347	0	0	0	239	631	401	0	607	402
RTOR Reduction (vph)	0	96	0	0	0	0	0	0	18	0	0	262
Lane Group Flow (vph)	299	917	0	0	0	0	239	631	383	0	607	140
Confl. Peds. (#/hr)			3						2			
Confl. Bikes (#/hr)			3									2
Turn Type	Split	NA					Prot	NA	Perm		NA	Perm
Protected Phases	4	4					5	2			6	
Permitted Phases									2			6
Actuated Green, G (s)	14.9	14.9					14.5	43.6	43.6		24.4	24.4
Effective Green, g (s)	14.9	14.9					14.5	43.6	43.6		24.4	24.4
Actuated g/C Ratio	0.21	0.21					0.21	0.62	0.62		0.35	0.35
Clearance Time (s)	6.1	6.1					4.7	5.4	5.4		5.4	5.4
Vehicle Extension (s)	3.0	3.0					3.0	5.0	5.0		5.0	5.0
Lane Grp Cap (vph)	376	703					366	2204	971		1233	544
v/s Ratio Prot	0.17	c0.28					c0.14	0.18			c0.17	
v/s Ratio Perm									0.25			0.09
v/c Ratio	0.80	1.30					0.65	0.29	0.39		0.49	0.26
Uniform Delay, d1	26.1	27.6					25.4	6.1	6.6		17.9	16.3
Progression Factor	1.00	1.00					0.86	0.64	0.59		1.00	1.00
Incremental Delay, d2	11.1	147.2					4.0	0.3	1.2		1.4	1.1
Delay (s)	37.2	174.7					25.8	4.2	5.1		19.3	17.5
Level of Service	D	F					C	A	A		B	B
Approach Delay (s)		143.4			0.0			8.5			18.6	
Approach LOS		F			A			A			B	

Intersection Summary			
HCM 2000 Control Delay	60.6	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	16.2
Intersection Capacity Utilization	67.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	45	59	190	12	0	133	0	943	31	17	119	739
Future Volume (vph)	45	59	190	12	0	133	0	943	31	17	119	739
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5	4.5	4.5		4.5		5.0	5.0			5.0
Lane Util. Factor		1.00	1.00	1.00		1.00		0.91	1.00			0.95
Frpb, ped/bikes		1.00	1.00	1.00		0.99		1.00	0.98			1.00
Flpb, ped/bikes		1.00	1.00	1.00		1.00		1.00	1.00			1.00
Frt		1.00	0.85	1.00		0.85		1.00	0.85			1.00
Flt Protected		0.98	1.00	0.95		1.00		1.00	1.00			0.99
Satd. Flow (prot)		1823	1583	1770		1562		5085	1550			3512
Flt Permitted		0.98	1.00	0.68		1.00		1.00	1.00			0.64
Satd. Flow (perm)		1823	1583	1270		1562		5085	1550			2273
Peak-hour factor, PHF	0.89	0.89	0.89	0.91	0.91	0.91	0.91	0.91	0.91	0.90	0.90	0.90
Adj. Flow (vph)	51	66	213	13	0	146	0	1036	34	19	132	821
RTOR Reduction (vph)	0	0	183	0	0	125	0	0	9	0	0	0
Lane Group Flow (vph)	0	117	30	13	0	21	0	1036	25	0	0	972
Confl. Bikes (#/hr)						1			2			
Turn Type	Perm	NA	Perm	Perm		Perm		NA	Perm	custom	Prot	NA
Protected Phases		8						2			1	6
Permitted Phases	8		8	4		4			2	1		
Actuated Green, G (s)		9.9	9.9	9.9		9.9		50.6	50.6			50.6
Effective Green, g (s)		9.9	9.9	9.9		9.9		50.6	50.6			50.6
Actuated g/C Ratio		0.14	0.14	0.14		0.14		0.72	0.72			0.72
Clearance Time (s)		4.5	4.5	4.5		4.5		5.0	5.0			5.0
Vehicle Extension (s)		3.5	3.5	3.5		3.5		4.0	4.0			4.0
Lane Grp Cap (vph)		257	223	179		220		3675	1120			1643
v/s Ratio Prot								0.20				
v/s Ratio Perm		0.06	0.02	0.01		0.01			0.02			c0.43
v/c Ratio		0.46	0.14	0.07		0.09		0.28	0.02			0.59
Uniform Delay, d1		27.6	26.3	26.1		26.1		3.4	2.7			4.7
Progression Factor		1.00	1.00	1.00		1.00		1.00	1.00			1.84
Incremental Delay, d2		1.5	0.3	0.2		0.2		0.2	0.0			0.4
Delay (s)		29.1	26.6	26.3		26.4		3.6	2.8			9.0
Level of Service		C	C	C		C		A	A			A
Approach Delay (s)		27.5			26.4			3.5				9.0
Approach LOS		C			C			A				A

Intersection Summary			
HCM 2000 Control Delay	10.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	72.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	0
Future Volume (vph)	0
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frpb, ped/bikes	
Flpb, ped/bikes	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.90
Adj. Flow (vph)	0
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Confl. Bikes (#/hr)	
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	146	24	5	84	13	6
Future Volume (vph)	146	24	5	84	13	6
Peak Hour Factor	0.90	0.90	0.89	0.89	0.59	0.59
Hourly flow rate (vph)	162	27	6	94	22	10

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total (vph)	189	100	32
Volume Left (vph)	0	6	22
Volume Right (vph)	27	0	10
Hadj (s)	-0.05	0.05	-0.02
Departure Headway (s)	4.0	4.2	4.5
Degree Utilization, x	0.21	0.12	0.04
Capacity (veh/h)	880	841	746
Control Delay (s)	8.1	7.8	7.7
Approach Delay (s)	8.1	7.8	7.7
Approach LOS	A	A	A

Intersection Summary			
Delay	8.0		
Level of Service	A		
Intersection Capacity Utilization	19.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	128	24	12	67	18	29
Future Volume (Veh/h)	128	24	12	67	18	29
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.82	0.82	0.65	0.65
Hourly flow rate (vph)	142	27	15	82	28	45
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			169		268	156
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			169		268	156
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		96	95
cM capacity (veh/h)			1409		714	890

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	169	97	73
Volume Left	0	15	28
Volume Right	27	0	45
cSH	1700	1409	813
Volume to Capacity	0.10	0.01	0.09
Queue Length 95th (ft)	0	1	7
Control Delay (s)	0.0	1.2	9.9
Lane LOS		A	A
Approach Delay (s)	0.0	1.2	9.9
Approach LOS			A

Intersection Summary			
Average Delay	2.5		
Intersection Capacity Utilization	23.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	59	60	37	2	20	22	21	16	1	13	19	37
Future Volume (vph)	59	60	37	2	20	22	21	16	1	13	19	37
Peak Hour Factor	0.74	0.74	0.74	0.65	0.65	0.65	0.73	0.73	0.73	0.69	0.69	0.69
Hourly flow rate (vph)	80	81	50	3	31	34	29	22	1	19	28	54

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1
Volume Total (vph)	211	68	51	1	101
Volume Left (vph)	80	3	29	0	19
Volume Right (vph)	50	34	0	1	54
Hadj (s)	-0.03	-0.26	0.15	-0.57	-0.25
Departure Headway (s)	4.3	4.2	4.8	3.2	4.3
Degree Utilization, x	0.25	0.08	0.07	0.00	0.12
Capacity (veh/h)	808	799	699	1121	774
Control Delay (s)	8.7	7.6	8.1	6.2	7.9
Approach Delay (s)	8.7	7.6	8.1		7.9
Approach LOS	A	A	A		A

Intersection Summary			
Delay	8.3		
Level of Service	A		
Intersection Capacity Utilization	32.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Stop	Stop		Stop	
Traffic Volume (vph)	7	102	76	7	9	3
Future Volume (vph)	7	102	76	7	9	3
Peak Hour Factor	0.80	0.80	0.69	0.69	0.60	0.60
Hourly flow rate (vph)	9	128	110	10	15	5

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total (vph)	137	120	20
Volume Left (vph)	9	0	15
Volume Right (vph)	0	10	5
Hadj (s)	0.05	-0.02	0.03
Departure Headway (s)	4.1	4.1	4.5
Degree Utilization, x	0.16	0.14	0.02
Capacity (veh/h)	863	873	753
Control Delay (s)	7.9	7.7	7.6
Approach Delay (s)	7.9	7.7	7.6
Approach LOS	A	A	A

Intersection Summary			
Delay	7.8		
Level of Service	A		
Intersection Capacity Utilization	21.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	188	218	117	0	0	0	337	665	399	0	369	626
Future Volume (vph)	188	218	117	0	0	0	337	669	403	0	385	626
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.1	6.1					4.7	5.4	5.4		5.4	5.4
Lane Util. Factor	1.00	0.95					1.00	0.95	1.00		0.95	1.00
Frpb, ped/bikes	1.00	0.96					1.00	1.00	0.97		1.00	0.99
Flpb, ped/bikes	1.00	1.00					1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.95					1.00	1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00					0.95	1.00	1.00		1.00	1.00
Satd. Flow (prot)	1770	3212					1770	3539	1536		3539	1562
Flt Permitted	0.95	1.00					0.95	1.00	1.00		1.00	1.00
Satd. Flow (perm)	1770	3212					1770	3539	1536		3539	1562
Peak-hour factor, PHF	0.93	0.93	0.93	0.80	0.80	0.80	0.91	0.91	0.91	0.97	0.97	0.97
Adj. Flow (vph)	202	234	126	0	0	0	370	735	443	0	397	645
RTOR Reduction (vph)	0	104	0	0	0	0	0	0	79	0	0	386
Lane Group Flow (vph)	202	256	0	0	0	0	370	735	364	0	397	259
Confl. Peds. (#/hr)			10						15			
Confl. Bikes (#/hr)			5									2
Turn Type	Split	NA					Prot	NA	Perm		NA	Perm
Protected Phases	4	4					5	2			6	
Permitted Phases									2			6
Actuated Green, G (s)	12.4	12.4					17.9	46.1	46.1		23.5	23.5
Effective Green, g (s)	12.4	12.4					17.9	46.1	46.1		23.5	23.5
Actuated g/C Ratio	0.18	0.18					0.26	0.66	0.66		0.34	0.34
Clearance Time (s)	6.1	6.1					4.7	5.4	5.4		5.4	5.4
Vehicle Extension (s)	3.0	3.0					3.0	5.0	5.0		5.0	5.0
Lane Grp Cap (vph)	313	568					452	2330	1011		1188	524
v/s Ratio Prot	c0.11	0.08					c0.21	0.21			0.11	
v/s Ratio Perm									0.24			c0.17
v/c Ratio	0.65	0.45					0.82	0.32	0.36		0.33	0.49
Uniform Delay, d1	26.8	25.8					24.5	5.1	5.4		17.4	18.5
Progression Factor	1.00	1.00					0.85	0.64	0.43		1.00	1.00
Incremental Delay, d2	4.5	0.6					10.5	0.3	0.9		0.8	3.3
Delay (s)	31.3	26.3					31.3	3.6	3.3		18.2	21.8
Level of Service	C	C					C	A	A		B	C
Approach Delay (s)		28.1			0.0			10.1			20.4	
Approach LOS		C			A			B			C	

Intersection Summary			
HCM 2000 Control Delay	16.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	16.2
Intersection Capacity Utilization	65.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	58	21	142	24	0	203	0	1157	23	63	424	0
Future Volume (vph)	58	37	142	24	0	211	0	1157	23	79	424	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5	4.5	4.5		4.5		5.0	5.0		5.0	
Lane Util. Factor		1.00	1.00	1.00		1.00		0.91	1.00		0.95	
Frpb, ped/bikes		1.00	1.00	1.00		0.98		1.00	0.97		1.00	
Flpb, ped/bikes		1.00	1.00	1.00		1.00		1.00	1.00		1.00	
Frt		1.00	0.85	1.00		0.85		1.00	0.85		1.00	
Flt Protected		0.97	1.00	0.95		1.00		1.00	1.00		0.99	
Satd. Flow (prot)		1803	1583	1770		1555		5085	1544		3512	
Flt Permitted		0.97	1.00	0.68		1.00		1.00	1.00		0.66	
Satd. Flow (perm)		1803	1583	1269		1555		5085	1544		2326	
Peak-hour factor, PHF	0.81	0.81	0.81	0.86	0.86	0.86	0.93	0.93	0.93	0.82	0.82	0.82
Adj. Flow (vph)	72	46	175	28	0	245	0	1244	25	96	517	0
RTOR Reduction (vph)	0	0	150	0	0	210	0	0	7	0	0	0
Lane Group Flow (vph)	0	118	25	28	0	35	0	1244	18	0	613	0
Confl. Peds. (#/hr)	2					2			3			
Confl. Bikes (#/hr)						1			2			8
Turn Type	Perm	NA	Perm	Perm		Perm		NA	Perm	Prot	NA	
Protected Phases		8						2		1	6	
Permitted Phases	8		8	4		4			2			
Actuated Green, G (s)		10.0	10.0	10.0		10.0		50.5	50.5		50.5	
Effective Green, g (s)		10.0	10.0	10.0		10.0		50.5	50.5		50.5	
Actuated g/C Ratio		0.14	0.14	0.14		0.14		0.72	0.72		0.72	
Clearance Time (s)		4.5	4.5	4.5		4.5		5.0	5.0		5.0	
Vehicle Extension (s)		3.5	3.5	3.5		3.5		4.0	4.0		4.0	
Lane Grp Cap (vph)		257	226	181		222		3668	1113		1678	
v/s Ratio Prot								0.24				
v/s Ratio Perm		0.07	0.02	0.02		0.02			0.01		c0.26	
v/c Ratio		0.46	0.11	0.15		0.16		0.34	0.02		0.37	
Uniform Delay, d1		27.5	26.1	26.3		26.3		3.6	2.7		3.7	
Progression Factor		1.00	1.00	1.00		1.00		1.00	1.00		2.17	
Incremental Delay, d2		1.5	0.3	0.5		0.4		0.3	0.0		0.1	
Delay (s)		29.1	26.4	26.8		26.7		3.8	2.8		8.1	
Level of Service		C	C	C		C		A	A		A	
Approach Delay (s)		27.5			26.7			3.8			8.1	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	10.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	59.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	64	12	2	150	33	7
Future Volume (vph)	96	12	2	158	33	7
Peak Hour Factor	0.77	0.77	0.81	0.81	0.77	0.77
Hourly flow rate (vph)	125	16	2	195	43	9

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total (vph)	141	197	52
Volume Left (vph)	0	2	43
Volume Right (vph)	16	0	9
Hadj (s)	-0.03	0.04	0.10
Departure Headway (s)	4.2	4.2	4.7
Degree Utilization, x	0.16	0.23	0.07
Capacity (veh/h)	838	839	707
Control Delay (s)	8.0	8.5	8.1
Approach Delay (s)	8.0	8.5	8.1
Approach LOS	A	A	A

Intersection Summary			
Delay	8.3		
Level of Service	A		
Intersection Capacity Utilization	19.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	49	19	43	123	22	18
Future Volume (Veh/h)	49	51	43	123	30	18
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.78	0.78	0.80	0.80	0.83	0.83
Hourly flow rate (vph)	63	65	54	154	36	22
Pedestrians	1				3	
Lane Width (ft)	12.0				12.0	
Walking Speed (ft/s)	3.5				3.5	
Percent Blockage	0				0	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			131		362	98
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			131		362	98
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			96		94	98
cM capacity (veh/h)			1450		611	955

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	128	208	58
Volume Left	0	54	36
Volume Right	65	0	22
cSH	1700	1450	708
Volume to Capacity	0.08	0.04	0.08
Queue Length 95th (ft)	0	3	7
Control Delay (s)	0.0	2.2	10.5
Lane LOS		A	B
Approach Delay (s)	0.0	2.2	10.5
Approach LOS			B

Intersection Summary			
Average Delay	2.7		
Intersection Capacity Utilization	25.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	43	13	5	1	46	17	41	50	4	9	4	79
Future Volume (vph)	43	13	5	1	46	17	41	50	4	9	4	79
Peak Hour Factor	0.69	0.69	0.69	0.84	0.84	0.84	0.63	0.63	0.63	0.79	0.79	0.79
Hourly flow rate (vph)	62	19	7	1	55	20	65	79	6	11	5	100

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1
Volume Total (vph)	88	76	144	6	116
Volume Left (vph)	62	1	65	0	11
Volume Right (vph)	7	20	0	6	100
Hadj (s)	0.13	-0.12	0.12	-0.57	-0.46
Departure Headway (s)	4.7	4.5	4.5	3.2	4.0
Degree Utilization, x	0.11	0.09	0.18	0.01	0.13
Capacity (veh/h)	712	747	757	1121	852
Control Delay (s)	8.3	7.9	8.5	6.2	7.6
Approach Delay (s)	8.3	7.9	8.5		7.6
Approach LOS	A	A	A		A

Intersection Summary			
Delay	8.1		
Level of Service	A		
Intersection Capacity Utilization	29.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Stop	Stop		Stop	
Traffic Volume (vph)	3	112	148	3	3	3
Future Volume (vph)	3	112	148	3	3	3
Peak Hour Factor	0.65	0.65	0.70	0.70	0.38	0.38
Hourly flow rate (vph)	5	172	211	4	8	8

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total (vph)	177	215	16
Volume Left (vph)	5	0	8
Volume Right (vph)	0	4	8
Hadj (s)	0.04	0.02	-0.17
Departure Headway (s)	4.2	4.1	4.6
Degree Utilization, x	0.21	0.25	0.02
Capacity (veh/h)	846	859	720
Control Delay (s)	8.3	8.5	7.7
Approach Delay (s)	8.3	8.5	7.7
Approach LOS	A	A	A

Intersection Summary			
Delay	8.4		
Level of Service	A		
Intersection Capacity Utilization	18.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	272	606	316	0	0	0	213	562	357	0	540	358
Future Volume (vph)	272	606	316	0	0	0	213	578	373	0	544	358
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.1	6.1					4.7	5.4	5.4		5.4	5.4
Lane Util. Factor	1.00	0.95					1.00	0.95	1.00		0.95	1.00
Frpb, ped/bikes	1.00	0.98					1.00	1.00	0.99		1.00	0.99
Flpb, ped/bikes	1.00	1.00					1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.95					1.00	1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00					0.95	1.00	1.00		1.00	1.00
Satd. Flow (prot)	1770	3305					1770	3539	1560		3539	1562
Flt Permitted	0.95	1.00					0.95	1.00	1.00		1.00	1.00
Satd. Flow (perm)	1770	3305					1770	3539	1560		3539	1562
Peak-hour factor, PHF	0.91	0.91	0.91	0.80	0.80	0.80	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	299	666	347	0	0	0	239	649	419	0	611	402
RTOR Reduction (vph)	0	96	0	0	0	0	0	0	18	0	0	262
Lane Group Flow (vph)	299	917	0	0	0	0	239	649	401	0	611	140
Confl. Peds. (#/hr)			3						2			
Confl. Bikes (#/hr)			3									2
Turn Type	Split	NA					Prot	NA	Perm		NA	Perm
Protected Phases	4	4					5	2			6	
Permitted Phases									2			6
Actuated Green, G (s)	14.9	14.9					14.5	43.6	43.6		24.4	24.4
Effective Green, g (s)	14.9	14.9					14.5	43.6	43.6		24.4	24.4
Actuated g/C Ratio	0.21	0.21					0.21	0.62	0.62		0.35	0.35
Clearance Time (s)	6.1	6.1					4.7	5.4	5.4		5.4	5.4
Vehicle Extension (s)	3.0	3.0					3.0	5.0	5.0		5.0	5.0
Lane Grp Cap (vph)	376	703					366	2204	971		1233	544
v/s Ratio Prot	0.17	c0.28					c0.14	0.18			c0.17	
v/s Ratio Perm									0.26			0.09
v/c Ratio	0.80	1.30					0.65	0.29	0.41		0.50	0.26
Uniform Delay, d1	26.1	27.6					25.4	6.1	6.7		18.0	16.3
Progression Factor	1.00	1.00					0.86	0.64	0.62		1.00	1.00
Incremental Delay, d2	11.1	147.2					4.0	0.3	1.2		1.4	1.1
Delay (s)	37.2	174.7					25.8	4.3	5.4		19.4	17.5
Level of Service	D	F					C	A	A		B	B
Approach Delay (s)		143.4			0.0			8.6			18.6	
Approach LOS		F			A			A			B	

Intersection Summary			
HCM 2000 Control Delay	60.1	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	16.2
Intersection Capacity Utilization	67.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	45	59	190	12	0	133	0	943	31	17	119	739
Future Volume (vph)	45	63	190	12	0	165	0	943	31	17	123	739
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5	4.5	4.5		4.5		5.0	5.0			5.0
Lane Util. Factor		1.00	1.00	1.00		1.00		0.91	1.00			0.95
Frpb, ped/bikes		1.00	1.00	1.00		0.99		1.00	0.98			1.00
Flpb, ped/bikes		1.00	1.00	1.00		1.00		1.00	1.00			1.00
Frt		1.00	0.85	1.00		0.85		1.00	0.85			1.00
Flt Protected		0.98	1.00	0.95		1.00		1.00	1.00			0.99
Satd. Flow (prot)		1825	1583	1770		1562		5085	1550			3511
Flt Permitted		0.98	1.00	0.68		1.00		1.00	1.00			0.64
Satd. Flow (perm)		1825	1583	1264		1562		5085	1550			2250
Peak-hour factor, PHF	0.89	0.89	0.89	0.91	0.91	0.91	0.91	0.91	0.91	0.90	0.90	0.90
Adj. Flow (vph)	51	71	213	13	0	181	0	1036	34	19	137	821
RTOR Reduction (vph)	0	0	182	0	0	155	0	0	10	0	0	0
Lane Group Flow (vph)	0	122	31	13	0	26	0	1036	24	0	0	977
Confl. Bikes (#/hr)						1			2			
Turn Type	Perm	NA	Perm	Perm		Perm		NA	Perm	custom	Prot	NA
Protected Phases		8						2			1	6
Permitted Phases	8		8	4		4			2	1		
Actuated Green, G (s)		10.1	10.1	10.1		10.1		50.4	50.4			50.4
Effective Green, g (s)		10.1	10.1	10.1		10.1		50.4	50.4			50.4
Actuated g/C Ratio		0.14	0.14	0.14		0.14		0.72	0.72			0.72
Clearance Time (s)		4.5	4.5	4.5		4.5		5.0	5.0			5.0
Vehicle Extension (s)		3.5	3.5	3.5		3.5		4.0	4.0			4.0
Lane Grp Cap (vph)		263	228	182		225		3661	1116			1620
v/s Ratio Prot								0.20				
v/s Ratio Perm		0.07	0.02	0.01		0.02			0.02			c0.43
v/c Ratio		0.46	0.13	0.07		0.12		0.28	0.02			0.60
Uniform Delay, d1		27.5	26.1	25.9		26.1		3.4	2.8			4.8
Progression Factor		1.00	1.00	1.00		1.00		1.00	1.00			1.83
Incremental Delay, d2		1.5	0.3	0.2		0.3		0.2	0.0			0.4
Delay (s)		29.0	26.5	26.1		26.3		3.6	2.8			9.3
Level of Service		C	C	C		C		A	A			A
Approach Delay (s)		27.4			26.3			3.6				9.3
Approach LOS		C			C			A				A

Intersection Summary			
HCM 2000 Control Delay	10.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	72.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	0
Future Volume (vph)	0
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frpb, ped/bikes	
Flpb, ped/bikes	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.90
Adj. Flow (vph)	0
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Confl. Bikes (#/hr)	
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	146	24	5	84	13	6
Future Volume (vph)	154	24	5	116	13	6
Peak Hour Factor	0.90	0.90	0.89	0.89	0.59	0.59
Hourly flow rate (vph)	171	27	6	130	22	10

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total (vph)	198	136	32
Volume Left (vph)	0	6	22
Volume Right (vph)	27	0	10
Hadj (s)	-0.05	0.04	-0.02
Departure Headway (s)	4.1	4.2	4.6
Degree Utilization, x	0.22	0.16	0.04
Capacity (veh/h)	870	839	725
Control Delay (s)	8.2	8.0	7.8
Approach Delay (s)	8.2	8.0	7.8
Approach LOS	A	A	A

Intersection Summary			
Delay	8.1		
Level of Service	A		
Intersection Capacity Utilization	19.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	128	24	12	67	18	29
Future Volume (Veh/h)	128	32	12	67	50	29
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.82	0.82	0.65	0.65
Hourly flow rate (vph)	142	36	15	82	77	45
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			178		272	160
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			178		272	160
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		89	95
cM capacity (veh/h)			1398		710	885

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	178	97	122
Volume Left	0	15	77
Volume Right	36	0	45
cSH	1700	1398	766
Volume to Capacity	0.10	0.01	0.16
Queue Length 95th (ft)	0	1	14
Control Delay (s)	0.0	1.2	10.6
Lane LOS		A	B
Approach Delay (s)	0.0	1.2	10.6
Approach LOS			B

Intersection Summary			
Average Delay	3.6		
Intersection Capacity Utilization	23.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	59	60	37	2	20	22	21	16	1	13	19	37
Future Volume (vph)	59	60	37	2	20	22	21	16	1	13	19	37
Peak Hour Factor	0.74	0.74	0.74	0.65	0.65	0.65	0.73	0.73	0.73	0.69	0.69	0.69
Hourly flow rate (vph)	80	81	50	3	31	34	29	22	1	19	28	54

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1
Volume Total (vph)	211	68	51	1	101
Volume Left (vph)	80	3	29	0	19
Volume Right (vph)	50	34	0	1	54
Hadj (s)	-0.03	-0.26	0.15	-0.57	-0.25
Departure Headway (s)	4.3	4.2	4.8	3.2	4.3
Degree Utilization, x	0.25	0.08	0.07	0.00	0.12
Capacity (veh/h)	808	799	699	1121	774
Control Delay (s)	8.7	7.6	8.1	6.2	7.9
Approach Delay (s)	8.7	7.6	8.1		7.9
Approach LOS	A	A	A		A

Intersection Summary			
Delay	8.3		
Level of Service	A		
Intersection Capacity Utilization	32.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Stop	Stop		Stop	
Traffic Volume (vph)	7	102	76	7	9	3
Future Volume (vph)	7	102	76	7	9	3
Peak Hour Factor	0.80	0.80	0.69	0.69	0.60	0.60
Hourly flow rate (vph)	9	128	110	10	15	5

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total (vph)	137	120	20
Volume Left (vph)	9	0	15
Volume Right (vph)	0	10	5
Hadj (s)	0.05	-0.02	0.03
Departure Headway (s)	4.1	4.1	4.5
Degree Utilization, x	0.16	0.14	0.02
Capacity (veh/h)	863	873	753
Control Delay (s)	7.9	7.7	7.6
Approach Delay (s)	7.9	7.7	7.6
Approach LOS	A	A	A

Intersection Summary			
Delay	7.8		
Level of Service	A		
Intersection Capacity Utilization	21.4%	ICU Level of Service	A
Analysis Period (min)	15		

Appendix C

Trip Generation Worksheets

Table 1A - Daily and Peak Hour Trips by Phase (80LF/Day Production Rate)

Phase	From	To	Duration (Week)	Daily Trips (One-Way) Haul Truck	Material Truck	Worker	Total	Peak Hour Trips (One-Way) Haul Truck	Material Truck	Worker	Total
PIPELINE PHASE 1											
Installation on Windor Dr, Condit Rd, and Leland Dr.	Week 1	Week 7	7	24	6	48	78	4	1	24	29
Flushing, Pressure Testing, and Chlorination	Week 8	Week 11	4	0	6	26	32	0	1	13	14
Paving on Windor Dr, Condit Rd, and Leland Dr.	Week 12	Week 12	1	20	0	26	46	3	0	13	16
MOBILIZATION											
Mobilization for Reservoir Replacement	Week 13	Week 14	2	0	8	4	12	0	2	2	4
DEMOLITION											
Site Work - Tree Removal	Week 15	Week 16	2	4	0	4	8	1	0	2	3
Drain Reservoir	Week 17	Week 20	4	2	0	4	6	1	0	2	3
Removal and Crush Concrete Roof Panels and Structure	Week 21	Week 26	6	28	0	30	58	4	0	15	19
Remove and Crush Concrete Girders	Week 27	Week 29	3	8	0	30	38	2	0	15	17
Remove and Crush Concrete Columns and Footings	Week 30	Week 32	3	6	0	30	36	1	0	15	16
Remove and Crush Concrete Lining	Week 33	Week 38	6	12	0	30	42	2	0	15	17
Open Cut Excavation and Soil Hauling	Week 39	Week 62	24	70	0	20	90	10	0	10	20
TANK CONSTRUCTION											
Reservoir Concrete Foundation	Week 63	Week 70	8	0	106	46	152	0	16	23	39
Reservoir Concrete Walls/Columns	Week 71	Week 81	11	0	26	36	62	0	4	18	22
Reservoir Prestress Wrapping/Shotcrete	Week 82	Week 89	8	0	16	16	32	0	3	8	11
Reservoir Concrete Roof Slab	Week 90	Week 109	20	0	100	36	136	0	15	18	33
Valve Pit and Pit Piping/Valves	Week 110	Week 116	7	0	32	16	48	0	5	8	13
Field Testing and Startup	Week 117	Week 125	9	0	2	16	18	0	1	8	9
PIPELINE PHASE 2											
Installation within reservoir property and unpaved area	Week 126	Week 127	2	24	6	48	78	4	1	24	29
Installation within reservoir and in new access road	Week 128	Week 128	1	24	6	48	78	4	1	24	29
Flushing, Pressure Testing, and Chlorination	Week 129	Week 130	2	0	6	26	32	0	1	13	14
Paving within reservoir and new access road	Week 131	Week 131	1	12	0	26	38	2	0	13	15
SITE RESTORATION											
Tank Backfill	Week 132	Week 144	13	10	0	8	18	2	0	4	6
Contouring/Landscaping	Week 145	Week 152	8	0	48	16	64	0	7	8	15
Complete Civil Work	Week 153	Week 156	4	0	8	8	16	0	2	4	6
Demobilization	Week 157	Week 158	2	0	8	8	16	0	2	4	6
SUMMARY											
Total			158								
Max				70	106	48		10	16	24	39

Source:

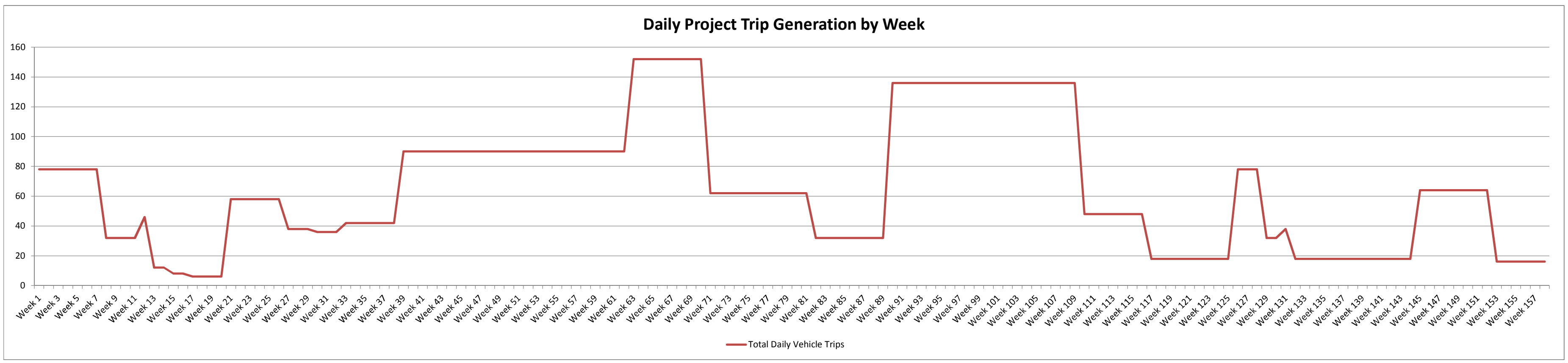
Leland Reservoir Replacement and Pipeline Installation at 80LF/day Production Rate - Truck Trip Estimate , EBMUD, 1/12/2017

Leland Reservoir Replacement - 36-inch Pipeline Installation at 80LF/day Production Rate , EBMUD, 1/12/2017

Table 2 - Project Trip Generation by Week

		80LF/Day Production Rate							
		Daily Trips				Peak Hour			
Week	Week	Haul Truck Trips	E/M Truck Trips	Worker Vehicle Trips	Total Daily Vehicle Trips	Haul Truck	Material Truck	Worker	Total Peak Hour Trips @80LF/Day
Week 1	10/1/2022	24	6	48	78	4	1	24	29
Week 2	10/8/2022	24	6	48	78	4	1	24	29
Week 3	10/15/2022	24	6	48	78	4	1	24	29
Week 4	10/22/2022	24	6	48	78	4	1	24	29
Week 5	10/29/2022	24	6	48	78	4	1	24	29
Week 6	11/5/2022	24	6	48	78	4	1	24	29
Week 7	11/12/2022	24	6	48	78	4	1	24	29
Week 8	11/19/2022	0	6	26	32	0	1	13	14
Week 9	11/26/2022	0	6	26	32	0	1	13	14
Week 10	12/3/2022	0	6	26	32	0	1	13	14
Week 11	12/10/2022	0	6	26	32	0	1	13	14
Week 12	12/17/2022	20	0	26	46	3	0	13	16
Week 13	12/24/2022	0	8	4	12	0	2	2	4
Week 14	12/31/2022	0	8	4	12	0	2	2	4
Week 15	1/7/2023	4	0	4	8	1	0	2	3
Week 16	1/14/2023	4	0	4	8	1	0	2	3
Week 17	1/21/2023	2	0	4	6	1	0	2	3
Week 18	1/28/2023	2	0	4	6	1	0	2	3
Week 19	2/4/2023	2	0	4	6	1	0	2	3
Week 20	2/11/2023	2	0	4	6	1	0	2	3
Week 21	2/18/2023	28	0	30	58	4	0	15	19
Week 22	2/25/2023	28	0	30	58	4	0	15	19
Week 23	3/4/2023	28	0	30	58	4	0	15	19
Week 24	3/11/2023	28	0	30	58	4	0	15	19
Week 25	3/18/2023	28	0	30	58	4	0	15	19
Week 26	3/25/2023	28	0	30	58	4	0	15	19
Week 27	4/1/2023	8	0	30	38	2	0	15	17
Week 28	4/8/2023	8	0	30	38	2	0	15	17
Week 29	4/15/2023	8	0	30	38	2	0	15	17
Week 30	4/22/2023	6	0	30	36	1	0	15	16
Week 31	4/29/2023	6	0	30	36	1	0	15	16
Week 32	5/6/2023	6	0	30	36	1	0	15	16
Week 33	5/13/2023	12	0	30	42	2	0	15	17
Week 34	5/20/2023	12	0	30	42	2	0	15	17
Week 35	5/27/2023	12	0	30	42	2	0	15	17
Week 36	6/3/2023	12	0	30	42	2	0	15	17
Week 37	6/10/2023	12	0	30	42	2	0	15	17
Week 38	6/17/2023	12	0	30	42	2	0	15	17
Week 39	6/24/2023	70	0	20	90	10	0	10	20
Week 40	7/1/2023	70	0	20	90	10	0	10	20
Week 41	7/8/2023	70	0	20	90	10	0	10	20
Week 42	7/15/2023	70	0	20	90	10	0	10	20
Week 43	7/22/2023	70	0	20	90	10	0	10	20
Week 44	7/29/2023	70	0	20	90	10	0	10	20
Week 45	8/5/2023	70	0	20	90	10	0	10	20
Week 46	8/12/2023	70	0	20	90	10	0	10	20
Week 47	8/19/2023	70	0	20	90	10	0	10	20
Week 48	8/26/2023	70	0	20	90	10	0	10	20
Week 49	9/2/2023	70	0	20	90	10	0	10	20
Week 50	9/9/2023	70	0	20	90	10	0	10	20
Week 51	9/16/2023	70	0	20	90	10	0	10	20
Week 52	9/23/2023	70	0	20	90	10	0	10	20
Week 53	9/30/2023	70	0	20	90	10	0	10	20
Week 54	10/7/2023	70	0	20	90	10	0	10	20
Week 55	10/14/2023	70	0	20	90	10	0	10	20
Week 56	10/21/2023	70	0	20	90	10	0	10	20
Week 57	10/28/2023	70	0	20	90	10	0	10	20
Week 58	11/4/2023	70	0	20	90	10	0	10	20
Week 59	11/11/2023	70	0	20	90	10	0	10	20
Week 60	11/18/2023	70	0	20	90	10	0	10	20
Week 61	11/25/2023	70	0	20	90	10	0	10	20
Week 62	12/2/2023	70	0	20	90	10	0	10	20
Week 63	12/9/2023	0	106	46	152	0	16	23	39
Week 64	12/16/2023	0	106	46	152	0	16	23	39
Week 65	12/23/2023	0	106	46	152	0	16	23	39
Week 66	12/30/2023	0	106	46	152	0	16	23	39
Week 67	1/6/2024	0	106	46	152	0	16	23	39
Week 68	1/13/2024	0	106	46	152	0	16	23	39
Week 69	1/20/2024	0	106	46	152	0	16	23	39
Week 70	1/27/2024	0	106	46	152	0	16	23	39
Week 71	2/3/2024	0	26	36	62	0	4	18	22
Week 72	2/10/2024	0	26	36	62	0	4	18	22
Week 73	2/17/2024	0	26	36	62	0	4	18	22
Week 74	2/24/2024	0	26	36	62	0	4	18	22
Week 75	3/2/2024	0	26	36	62	0	4	18	22
Week 76	3/9/2024	0	26	36	62	0	4	18	22
Week 77	3/16/2024	0	26	36	62	0	4	18	22
Week 78	3/23/2024	0	26	36	62	0	4	18	22
Week 79	3/30/2024	0	26	36	62	0	4	18	22

Week 80	4/6/2024	0	26	36	62	0	4	18	22
Week 81	4/13/2024	0	26	36	62	0	4	18	22
Week 82	4/20/2024	0	16	16	32	0	3	8	11
Week 83	4/27/2024	0	16	16	32	0	3	8	11
Week 84	5/4/2024	0	16	16	32	0	3	8	11
Week 85	5/11/2024	0	16	16	32	0	3	8	11
Week 86	5/18/2024	0	16	16	32	0	3	8	11
Week 87	5/25/2024	0	16	16	32	0	3	8	11
Week 88	6/1/2024	0	16	16	32	0	3	8	11
Week 89	6/8/2024	0	16	16	32	0	3	8	11
Week 90	6/15/2024	0	100	36	136	0	15	18	33
Week 91	6/22/2024	0	100	36	136	0	15	18	33
Week 92	6/29/2024	0	100	36	136	0	15	18	33
Week 93	7/6/2024	0	100	36	136	0	15	18	33
Week 94	7/13/2024	0	100	36	136	0	15	18	33
Week 95	7/20/2024	0	100	36	136	0	15	18	33
Week 96	7/27/2024	0	100	36	136	0	15	18	33
Week 97	8/3/2024	0	100	36	136	0	15	18	33
Week 98	8/10/2024	0	100	36	136	0	15	18	33
Week 99	8/17/2024	0	100	36	136	0	15	18	33
Week 100	8/24/2024	0	100	36	136	0	15	18	33
Week 101	8/31/2024	0	100	36	136	0	15	18	33
Week 102	9/7/2024	0	100	36	136	0	15	18	33
Week 103	9/14/2024	0	100	36	136	0	15	18	33
Week 104	9/21/2024	0	100	36	136	0	15	18	33
Week 105	9/28/2024	0	100	36	136	0	15	18	33
Week 106	10/5/2024	0	100	36	136	0	15	18	33
Week 107	10/12/2024	0	100	36	136	0	15	18	33
Week 108	10/19/2024	0	100	36	136	0	15	18	33
Week 109	10/26/2024	0	100	36	136	0	15	18	33
Week 110	11/2/2024	0	32	16	48	0	5	8	13
Week 111	11/9/2024	0	32	16	48	0	5	8	13
Week 112	11/16/2024	0	32	16	48	0	5	8	13
Week 113	11/23/2024	0	32	16	48	0	5	8	13
Week 114	11/30/2024	0	32	16	48	0	5	8	13
Week 115	12/7/2024	0	32	16	48	0	5	8	13
Week 116	12/14/2024	0	32	16	48	0	5	8	13
Week 117	12/21/2024	0	2	16	18	0	1	8	9
Week 118	12/28/2024	0	2	16	18	0	1	8	9
Week 119	1/4/2025	0	2	16	18	0	1	8	9
Week 120	1/11/2025	0	2	16	18	0	1	8	9
Week 121	1/18/2025	0	2	16	18	0	1	8	9
Week 122	1/25/2025	0	2	16	18	0	1	8	9
Week 123	2/1/2025	0	2	16	18	0	1	8	9
Week 124	2/8/2025	0	2	16	18	0	1	8	9
Week 125	2/15/2025	0	2	16	18	0	1	8	9
Week 126	2/22/2025	24	6	48	78	4	1	24	29
Week 127	3/1/2025	24	6	48	78	4	1	24	29
Week 128	3/8/2025	24	6	48	78	4	1	24	29
Week 129	3/15/2025	0	6	26	32	0	1	13	14
Week 130	3/22/2025	0	6	26	32	0	1	13	14
Week 131	3/29/2025	12	0	26	38	2	0	13	15
Week 132	4/5/2025	10	0	8	18	2	0	4	6
Week 133	4/12/2025	10	0	8	18	2	0	4	6
Week 134	4/19/2025	10	0	8	18	2	0	4	6
Week 135	4/26/2025	10	0	8	18	2	0	4	6
Week 136	5/3/2025	10	0	8	18	2	0	4	6
Week 137	5/10/2025	10	0	8	18	2	0	4	6
Week 138	5/17/2025	10	0	8	18	2	0	4	6
Week 139	5/24/2025	10	0	8	18	2	0	4	6
Week 140	5/31/2025	10	0	8	18	2	0	4	6
Week 141	6/7/2025	10	0	8	18	2	0	4	6
Week 142	6/14/2025	10	0	8	18	2	0	4	6
Week 143	6/21/2025	10	0	8	18	2	0	4	6
Week 144	6/28/2025	10	0	8	18	2	0	4	6
Week 145	7/5/2025	0	48	16	64	0	7	8	15
Week 146	7/12/2025	0	48	16	64	0	7	8	15
Week 147	7/19/2025	0	48	16	64	0	7	8	15
Week 148	7/26/2025	0	48	16	64	0	7	8	15
Week 149	8/2/2025	0	48	16	64	0	7	8	15
Week 150	8/9/2025	0	48	16	64	0	7	8	15
Week 151	8/16/2025	0	48	16	64	0	7	8	15
Week 152	8/23/2025	0	48	16	64	0	7	8	15
Week 153	8/30/2025	0	8	8	16	0	2	4	6
Week 154	9/6/2025	0	8	8	16	0	2	4	6
Week 155	9/13/2025	0	8	8	16	0	2	4	6
Week 156	9/20/2025	0	8	8	16	0	2	4	6
Week 157	9/27/2025	0	8	8	16	0	2	4	6
Week 158	10/4/2025	0	8	8	16	0	2	4	6
Total		**2,380**	**4,048**	**3,888**	**10,316**				
Min					**6**				
Max					**152**				**39**
Average					**65**				
85th %					**136**				**33**



Daily Project Trip Generation by Week
160
140
120
100
80
60
40
20
0
Week 1
Week 3
Week 5
Week 7
Week 9
Week 11
Week 13
Week 15
Week 17
Week 19
Week 21
Week 23
Week 25
Week 27
Week 29
Week 31
Week 33
Week 35
Week 37
Week 39
Week 41
Week 43
Week 45
Week 47
Week 49
Week 51
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Week 55
Week 57
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Week 61
Week 63
Week 65
Week 67
Week 69
Week 71
Week 73
Week 75
Week 77
Week 79
Week 81
Week 83
Week 85
Week 87
Week 89
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Week 93
Week 95
Week 97
Week 99
Week 101
Week 103
Week 105
Week 107
Week 109
Week 111
Week 113
Week 115
Week 117
Week 119
Week 121
Week 123
Week 125
Week 127
Week 129
Week 131
Week 133
Week 135
Week 137
Week 139
Week 141
Week 143
Week 145
Week 147
Week 149
Week 151
Week 153
Week 155
Week 157
Total Daily Vehicle Trips

Table 3 - Project Trip Generation Summary*

Type	Daily			AM Peak Hour			PM Peak Hour		
	IB	OB	Total	IB	OB	Total	IB	OB	Total
Worker Trips	23	23	46	23	0	23	0	23	23
Material Delivery Trips	53	53	106	8	8	16	8	8	16
Hauling Truck Trips	0	0	0	0	0	0	0	0	0
Total	76	76	152	31	8	39	8	31	39

Notes:

(1) Truck trips (hauling and material delivery) are assumed to generate 50/50 inbound and outbound trips during the peak hour.

(2) All workers are conservatively assumed to arrive during the AM peak-hour and leave during the PM peak-hour.

Appendix D

Queueing Analysis

Lane Group	EBT	WBT
Lane Group Flow (vph)	109	154
v/c Ratio	0.31	0.11
Control Delay	32.6	0.2
Queue Delay	0.0	0.0
Total Delay	32.6	0.2
Queue Length 50th (ft)	56	1
Queue Length 95th (ft)	105	0
Internal Link Dist (ft)	608	220
Turn Bay Length (ft)		
Base Capacity (vph)	357	1373
Starvation Cap Reductn	0	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.31	0.11

Intersection Summary

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑			
Volume (vph)	0	100	142	0	0	0
Ideal Flow (vphpl)	1400	1400	1400	1400	1400	1400
Total Lost time (s)		24.0	4.0			
Lane Util. Factor		1.00	1.00			
Frt		1.00	1.00			
Flt Protected		1.00	1.00			
Satd. Flow (prot)		1373	1373			
Flt Permitted		1.00	1.00			
Satd. Flow (perm)		1373	1373			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	109	154	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	109	154	0	0	0
Turn Type						
Protected Phases		1	Free			
Permitted Phases						
Actuated Green, G (s)		26.0	100.0			
Effective Green, g (s)		26.0	100.0			
Actuated g/C Ratio		0.26	1.00			
Clearance Time (s)		24.0				
Lane Grp Cap (vph)		357	1373			
v/s Ratio Prot		c0.08	0.11			
v/s Ratio Perm						
v/c Ratio		0.31	0.11			
Uniform Delay, d1		29.7	0.0			
Progression Factor		1.00	1.00			
Incremental Delay, d2		2.2	0.2			
Delay (s)		31.9	0.2			
Level of Service		C	A			
Approach Delay (s)		31.9	0.2		0.0	
Approach LOS		C	A		A	

Intersection Summary			
HCM Average Control Delay	13.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.18		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	24.0
Intersection Capacity Utilization	30.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	WBT
Lane Group Flow (vph)	109	154
v/c Ratio	0.08	0.43
Control Delay	0.1	35.4
Queue Delay	0.0	0.0
Total Delay	0.1	35.4
Queue Length 50th (ft)	1	82
Queue Length 95th (ft)	1	143
Internal Link Dist (ft)	220	656
Turn Bay Length (ft)		
Base Capacity (vph)	1373	357
Starvation Cap Reductn	0	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.08	0.43

Intersection Summary

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑			
Volume (vph)	0	100	142	0	0	0
Ideal Flow (vphpl)	1400	1400	1400	1400	1400	1400
Total Lost time (s)		4.0	24.0			
Lane Util. Factor		1.00	1.00			
Frt		1.00	1.00			
Flt Protected		1.00	1.00			
Satd. Flow (prot)		1373	1373			
Flt Permitted		1.00	1.00			
Satd. Flow (perm)		1373	1373			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	109	154	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	109	154	0	0	0
Turn Type						
Protected Phases		Free	2			
Permitted Phases						
Actuated Green, G (s)		100.0	26.0			
Effective Green, g (s)		100.0	26.0			
Actuated g/C Ratio		1.00	0.26			
Clearance Time (s)			24.0			
Lane Grp Cap (vph)		1373	357			
v/s Ratio Prot		0.08	c0.11			
v/s Ratio Perm						
v/c Ratio		0.08	0.43			
Uniform Delay, d1		0.0	30.8			
Progression Factor		1.00	1.00			
Incremental Delay, d2		0.1	3.8			
Delay (s)		0.1	34.6			
Level of Service		A	C			
Approach Delay (s)		0.1	34.6		0.0	
Approach LOS		A	C		A	

Intersection Summary			
HCM Average Control Delay	20.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.20		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	24.0
Intersection Capacity Utilization	30.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	NBT	SBT
Lane Group Flow (vph)	16	27
v/c Ratio	0.01	0.09
Control Delay	0.0	22.2
Queue Delay	0.0	0.0
Total Delay	0.0	22.2
Queue Length 50th (ft)	0	9
Queue Length 95th (ft)	0	28
Internal Link Dist (ft)	220	278
Turn Bay Length (ft)		
Base Capacity (vph)	1373	314
Starvation Cap Reductn	0	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.01	0.09

Intersection Summary

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			↑			↑
Volume (vph)	0	0	15	0	0	25
Ideal Flow (vphpl)	1400	1400	1400	1400	1400	1400
Total Lost time (s)			4.0			19.0
Lane Util. Factor			1.00			1.00
Frt			1.00			1.00
Flt Protected			1.00			1.00
Satd. Flow (prot)			1373			1373
Flt Permitted			1.00			1.00
Satd. Flow (perm)			1373			1373
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	16	0	0	27
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	16	0	0	27
Turn Type						
Protected Phases			Free			1
Permitted Phases						
Actuated Green, G (s)			70.0			16.0
Effective Green, g (s)			70.0			16.0
Actuated g/C Ratio			1.00			0.23
Clearance Time (s)						19.0
Lane Grp Cap (vph)			1373			314
v/s Ratio Prot			0.01			c0.02
v/s Ratio Perm						
v/c Ratio			0.01			0.09
Uniform Delay, d1			0.0			21.2
Progression Factor			1.00			1.00
Incremental Delay, d2			0.0			0.5
Delay (s)			0.0			21.8
Level of Service			A			C
Approach Delay (s)	0.0		0.0			21.8
Approach LOS	A		A			C

Intersection Summary			
HCM Average Control Delay	13.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.03		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	20.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	NBT	SBT
Lane Group Flow (vph)	16	27
v/c Ratio	0.05	0.02
Control Delay	21.7	0.0
Queue Delay	0.0	0.0
Total Delay	21.7	0.0
Queue Length 50th (ft)	5	1
Queue Length 95th (ft)	20	0
Internal Link Dist (ft)	432	220
Turn Bay Length (ft)		
Base Capacity (vph)	314	1373
Starvation Cap Reductn	0	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.05	0.02

Intersection Summary

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			↑			↑
Volume (vph)	0	0	15	0	0	25
Ideal Flow (vphpl)	1400	1400	1400	1400	1400	1400
Total Lost time (s)			19.0			4.0
Lane Util. Factor			1.00			1.00
Frt			1.00			1.00
Flt Protected			1.00			1.00
Satd. Flow (prot)			1373			1373
Flt Permitted			1.00			1.00
Satd. Flow (perm)			1373			1373
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	16	0	0	27
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	16	0	0	27
Turn Type						
Protected Phases			2			Free
Permitted Phases						
Actuated Green, G (s)			16.0			70.0
Effective Green, g (s)			16.0			70.0
Actuated g/C Ratio			0.23			1.00
Clearance Time (s)			19.0			
Lane Grp Cap (vph)			314			1373
v/s Ratio Prot			c0.01			0.02
v/s Ratio Perm						
v/c Ratio			0.05			0.02
Uniform Delay, d1			21.1			0.0
Progression Factor			1.00			1.00
Incremental Delay, d2			0.3			0.0
Delay (s)			21.4			0.0
Level of Service			C			A
Approach Delay (s)	0.0		21.4			0.0
Approach LOS	A		C			A

Intersection Summary			
HCM Average Control Delay	8.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.03		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	20.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	NBT	SBT
Lane Group Flow (vph)	42	68
v/c Ratio	0.03	0.22
Control Delay	0.1	24.1
Queue Delay	0.0	0.0
Total Delay	0.1	24.1
Queue Length 50th (ft)	0	24
Queue Length 95th (ft)	0	56
Internal Link Dist (ft)	220	278
Turn Bay Length (ft)		
Base Capacity (vph)	1373	314
Starvation Cap Reductn	0	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.03	0.22

Intersection Summary

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			↑			↑
Volume (vph)	0	0	39	0	0	63
Ideal Flow (vphpl)	1400	1400	1400	1400	1400	1400
Total Lost time (s)			4.0			19.0
Lane Util. Factor			1.00			1.00
Frt			1.00			1.00
Flt Protected			1.00			1.00
Satd. Flow (prot)			1373			1373
Flt Permitted			1.00			1.00
Satd. Flow (perm)			1373			1373
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	42	0	0	68
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	42	0	0	68
Turn Type						
Protected Phases			Free			1
Permitted Phases						
Actuated Green, G (s)			70.0			16.0
Effective Green, g (s)			70.0			16.0
Actuated g/C Ratio			1.00			0.23
Clearance Time (s)						19.0
Lane Grp Cap (vph)			1373			314
v/s Ratio Prot			0.03			c0.05
v/s Ratio Perm						
v/c Ratio			0.03			0.22
Uniform Delay, d1			0.0			21.9
Progression Factor			1.00			1.00
Incremental Delay, d2			0.0			1.6
Delay (s)			0.0			23.5
Level of Service			A			C
Approach Delay (s)	0.0		0.0			23.5
Approach LOS	A		A			C

Intersection Summary			
HCM Average Control Delay	14.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.09		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	20.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	NBT	SBT
Lane Group Flow (vph)	42	68
v/c Ratio	0.13	0.05
Control Delay	22.9	0.1
Queue Delay	0.0	0.0
Total Delay	22.9	0.1
Queue Length 50th (ft)	15	0
Queue Length 95th (ft)	38	0
Internal Link Dist (ft)	432	220
Turn Bay Length (ft)		
Base Capacity (vph)	314	1373
Starvation Cap Reductn	0	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.13	0.05

Intersection Summary

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			↑			↑
Volume (vph)	0	0	39	0	0	63
Ideal Flow (vphpl)	1400	1400	1400	1400	1400	1400
Total Lost time (s)			19.0			4.0
Lane Util. Factor			1.00			1.00
Frt			1.00			1.00
Flt Protected			1.00			1.00
Satd. Flow (prot)			1373			1373
Flt Permitted			1.00			1.00
Satd. Flow (perm)			1373			1373
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	42	0	0	68
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	42	0	0	68
Turn Type						
Protected Phases			2			Free
Permitted Phases						
Actuated Green, G (s)			16.0			70.0
Effective Green, g (s)			16.0			70.0
Actuated g/C Ratio			0.23			1.00
Clearance Time (s)			19.0			
Lane Grp Cap (vph)			314			1373
v/s Ratio Prot			c0.03			0.05
v/s Ratio Perm						
v/c Ratio			0.13			0.05
Uniform Delay, d1			21.5			0.0
Progression Factor			1.00			1.00
Incremental Delay, d2			0.9			0.1
Delay (s)			22.4			0.1
Level of Service			C			A
Approach Delay (s)	0.0		22.4			0.1
Approach LOS	A		C			A

Intersection Summary			
HCM Average Control Delay	8.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.08		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	20.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Appendix N: EBMUD Standard Practices and Procedures

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DOCUMENT 00 31 21.13

SITE SURVEY INFORMATION

PART 1 - GENERAL

1.1 SUMMARY

A. Work includes:

1. Audio-video documentation utilizing digital recording of surface features taken along the entire length of the project and includes all work and storage areas, and all intersecting roadways.

a. Prior to audio-video recording of the project, all areas to be inventoried shall be investigated visually with notations made of items not readily visible by audio-video recording or photographic methods.

B. Related sections:

1. Section 01 31 23.10 - Web-based Construction Document Management

2. Section 01 33 00 - Submittal Procedures

1.2 SITE SURVEY AUDIO-VIDEO RECORDING REQUIREMENTS

A. Pre-Construction Survey: The Contractor shall, in the presence of the Engineer, perform a Pre-Construction Site Survey audio-video recording of the complete project alignment, proposed equipment and material staging areas, and all access and haul routes to be utilized during construction. The survey shall fully document the conditions of pavements and public and private improvements within the limits of work. Prior to commencement of the Pre-Construction Survey recording, the Contractor shall notify the Engineer in writing within 48-hours of the recording. The District may provide a designated representative to accompany and observe all audio-video recording operations. Audio-video recording completed without a District Representative present will be unacceptable unless specifically authorized by the District.

B. The format of the site survey shall be a digital audio-video file in mp4, avi, or mpg with narrative, supplemented with photographs and field notes as appropriate.

C. Provide a copy of the pre-construction survey to the District for review and comment.

D. The Contractor shall employ a qualified videographer, experienced in taking properly documented and annotated video to take a Pre-Construction recording of the entire site including the areas of adjacent properties and shall be made within 30-days of Work beginning.

E. The Contractor shall submit a quality audio-video recording documenting Pre-Construction field conditions for the entire project. When the Work includes construction of water, wastewater, recycle, or other lines in the vicinity of any street or road, the Contractor shall take digital audio-video recordings of existing conditions along both sides of the street or road. The finalized pre-construction audio-video recording shall be submitted to the District and accepted prior to commencing any Work or using any Contractor laydown areas.

F. Post-Construction Survey: The Contractor shall, in the presence of the Engineer, perform a Post-Construction Site Survey audio-video recording of the same areas recorded in the Pre-Construction Survey. The Engineer will review post-construction survey findings with the Contractor and develop a complete listing of project site restoration requirements to be accomplished by the Contractor. Prior to commencement of Post-Construction Survey recording, the Contractor shall notify the Engineer in writing within 48-hours of the recording. The District may provide a designated representative to accompany and observe all audio-video recording operations. Audio-video recording completed without a District Representative present will be unacceptable unless specifically authorized by the District. The Contractor shall be responsible for repairing any damage or defect not documented as existing prior to construction.

PART 2 - PRODUCTS

2.1 AUDIO-VIDEO RECORDING

A. The resolution of the video shall be 1080p or higher.

B. Each recording shall contain the following information and arrangement at the beginning as a title screen:

1. “EBMUD”
2. PROJECT NAME
3. PROJECT NUMBER
4. CONTRACTOR: (Name of Contractor)
5. DATE: (When video was recorded)
6. VIDEO BY: (Firm Name of Videographer)
7. LOCATION: (Description of Location(s), View(s), Direction of Travel)

C. Information appearing on the video recording must be continuous and run simultaneously by computer generated transparent digital information. No editing or overlaying of information at a later date will be acceptable.

D. Time must be accurate and continuously displayed on the recording.

E. Written documentation must coincide with the information on the recordings so as to make easy retrieval of locations at a later date.

F. The video recording system shall have the capability to transfer individual frames of video electronically into hard copy prints or photographic negatives.

G. The finalized audio-video recordings shall be saved on appropriate physical media (e.g. USB flash drive, DVD) viewable on computer with standard media player software and shall contain a Table of Contents outlining the file folder hierarchy and description of files included.

H. The physical media shall be labeled with the following information:

1. "EBMUD"

2. Date of Recording

3. Project Name and Number

I. Ownership of Recordings: All audio-video recordings will become the permanent property of the District.

J. Any portion of the recorded coverage deemed unacceptable by the District shall be re-taped by the Contractor at no additional cost to the District.

PART 3 - EXECUTION

3.1 VIDEO VIEWS AND NARRATIVE REQUIRED

A. Complete coverage shall include all surface features within 100-feet of the limits of Work to be used by the Contractor and shall be supported by appropriate audio description made simultaneously with video coverage.

B. The Contractor is advised not to enter any private property before permission is granted to do so, or the District has been notified by the Contractor that the legal right to do so has been obtained. The Contractor shall be held liable for entry made other than stated herein.

C. Such coverage shall include, but not be limited to, all existing driveways, sidewalks, pavement, curbs, gutters, ditches, berms, roadways, landscaping, trees, culverts, headwalls, and retaining walls, fencing, gates, handrails, signage, manholes, vaults, utility boxes, lighting, traffic signals and controls, loop detectors, landscaping, irrigation controllers, street furniture, equipment, appurtenances, structures, and other existing features etc. located within the work zone. Video coverage shall extend to the maximum height of all structures within this zone.

D. Site Recording: All video recording shall be done during times of good visibility. No outside recording shall be done during periods of visible precipitation, mist, fog, or when the ground area is covered with snow, standing water, leaves or debris, unless otherwise authorized by the Engineer.

E. Sufficient sunlight shall be present to properly illuminate the subjects of recording and to produce bright, sharp video recordings of those subjects. Shadowing and glare shall be avoided. In order to produce the proper detail and perspective, adequate auxiliary lighting shall be provided to fill in shadow areas caused by trees, utility poles, road signs and other such objects, as well as other conditions requiring artificial illumination.

F. The camera shall be firmly stabilized such that transport of the camera during the recording process will not cause an unsteady picture.

G. The average rate of speed in the general direction of travel of the conveyance used during taping shall not exceed 60-feet per minute. Panning rates and zoom-out rates shall be controlled sufficiently so that playback will produce adequate clarity of the object and features of interest being viewed.

H. When conventional wheeled vehicles are used as conveyances for the recording, the distance from the camera lens to the ground shall be such as to ensure proper perspective. In instances where tape coverage will be required in areas not accessible to conventional wheeled vehicles, such coverage shall be obtained by walking or by special conveyance approved by the Engineer but with the same requirements for tape quality and content as specified herein, except as may be specifically exempted by the Engineer.

I. The video recorder shall take special efforts to point out and provide audio commentary on cracking, breakage, damage, settlement and other defects in existing features. Restrict commentary to factual descriptions of all features without commentary on causation.

END OF DOCUMENT

SECTION 01 14 00

WORK RESTRICTIONS

PART 1 - GENERAL

1.1 DESCRIPTION

A. This section describes special requirements and construction constraints that may affect the Work. These requirements and constraints are in addition to those appearing elsewhere in the specifications.

1.2 RELATED SECTIONS

A. Section 01 35 24 – Project Safety Requirements

B. Section 01 35 44 – Environmental Requirements

C. Section 01 35 13 – Special Project Procedures

D. Section 01 35 53 – Security Procedures

E. Section 01 50 00 – Temporary Facilities and Controls

1.3 SUBMITTALS

A. Certification that all requirements of agencies having jurisdiction over the Work have been satisfied.

B. Pipeline Connection Work Plan (for Shutdowns)

1. Plan shall be submitted no less than 15 work days prior to performing the Work for the approval of the Engineer.

2. The connection work plan shall include the details of final dewatering of the existing pipeline and installation of necessary pipe and valves during the shutdown. It shall also contain a schedule of items of Work by time required. Items of Work shall include:

a. Preparation by District including gravity dewatering.

b. Excavation and shoring

c. Remove coating, verify size, etc. (prior to shutdown)

d. Final dewatering (pumping)

e. Cut and remove existing pipe

f. Clean and disinfect interior

g. Install and fit

h. Weld

i. Repair lining.

j. Attach manhole cover

k. Ready for service

l. Repair coating

m. Backfill

C. Submit for approval detailed facility outage plans.

1.4 WORK HOURS

A. Work or activity of any kind shall be limited to the hours from 7:00 a.m. to 6:00 p.m. Monday through Friday with the exception of required outages, as described in Section 01 35 13.

B. Work in excess of eight hours per day, work on Saturdays, work on Sundays, or work on District holidays requires prior consent of the Engineer and is subject to Cost of Overtime Construction Inspection. Contractor shall notify the Engineer no less than 96 hours prior to beginning scheduled work at night or on a Saturday, Sunday or District holidays.

C. District holidays

1. Holidays are:

New Years Day
Martin Luther King Day (3rd Monday in January)
Lincoln's Birthday
Washington's Birthday (3rd Monday in February)
Chavez’s Birthday

Memorial Day (last Monday in May)
Independence Day
Labor Day (1st Monday in September)
Admission Day
Columbus Day (2nd Monday in October)
Veteran's Day
Thanksgiving Day and following Friday
Christmas Day

2. When a holiday falls on Sunday, the following Monday shall be observed as the holiday. When a holiday falls on Saturday, the preceding Friday shall be observed as the holiday.

D. Truck operations (haul trucks and concrete delivery trucks) shall be limited to the daytime hours ___ a.m. and ___ p.m.

1.5 COST OF OVERTIME CONSTRUCTION INSPECTION

A. Overtime construction work performed at the option of, or for the convenience of, the Contractor will be inspected by the District at expense of the Contractor. For any such overtime beyond the regular 8-hour day and for any time worked on Saturday, Sunday, or holidays the charges will be as shown in the following schedule:

	Charge per Hour
Associate Engineer	$94.60
Assistant Engineer	$85.70
Senior Construction Inspector	$83.60
Construction Inspector	$75.80
Junior Engineer	$73.90
Pickup truck	$21.50

B. There will be no charges for the inspection of overtime work ordered by the Engineer or required by the specifications.

1.6 COOPERATION WITH OTHER WORK FORCES

A. Other contractors, other utilities and public agencies or their contractors, other District contractors, and District personnel may be working in the vicinity during the project construction period.

B. Any costs for providing cooperation with other work forces shall be considered as included in the bid price for the various contract items of Work and no separate payment will be made therefor.

1.7 MAINTENANCE OF FACILITY OPERATION

A. The Contractor will be performing Work at or near operating telecommunications, water storage, water treatment, and water distribution sites. Under these conditions, extra precautions will be necessary to ensure that no damage occurs to those treatment or distribution facilities, including piping, utilities, roads, and structures, that are to remain in operation and are not to be modified or replaced. Any temporary facilities, materials, equipment and labor required to achieve these objectives shall be provided by the Contractor at its own expense. At the completion of Work, all such temporary facilities, materials and equipment remaining shall be removed from the site. See Section 01 35 13 Special Project Procedures.

1.8 CONSTRUCTION NOISE

A. Noise-generating activities greater than 90 dBA (impact construction such as concrete breaking, concrete crushing, tree grinding, etc) shall be limited to the hours of ______ a.m. and ______ p.m., Monday through Friday.

1.9 SCHEDULING RESTRAINTS

A. Exceptions to the work hour constraints in Article ___- Work Hours may be made upon application to the Engineer, if required, for work outages discussed in Article ___ - Shutdowns.

B. All Work shall be in accordance with local ordinances including encroachment permit conditions included in Appendix B.

C. All Work shall be in accordance with Section 01 35 44 Environmental Requirements and Section 01 35 46 Environmental Mitigation including restrictions regarding ______________ habitat protection that might cause temporary demobilization.

1.10 OUTSIDE AGENCY PERMITS

A. The Contractor shall comply with all requirements of any permits and be responsible for all associated costs.

B. The District has received an encroachment permit (Appendix B) from ___________________ covering Work under this specification.

C. The Contractor shall apply for an ___________Permit from the ________ for Work covered under this specification.

D. Where requirements of the permits differ from those of the drawings and specifications, the more stringent requirements shall apply.

E. Neither a building permit nor an electrical permit is required.

1.11 PG&E WORK

A. PG&E will require approximately 30 calendar days to complete the installation of electrical service after ___________________________ and related conduit are installed. Provide minimum 2 weeks' advance notice to PG&E of date that pads and conduit installation will be completed so that PG&E installation can be scheduled. The PG&E installation will be paid for by the District.

1.12 AVAILABLE UTILITIES

A. Water for hydrostatic testing, flushing and chlorinating the pipeline, and reservoir washdown, will be provided by the District as per Section 01 50 00. The water shall be drawn from the hydrant shown on Drawing ________________. The Contractor shall provide all other water.

   1. Availability of water will be subject to District operational requirements.

B. 120 volt power will be available ____ ____.

1.13 SHUTDOWNS

A. A single _-hour continuous shutdown of the existing __″ pipelines, as shown on Drawing ________ will be permitted to install connection piping to the existing pipeline. Perform shutdown in accordance with the accepted Pipeline Connection Work Plan.

B. Shutdown period begins when the gravity drained pipe is made available to the Contractor and ends when the pipeline is ready for return to service.

C. Schedule of shutdown and return to service operations shall be prepared jointly by the Contractor and the Engineer.

D. The Contractor shall give a written minimum 10 work day notification to the Engineer to schedule a shutdown of existing pipeline, prior to any connection Work in the field.

E. District personnel will operate all valves in the pipeline system for shutdown as well as for the return to service.

F. The District will not start a shutdown until the Work location is excavated and shored, the existing pipe size verified, and pipe size adjustments prepared.

G. District will drain the existing pipeline by gravity. The Contractor shall be responsible for any water left standing in the pipe after draining. Disposal of water shall be in accordance with Section 01 35 44, Environmental Requirements.

H. Details of the existing pipelines to be drained for the shutdown are given below.

1. Length and size of pipelines: ___ feet of _″ pipe.

2. Location: See Drawing W-_______.

1.14 FACILITYOUTAGE PLAN

A. Modifications to existing facilities, the construction of new facilities, and the connection of new to existing facilities may require the temporary outage of water distribution systems. In addition to the Construction Schedule required under Section 01 32 00, the Contractor shall submit a detailed outage plan and time schedule for each outage for all construction activities that will make it necessary to remove equipment, electrical circuits, or any other system from service.

B. An "outage" is defined as the period of time when all of the ______ within an identified facility are not available for service.

C. The outage plans shall be submitted for the Engineer's review and acceptance a minimum of 20 work days in advance of the time that such outages are requested. A Safe Work Permit (SWP form) as shown in Appendix A, shall accompany each outage plan. The outage plans shall be coordinated and submitted with the construction schedule. The outage plan shall describe the length of time required to complete said operation; lockout procedures for all affected equipment and systems; and the manpower and equipment which the Contractor shall provide in order to ensure proper operation of associated equipment. In addition, the outage plan shall describe the Contractor's contingency plan that shall be initiated in the event that the time constraints described in the approved SWP cannot be met. The contingency plan shall conform to all specified outage constraints. All costs for preparing and implementing the outage plan, including performing the Work outside of normal work hours, and other contingency actions, shall be incurred by the Contractor at no additional costs to the District.

D. Outage Activities:

1. Typical activities that may occur during outages include, but are not limited to:

a. ______________________

E. The District shall be notified in writing at least one week in advance of the outage if the schedule for performing the Work has changed or if other minor changes to the outage plan are made.

1.15 FACILITY OUTAGE CONSTRAINTS

A. General:

1. Schedule and coordinate all system outages in a manner to minimize duration and number required.

2. System outages will be permitted between _______ and _________. Outage requests outside of this period shall be submitted for the Engineer’s review and acceptance.

B. Comply with the following specific conditions to maintain existing normal levels of operation and maintenance service during construction. Constraints on outages of areas described herein and on the drawings shall be followed by the Contractor.

C. During outages and construction of temporary power and control for ________, the Contractor’s work force as described in the outage plan shall be maintained on the jobsite throughout the outage period.

D. Outages of _________ are limited to the following:

1.

E. Smaller planned outages are allowed as long as they are within the permitted outages listed above.

F. For unplanned outages, liquidated damages shall be assessed as specified in Document 00 73 00.

G. Water in the ________ piping shall be removed and disposed by the Contractor when replacing the _______________. The estimated quantity of water to be disposed is ________ gallons. Disposal shall as per the Contractor’s accepted water disposal plan.

PART 2 - NOT USED

PART 3 - NOT USED

END OF SECTION

SECTION 01 35 24

PROJECT SAFETY REQUIREMENTS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included:

1. Be solely and exclusively responsible for maintaining job-site safety and compliance with all pertinent Groups and Articles set forth in Title 8, California Code of Regulations (Cal/OSHA), and Title 29, Code of Federal Regulations (OSHA; where applicable).

2. Contractor shall be the Creating, Controlling, and Correcting Employer for purposes of compliance with Cal/OSHA's multi-employer worksite rule (8 CCR 336.10) for itself and all of its site workers.

3. Meet with the Engineer prior to commencement of the Work to review the project safety requirements as applicable to the Contractor’s procedures and to develop mutual understandings relative to compliance with the safety requirements and administration of the Contractor’s project safety programs.

4. Provide for public safety when working in _________________.

   a. Night operations should be set up pursuant to the National Cooperative Highway Research Program (NCHPP) report 476, guidelines for design and operation of nighttime traffic control for highway maintenance and construction.

5. Complete a _______________ prior to starting work at _______________________. See Appendix A.

6. Be trained on Pardee Section Safe Clearance Procedure (See Appendix _). All Contractor personnel present on the project site shall be certified as Authorized Personnel under this procedure.

B. Site Activities

1. Control all harmful dusts, fumes, mists, vapors and gases exposures for all job-site workers, regardless of employer, so that respective permissible exposure limits (PEL) are not met or exceeded. Such hazards are contained in Title 8, California Code of Regulations (Cal/OSHA) § 5155 - Airborne Contaminants; Article 110 - Regulated Carcinogens; Construction Safety Order 1529 - Asbestos; and Construction Safety Order 1530.1 - Control of Employee Exposures from Dust-Generating Operations Conducted on Concrete or Masonry Materials.

2. Physically delineate and assign work areas and restrict access by unauthorized persons during the course of Work. See Section 01 35 53 Security Procedures for sign-in requirements.

3. Contractor shall not allow unsafe tools, equipment, or machinery to be brought onto the project. Unsafe tools, etc. shall be considered as those tools which are in need of repair, replacement, lacking proper maintenance, or are unsuitable for the task.

4. Contractor shall assemble, install, erect, and prepare safety related equipment, devices, and products in accordance with manufacturer specifications and recommendations. Manufacturer documentation shall be provided to the Engineer upon request.

5. Comply with the Federal Drug Free Workplace Act, Department of Transportation (DOT) testing regulations (49 CFR Part 32), CA State Vehicle Code (Section 34520) and all applicable legally valid rules and regulations regarding drug and alcohol misuse, including consumption, sale or possession.

6. Contractor personnel are specifically prohibited from bringing firearms, explosive devices, or other dangerous weapons on District property or while engaged in contract Work.

7. Contractor shall provide safe access for construction inspectors and other authorized District employees in order to inspect or review Work in progress.

C. Related Sections

1. Document 00 31 24 – Material Assessment Information

2. Document 00 62 00 – Insurance Requirements

3. Section 01 14 00 – Work Restrictions

4. Section 01 33 00 – Submittal Procedures

5. Section 01 35 44 – Environmental Requirements

6. Section 01 50 00 – Temporary Facilities and Controls

7. Section 02 82 13 – Asbestos Control Activities

8. Section 02 83 13 – Lead Hazard Control Activities

1.2 DEFINITIONS

A. Where used in the Contract Documents, the following words and terms shall have the meanings indicated. The meanings shall be applicable to the singular and plural of the words and terms.

B. Competent Person: As defined in Section 1504 of the Construction Safety Orders, Title 8, California Code of Regulations, one who is capable of identifying existing and predictable hazards in the surroundings, or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has the authorization to take prompt corrective measures to eliminate them.

C. Confined Spaces: Shall mean any space not designed for human occupancy and having the characteristics identified in Title 8, California Code of Regulations (Cal/OSHA), Article 108 - Confined Spaces.

D. Excavation: Any man-made cut, cavity, trench, or depression in an earth surface, formed by earth removal.

E. Hazardous Substance: Defined as any substance included in the list (Director's List) of hazardous substances prepared by the Director, California Department of Industrial Relations, pursuant to Labor Code Section 6382. Includes hazardous waste as defined herein.

F. Exposure Assessment: An assessment of potential chemical and physical hazards encountered on the project site.

G. LOTO: Lock-Out Tag-Out as defined by Title 8, California Code of Regulations, § 3314.

H. OPU: Order Prohibiting Use. A tag affixed to a dangerous workplace condition or practice which constitutes an imminent hazard to workers. An OPU tag may be posted prohibiting entry to the worksite, or part of the worksite, use of machinery, devices, or apparatus.

I. Safe Work Notice, or Safe Work Permit: A Notice or Permit required to be completed by the Contractor and District staff at water treatment plants and wastewater facilities. The Notice/Permit communicates work to be performed, the areas and potential hazards.

J. Trench: A narrow excavation (in relation to its length) made below the surface of the ground. In general, the depth is greater than the width, but the width of a trench (measured at the bottom) is not greater than 15 feet. If forms or other structures are installed or constructed in an excavation so as to reduce the dimension measured from the forms or structure to the side of the excavation to 15 feet or less, (measured at the bottom of the excavation), the excavation is also considered to be a trench.

1.3 SUBMITTAL OF PLANS AND PROCEDURES

A. General:

1. Prepare and submit in accordance with the applicable provisions of Section 01 33 00 – Submittal Procedures.

2. Allow 20 work days minimum for the Engineer's review plus transit time to and from the District offices.

3. The plans and procedures identified in this Article 1.3 shall be kept current. New hazards, mitigations, or procedures identified during the course of the Work shall be submitted as revisions to the identified plans and procedures within 5 days of being identified.

4. One copy of each plan and procedure submitted will be returned marked “Reviewed”, as described below, or “Acknowledged Receipt” or “Returned without Review” as described in Section 01 33 00 – Submittal Procedures.

   a. Reviewed” indicates that the plan has been reviewed for the protection of District employees in the Contractor work zones. Notations entered by the District will be applicable to District employees only.

   b. Work described under the plan shall not begin until the submitted plan has been returned as “Reviewed” or “Acknowledged Receipt”.

B. Project Safety and Health Plan:

1. Submit prior to start of the Work for the Engineer's review a Project Safety and Health Plan for the Work to be performed only if actual, potential, or anticipated hazards include: a) hazardous substances; b) fall protection issues; c) confined spaces; d) trenches or excavations; or, e) lockout/tagout. If the actual, potential, or anticipated hazards do not include one or more of these five hazards, no Plan is required.

2. Submit prior to start of Work the name of individual(s) who has been designated as:

   a. Contractor's Project Safety and Health Representative

   b. Submit principal and alternate Competent/Qualified Persons for: 1) scaffolding; 2) fall protection systems and equipment; and 3) employee protective systems for trenches and excavations.

   c. Qualified person to conduct and take samples and air measurements of known or suspect hazardous substance for personnel and environmental exposure. Sample results shall be submitted to the Engineer in writing and electronic format.

3. Plan shall include an emergency action plan in the event of an accident, or serious unplanned event (e.g.: gasoline break, fire, structure collapse, etc.) that requires notifying any responsive agencies (e.g.: fire departments, PG&E, rescue teams, etc).

C. Excavation Safety Plan

1. Submit detailed plan for worker protection and control of ground movement for the Engineer's review prior to any excavation work at jobsite. Include drawings and details of system or systems to be used, area in which each type of system will be used, de-watering, means of access and egress, storage of materials, and equipment restrictions. If plan is modified or changed, submit revised plan.

2. All surface encumbrances that are located and determined to create a hazard to employees shall be removed or supported, as necessary, to safeguard employees.

3. Tunnel work shall comply with the Tunnel Safety Orders.

D. Confined Space Operating Procedures:

1. Submit confined space operating and rescue procedures to the Engineer for review. Procedures shall conform to the applicable provisions of Sections 5156 through 5158, Title 8, California Code of Regulations.

2. If a pipeline is required to be entered, the Project Safety and Health Plan shall include a description of a safe access and rescue plan.

E. Fall Protection Procedures

1. Submit fall protection procedures to the Engineer for review prior to any work at heights at the jobsite.

2. The fall protection plan shall address control of fall hazards for any work occurring at heights greater than 7½ feet.

3. Procedures shall conform to applicable provisions of Sections 1669 through 1671.2, Title 8, California Code of Regulations.

4. The plan shall address scaffolds when used on site.

5. The plan shall address manlift equipment when used on site.

6. The plan shall address rescue of workers who may fall.

F. USA Marking Record

1. Submit utility locate and marking (USA marking) number and documents, and verification of markings. Make available to the Engineer the record of all subsequent utility marking events and meetings on the project.

G. Accident Reports

1. Upon request of the Engineer, complete and submit an accident investigation report. See Article 3.3.

H. Electrical Safety Plan

1. Submit a detailed electrical safety plan that is in accordance with NFPA 70E Article 110. The plan shall detail a program that directs activity appropriate to the risk associated with electrical hazards on the project. This shall include the following safety-related program elements and work practices:

   a. Awareness of the potential electrical hazards on the project.

   b. Electrical safety program principles including planning, de-energizing, identifying hazards, protecting employees and other similar items as listed in Annex E.1 of NFPA 70E.

   c. Electrical safety program controls such as employer-developed training, procedures, hazard elimination, and other similar items as listed in Annex E.2 of NFPA 70E.

   d. Electrical safety program procedures such as limits of approach, safe work practices, use of personal protective equipment (PPE), and similar items as listed in Annex E.3 of NFPA 70E.

   e. Risk assessment procedure that addresses employee exposure to electrical hazards, similar to the procedure listed in Annex F of NFPA 70E.

   f. Job briefing and planning checklists, similar to those listed in Annex I of NFPA 70E.

   g. Auditing of the electrical safety program.

1.4 TRAINING REQUIREMENTS

A. Ensure that all personnel who, as the result of work on this contract, will likely be exposed to hazardous conditions or hazardous substances at the site have received the appropriate training for the hazards they may encounter. Establish minimum training requirements and do not allow untrained workers to enter or perform Work at the site.

1.5 SAFETY VIDEO

A. All Contractor personnel shall view a plant safety video provided by the District prior to working on the site. The video will be provided to the Contractor at the pre-construction meeting. Contractor shall provide on a monthly basis an updated listing of Contractor personnel who have viewed the video.

1.6 FIRE PREVENTION AND PROTECTION

A. Perform all Work in a fire-safe manner and supply and maintain on the site adequate fire-fighting equipment capable of extinguishing incipient fires. Comply with applicable federal, local, and state fire-prevention regulations. Where these regulations do not apply, applicable parts of the National Fire Prevention Standards for Safeguarding Building Construction Operations (NFPA No. 241) shall be followed.

PART 2 - NOT USED

PART 3 - EXECUTION

3.1 PROJECT SAFETY AND HEALTH PLAN

A. General:

1. A copy of the Contractor's Project Safety and Health Plan shall be available at the construction site while excavations, confined spaces, fall protection, or LOTO are being performed, or hazardous substances are present

2. Contractor's Project Safety and Health Plan shall apply to all personnel working at, or visiting the site including, but not limited to, Contractor's employees, suppliers, truckers, and District personnel.

3. The Contractor's Project safety and health representative shall verify that all persons are in compliance with applicable safety and health requirements, and take action to ensure compliance where deficiencies are identified.

4. Provide the Engineer a minimum of 48 hours advance notice of time and location of pre-entry briefings so that District personnel, who are required to enter the Project, may attend. A record of attendance shall be provided to the Engineer within 24 hours after the briefing.

5. Contractor shall take representative personnel air samples for employee exposure to dust, fume, mist, and vapors of materials and substances brought onto the project or generated during the course of Work on the project. See paragraph B. below.

6. Exercise extreme care when handling or disposing of materials or substances that are listed as hazardous substances in Section 339 of Chapter 3.2, California Occupational Safety and Health Regulations, Title 8, California Code of Regulations, or in Title 26 (Toxics) of the California Code of Regulations, or as evidenced by the manufacturer's MSDS.

7. Maintain a snake venom extractor kit including appropriate snake anti-venom on-site for the duration of the project.

B. Sampling and Testing of Samples Collected for Exposure Analysis:

1. Be responsible for all sampling, including sampling for airborne contaminants, and testing of materials suspected of containing hazardous substances to determine if such materials pose potential safety & health

exposure hazards. All sampling shall be conducted by qualified persons, and testing shall be performed by an OSHA certified laboratory.

2. Copies of the results of testing and sampling shall be made available to the Engineer within 5-days of time of receipt from the certified laboratory.

3. Each sample shall have an identifying sample number assigned by the Contractor when the sample is taken with the prefix **SPEC** ____.

   a. Each sample number shall be included on the sampling chain of custody and in all reports, correspondence, and other documentation related to the sample. Each sample shall have a sampling chain of custody.

   b. Chain of custody shall show the name and organization of each person having custody of the sample, and shall also show the sample number, job name and location, time of day and date sample taken, material sampled, and tests to be performed.

3.2 HAZARDOUS CONDITIONS

A. Confined Spaces:

1. Attention is directed to the provisions of Article 108 of the General Industry Safety Orders, Title 8, California Code of Regulations, and Article 4 on Dusts, Fumes, Mists, Vapors, and Gases of Subchapter 4, the Construction Safety Orders, Title 8, California Code of Regulations.

2. All spaces shall be designated by Contractor as either PERMIT REQUIRED or NON-PERMIT REQUIRED. When designated PERMIT REQUIRED, a copy of the PERMIT shall be conspicuously posted for the duration of the Work within the space. Confined spaces designated as PERMIT REQUIRED after assessment shall be supported by a rescue team(s).

3. Tests for the presence of combustible or dangerous gases and/or oxygen deficiency in confined spaces shall be made with an approved device immediately prior to a worker entering the confined space and at intervals frequent enough to ensure a safe atmosphere during the time a worker is in such a structure. A record of such tests shall be kept at the jobsite.

4. No employee shall be permitted to enter a confined space, where tests indicate the presence of a hazardous atmosphere, unless the employee is wearing suitable and approved respiratory equipment, or until such time that continuous forced air ventilation has removed the hazardous atmosphere from the confined space.

5. Confined spaces that contain or that have last been used as containers of toxic gases, light oils, hydrogen sulfide, corrosives, or poisonous substances, shall,

in every case, be tested by means of approved devices or chemical analysis before being entered without wearing approved respiratory equipment.

6. Sources of ignition shall be prohibited in any confined space until after the atmosphere within the confined space has been tested and found safe.

7. Reservoirs, vessels, or other confined spaces having openings or manholes in the side as well as in the top shall be entered from the side openings or manholes when practicable.

8. Coordinate entry operations with the Engineer when both Contractor personnel and District personnel require permit space entry.

B. Excavation Safety:

1. Section 6705 of the Labor Code requires that the excavation of any trench 5 feet or more in depth shall not begin until the Contractor has received from the Engineer notification of the Engineer's acceptance of the Contractor's detailed plan for worker protection from the hazards of caving ground during the excavation of such trench.

   a. Such plan shall show the details of the design of shoring, bracing, sloping or other provisions to be made for worker protection during such excavation.

   b. No such plan shall allow the use of shoring, sloping or a protective system less effective than that required by the Construction Safety Orders, Title 8, California Code of Regulations, and if such plan varies from the shoring system standards established by the Construction Safety Orders, the plan shall be prepared and signed by an engineer who is registered as a Civil or Structural Engineer in the State of California. Cal/OSHA Permit: Title 8, CCR §341(a)(1) requires excavators to obtain a permit prior to digging trenches or excavations which are 5 feet or deeper and into which a person is required to descend.

2. California Government Code: Various sections of § 4216 describe the requirements and procedures for excavation notifications and utility excavation.

3. Requirements of Protective Systems:

   a. All excavations 5 ft. in depth or greater and not in stable rock shall have a protective system to prevent earth movement.

   b. For excavations greater than 20 ft. in depth, the detailed plan for worker protection and control of ground movement shall be prepared, and signed and dated, by a California registered Civil or Structural Engineer. The registered engineer shall:

1) Have at least five years' responsible experience in work of this nature.

2) Inspect the installation of the system prior to entry of any persons into the excavation and certify in writing to the District that the system is installed as designed.

3) Perform any necessary additional work that may be required because of unanticipated movements, deflections, or settlements of the protective system or the ground.

c. No changes or deviations from a protective system designed by a registered engineer shall be made without prior approval of the designing engineer.

d. In the event of any violation of Article 6 of the Construction Safety Orders or this paragraph, or deviation from the submitted plan for worker protection and control of ground movement, the Engineer may suspend Work or notify Cal/OSHA or both.

C. Fall Protection:

1. Section 1670 of the Construction Safety Orders, Title 8, California Code of Regulations, requires protective measures to be implemented whenever a worker is exposed to falls greater than 7½ feet.

2. On site activities shall conform to the requirements set forth in Sections 1669 through 1671.2, Title 8, California Code of Regulations.

3. A walkway or bridge, with standard guardrails, shall be provided where employees are required to cross excavations and trenches 6 feet or greater in depth per Section 1541 of the Construction Safety Orders, Title 8, California Code of Regulations.

D. Electrical:

1. For Work in which the Contractor must install temporary electrical circuits:

a. An electrical safety assessment (that includes ARCFLASH) shall be performed and provided to the Engineer.

b. The assessment shall be based on the NFPA 70 E (2015) Standard

c. Appropriate hazard labeling shall be provided.

2. For Work in which the Contractor installs electrical circuits required by the specification:

a. An electrical shock and ARCFLASH assessment shall be performed in accordance to the NFPA 70E (2015) Standard on installed equipment.

b. Appropriate labels shall be made and installed on equipment rated in excess of 480V (for example MCC, switchboards, panelboards, industrial control panels, etc.).

c. Prior to labeling, the label shall be reviewed by the Engineer for acceptance.

3. Where the Contractor or the District has knowledge of hazards covered by NFPA 70 E (2015) that are related to the Contractor's work, there shall be a documented meeting between the District and the Contractor.

E. LOTO (Lock-Out Tag-Out): Title 8, California Code of Regulations requires control of hazardous energy sources where any employee may be exposed to potential harm.

1. The Contractor with its subs shall meet with the District to share and reach agreement for implementation with LOTO plans and planning for any District equipment, process, or machinery that shall be locked-out.

2. The distinction between LOTO and operational shut-down shall be made.

3. Share and implement the following components of the LOTO plan:

a. LOTO locations,

b. Lock-out and tag-out methods and equipment,

c. De-energization verification,

d. Log of locked and tagged locations,

e. Stated emergency types and breach policy,

f. Return-to-service practice and removal of lock and tags.

F. Pardee Section Safe Clearance Procedure Training.

1. Schedule training of work personnel in the Pardee Section Safe Clearance Procedures with the Engineer.

2. The training is anticipated to be one hour in duration. Training will be conducted at the Pardee Center located on Pardee Dam Road in Valley Springs on a normal work day.

3.3 ACCIDENT REPORTS

A. Report any serious injury to the Engineer immediately. Examples of reportable injuries: broken limbs, amputation, chemical asphyxia, etc. Contractor is solely and exclusively responsible for notifying Cal/OSHA within 8-hours of the occurrence of a serious injury or fatality. Also promptly report in writing to the Engineer all accidents whatsoever arising out of, or in connection with, the performance of the Work whether on, or adjacent to, the site, giving full details and statements of witnesses. Reports shall document the root cause of the accident, if the accident was preventable, and how the accident will be prevented from reoccurring. Furnish further information to the District as requested.

B. If a claim is made by anyone against the Contractor or any subcontractor on account of any accident, arising out of or in connection with the performance of the Work, the Contractor shall promptly report the facts in writing to the Engineer, giving full details of the claim.

C. Notify the Engineer if representatives of Cal/OSHA or any other regulatory agency arrives at the job-site for any purpose, including inspections, consultations, or investigations. The notification shall be made to the Engineer within 30-minutes of the arrival of the representative to the project.

END OF SECTION

SECTION 01 35 44

ENVIRONMENTAL REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Work Includes:

1. Contractor shall be responsible for maintaining compliance with applicable Federal, State and Local environmental regulations in its execution of the Work.

2. Implement mitigations for construction impacts detailed in the Mitigation Monitoring and Report Plan (MMRP) certified under the California Environmental Quality Act (CEQA) for this project.

3. Proper and lawful disposal of all water, including but not limited to water from EBMUD facilities that may have been intended for drinking water supply.

4. Contractor shall obtain, pay for, comply with, and where necessary at the end of the Work, properly terminate all necessary local, state and federal permits to perform the Work as specified.

5. Contractor shall implement all required environmental plans, procedures, and controls during performance of the Work.

6. Meet with the Engineer prior to commencement of the Work to review the project environmental requirements as applicable to the Contractor's procedures and to develop mutual understandings relative to compliance with the environmental protection requirements and administration of the Contractor's environmental pollution control programs.

B. Site Activities

1. No debris including, but not limited to, demolition material, treated wood waste, stockpile leachate, soil, silt, sand, bark, slash, sawdust, asphalt, rubbish, paint, oil, cement, concrete or washings thereof, oil or petroleum products, or other organic or earthen materials from construction activities shall be allowed to enter into storm drains or surface waters or be placed where it may be washed by rainfall or runoff outside the construction limits. When operations are completed, excess materials or debris shall be removed from the work area as specified in the Construction and Demolition Waste Disposal Plan.

2. Excess material shall be disposed of in locations approved by the Engineer consistent with all applicable legal requirements and disposal facility permits.

3. Do not create a nuisance or pollution as defined in the California Water Code. Do not cause a violation of any applicable water quality standards for receiving

waters adopted by the Regional Board or the State Water Resources Control Board, as required by the Clean Water Act.

4. Clean up all spills and immediately notify the Engineer in the event of a spill.

5. Stationary equipment such as motors, pumps, and generators, shall be equipped with drip pans.

6. Divert or otherwise control surface water and waters flowing from existing projects, structures, or surrounding areas from coming onto the work and staging areas. The method of diversions or control shall be adequate to ensure the safety of stored materials and of personnel using these areas. Following completion of Work, ditches, dikes, or other ground alterations made by the Contractor shall be removed and the ground surfaces shall be returned to their former condition, or as near as practicable, in the Engineer's opinion.

7. Maintain construction sites to ensure that drainage from these sites will minimize erosion of stockpiled or stored materials and the adjacent native soil material.

8. Furnish all labor, equipment, and means required and shall carry out effective measures wherever, and as often as necessary, to prevent Contractor's operations from causing visible dust emissions to leave the work areas. These measures shall include, but are not limited to, providing additional watering equipment, reducing vehicle speeds on haul roads, restricting traffic on haul roads, covering haul vehicles, and applying a dust palliative to well-traveled haul roads. The Contractor shall provide the specifications of the dust palliative for Engineer approval prior to use. The Contractor shall be responsible for damage resulting from dust originating from its operations. The dust abatement measures shall be continued for the duration of the Contract. Water the site in the morning and evening, and as often as necessary, and clean vehicles leaving the site as necessary to prevent the transportation of dust and dirt onto public roads. Dust control involving water shall be done in such a manner as to minimize waste and runoff from the site.

9. Construction staging areas shall be graded, or otherwise protected with Best Management Practices (BMPs), to contain surface runoff so that contaminants such as oil, grease, and fuel products do not drain towards receiving waters including wetlands, drainages, and creeks.

10. All construction equipment shall be properly serviced and maintained in good operating condition to reduce emissions. Contractor shall make copies of equipment service logs available upon request.

11. Any chemical or hazardous material used in the performance of the Work shall be handled, stored, applied, and disposed of in a manner consistent with all applicable federal, state, and local laws and regulations.

12. Contaminated materials excavated and/or removed from the construction area shall be disposed of in a manner consistent with all applicable local, state, and federal laws and regulations.

C. Pre-Construction biological or cultural resources surveys

1. If the pre-construction biological or cultural resources surveys, or construction monitoring indicate the need for additional restricted areas in addition to those specified in the Contract Documents, and if the Contractor is required to stop work and relocate work activities, the Contractor's costs associated with these protective measures will be borne by the District and payment will be made in accordance with Article 7 of the General Conditions unless specified elsewhere.

2. Any delays to the Contractor's progress due to protection of biological or cultural resources not specified in the Contract Documents will be treated as differing site conditions. Refer to Article 7 of the General Conditions. Contractor shall be responsible for enforcement of work restrictions with all its subcontractors and suppliers of any tiers.

D. Related Sections

1. Document 00 31 24 – Materials Assessment Information

2. Document 00 62 00 – Insurance Requirements

3. Section 01 14 00 – Work Restrictions

4. Section 01 35 24 – Project Safety Requirements

5. Section 01 50 00 – Temporary Facilities and Controls

6. Section 01 74 19 – Construction Waste Management and Disposal

7. Section 02 82 13 – Asbestos Hazard Control Activities

8. Section 02 83 13 – Lead Hazard Control Activities

1.2 DEFINITIONS

A. Characterization: Identification of chemical, microbiological, or radiological constituents of solid wastes, liquid wastes, and imported fill materials. Characterization typically involves sampling and analysis performed by a laboratory that complies with and is certified under the Environmental Laboratory Accreditation Program (ELAP) of the California Department of Health Services.

B. Hazardous waste: A waste or combination of wastes as defined in 40 CFR 261.3, or regulated as hazardous waste in California pursuant to Chapter 11, Division 4.5, Title 22, California Code of Regulations, and Chapter 6.5, Division 20, California

Health and Safety Code, or those substances defined as hazardous wastes in 49 CFR 171.8.

C. State Water Resources Control Board (SWRCB) Order WQ 2014-0194-DWQ/General Order No. CAG 140001 (General Drinking Water Discharges Permit) – NPDES Permit for Drinking Water System Discharges: Authorizes discharges from drinking water systems. Provides regulatory coverage for short-term or seasonal planned and emergency (unplanned) discharges resulting from a water purveyor's essential operations and maintenance activities undertaken to comply with the federal Safe Drinking Water Act, the California Health and Safety Code, and the State Water Board's Division of Drinking Water permitting requirements for providing reliable delivery of safe drinking water.

D. State Water Resources Control Board ORDER NO. 2012-0006-DWQ NPDES NO. CAS000002 – NPDES Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Construction General Permit): Authorizes discharges of storm water associated with construction activity so long as the dischargers comply with all requirements, provisions, limitations and prohibitions in the permit. Provides regulatory coverage for construction sites or Linear Underground/Overhead Projects that disturb one or more acres of land surface, or that are part of a common plan of development or sale that disturbs more than one acre of land surface.

E. Sanitary Sewer Discharge Permit: Required for any discharges to a sanitary sewer system.

F. Also see Section 01 35 24 - Project Safety Requirement, Article 1.2.

G. Cultural Resources (include architectural resources, archaeological resources, tribal cultural resources, and human remains):

   1. Architectural resources include buildings, structures, objects, and historic districts. Residences, cabins, barns, lighthouses, military-related features, industrial buildings, and bridges are examples of architectural resources. An architectural resource can be considered a historic property if it is at least 50 years old and listed in, or eligible for listing in, the National Register of Historic Places or the California Register of Historical Resources.

   2. Archaeological resources consist of prehistoric and historic-era archaeological resources.

      a. Prehistoric archaeological resources consist of village sites, temporary camps, lithic scatters, roasting pits/hearths, milling features, petroglyphs, rock features, and burials. Associated artifacts include obsidian and chert flaked-stone tools (e.g., projectile points, knives, scrapers) or toolmaking debris; culturally darkened soil ("midden") containing heat-affected rocks, artifacts, or shellfish remains; and stone milling equipment (e.g., mortars, pestles, handstones, or milling slabs).

b. Historic-era archaeological resources consist of townsites, homesteads, agricultural or ranching features, mining-related features, refuse concentrations, and features or artifacts associated with early military and industrial land uses. An archaeological resource can also be considered a historic property if it is at least 50 years old and listed in, or eligible for listing in, the National Register of Historic Places or the California Register of Historical Resources.

3. Tribal cultural resources are sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American tribe that are listed, or determined to be eligible for listing, on the National Register of Historic Places, the California Register of Historical Resources, or a local register of historical resources.

4. Human Remains consist of skeletal remains, burials, cremations, and/or associated objects.

H. Certified Arborist: Individual designated by the District and certified by the International Society of Arboriculture who will provide professional tree services (trimming, caring, planting, monitoring, etc.).

I. Environmentally Sensitive Areas: Areas of ecological or cultural sensitivity where Work is restricted or prohibited.

J. Paleontological Resources: of the fossilized evidence of past life found in the geologic record. Fossils are preserved in sedimentary rocks, which are the most abundant rock type exposed at the surface of the earth. Despite the abundance of these rocks, and the vast numbers of organisms that have lived through time, preservation of plant or animal remains as fossils can be a rare occurrence. In many cases, fossils of animals and plants occur only in limited areas and in small numbers relative to the distribution of the living organisms they represent. In particular, fossils of vertebrates – animals with backbones – are sufficiently rare to be considered nonrenewable resources.

K. Pre-Construction Survey: Field evaluation of construction area in advance of construction activities.

L. Protected Trees: Trees designated as protected as shown on the drawings.

M. Staging Area: That area shown on the plans for the use of the contractors where construction-related activities will occur, including long-term and short-term equipment storage and maintenance, materials storage (both temporary and long term), parking, office space, etc.

N. Tree Drip Line: Outside perimeter of tree branch spread.

1.3 SUBMITTALS

A. Storm Water Management

1. Construction General Permit

    a. The Contractor shall create a user account on the SWRCB's Storm Water Multi-Application & Report Tracking System (SMARTS). The Engineer will link the Contractor to the District's account as a Data Submitter. The Contractor shall prepare and upload to SMARTS Permit Registration Documents (PRDs), including, but not limited to, a Notice of Intent, a Site Specific Risk Assessment, a Site Map, and a Storm Water Pollution Prevention Plan (SWPPP) for the Engineer's review which meets the requirements of the SWRCB, for coverage under the General Construction Stormwater Permit (Order No. 2009-0009-DWQ) and amendments thereto. Upon acceptance by the Engineer, the Engineer will electronically certify and file the PRDs to gain permit coverage and the Contractor shall submit the registration and the subsequent annual fees as required by the SWRCB.

    b. The Contractor shall be responsible for complying with the requirements of the Construction General Permit. The Contractor's responsibilities include, but are not limited to, providing qualified professionals as described in the permit to prepare and certify all permit-required documents/submittals and to implement effective stormwater/non-stormwater management practices, and conducting inspections and monitoring as required by the permit. The Contractor shall, in compliance with the permit, prepare and upload to SMARTS all required documents, photos, data, and/or reports (including the Annual Reports) and ensure permit coverage termination upon construction completion by preparing a Notice of Termination on SMARTS. The Contractor shall inform the Engineer when documents/reports are available on SMARTS for Engineer certification and submittal.

2. Storm Water Pollution Prevention Plan

    a. Submit a Stormwater Pollution Prevention Plan that describes measures that shall be implemented to prevent the discharge of contaminated storm water runoff from the jobsite. Contaminants to be addressed include, but are not limited to, soil, sediment, concrete residue, pH less than 6.5 or greater than 8.5, and chlorine residual and all other contaminants known to exist at the jobsite location as described in Document 00 31 24 - Material Assessment Information.

3. Alameda County Stormwater Permit

    a. In addition to the State's General Construction Stormwater Permit, the Contractor shall obtain and comply with Alameda County Public Works Agency's Stormwater Permit to enable the inspection of C.6 construction stormwater BMPs.

B. Water Control and Disposal Plan:

1. The Contractor shall submit a detailed Water Control and Disposal Plan for the Engineer's acceptance prior to any work at the jobsite.

   a. Plan shall comply with all requirements of the Specification and applicable discharge permits. Table 1 summarizes discharge permits that may be applicable to District projects.

TABLE 1 - Discharge Permit Summary Table

PERMIT*	**PERMIT COVERAGE**	**PERMIT OWNER**
SWRCB Order WQ 2014-0194-DWQ/General Order No. CAG 140001 – NPDES Permit for Drinking Water System Discharges	Discharges from a drinking water system of water that has been dedicated for drinking water purposes.	EBMUD
SWRCB ORDER NO. 2012-0006-DWQ NPDES NO. CAS000002 – Construction General Permit	Discharges from construction sites and linear underground/overhead projects greater than 1 acre.	EBMUD – Contractor will provide Qualified SWPPP Practitioner/Developer
Sanitary Sewer Discharge Permit	Publicly Owned Treatment Works approved discharges.	Contractor

* The most recent version of applicable permits shall be referenced for compliance.

   b. Contractor shall maintain proper control of the discharge at the discharge point to prevent erosion, scouring of bank, nuisance, contamination, and excess sedimentation in the receiving waters.

2. Drinking Water System Discharges

   a. Plan shall include the estimated flow rate and volume of all proposed discharges to surface waters, including discharges to storm drains. All receiving waters shall be clearly identified.

   b. Contractor shall track all discharges directly to a surface water body or a storm drain system that drains to a surface water body. A record consisting of discharge locations and volumes shall be submitted to the Engineer prior to Contract Acceptance.

   c. A monitoring program is required for drinking water system discharges greater than 325,850 gallons in conformance with Attachment E, Monitoring and Reporting Program, of the General Drinking Water Discharges Permit, when the water will be discharged either directly into a surface water body or a storm drain system that drains to a surface water body. A record consisting of discharge locations, volumes and

Water Quality (WQ) data shall be submitted to the Engineer. The Planned Discharge Tracking Form, attached to the end of this section, may be used to fulfill this requirement. All monitoring results shall be submitted to the Engineer prior to Contract Acceptance.

1) Contractor shall notify the Engineer, at least one week prior to the start of a planned discharge equal to or greater than 325,850 gallons, of the following:

a) The discharge start date;

b) The discharge location and the applicable receiving water;

c) The flow rate and volume to be discharged; and

d) The reason(s) for discharge.

d. Contractor shall dechlorinate all drinking water system discharges to achieve a total chlorine residual concentration of < 0.1 mg/L measured with a handheld chlorine meter utilizing a US EPA approved method and provide effective erosion & sediment control to achieve a visual turbidity concentration of ≤ 100 NTU by implementing BMPs which meet the District minimum standards (see Figure 1 attached to the end of this section) or better.

e. Instead of discharging to surface waters, where feasible, Contractor shall beneficially reuse water derived from drinking water systems as defined in the General Drinking Water Discharges Permit. Potential reuse strategies include, but are not limited to, landscape irrigation, agricultural irrigation, dust control, and discharge to stormwater capture basins or other groundwater recharge systems. Contractor shall do so without impacting property or the environment. Contractor shall provide a record of reuse location(s) and volume(s) and submit it to the Engineer prior to Contract Acceptance.

f. Contractor shall ensure that the pH level of any discharges shall not be depressed below 6.5, nor elevated above 8.5. If there is potential for discharges to be below 6.5 or above 8.5, Contractor shall employ pH adjustment best management practices to ensure discharges are within the range of 6.5 and 8.5. Contractor shall conduct onsite field measurements for pH per quality assurance and quality control (QA/QC) protocol that conform to U.S. EPA guidelines, or procedures approved by the American Water Works Association or other professional drinking water industry association. Contractor shall submit all monitoring results to the Engineer prior to Contract Acceptance.

3. Non-Stormwater Discharges

a. Plan shall describe measures for containment, handling, treatment (as necessary), and disposal of discharges such as groundwater (if encountered), runoff of water used for dust control, stockpile leachate, tank heel water, wash water, sawcut slurry, test water and construction water or other liquid that has been in contact with any interior surfaces of District facilities. Contractor shall provide the Engineer with containment, handling, treatment and disposal designs and a sampling & analysis plan for approval before commencing the Work. Sampling and analysis shall be in conformance with Sections 1.3 (K) *Analytical Test Results* and 3.1 *SAMPLING AND ANALYSIS*.

4. Sanitary Sewer Discharges

a. It is District policy to send superchlorinated discharges from pipeline disinfection to the sanitary sewer system. Plan shall include a sampling and analytical program for superchlorinated discharges in conformance with the Sanitary Sewer Discharge Permit. All monitoring results shall be submitted to the Engineer prior to the end of the Work.

b. Obtain and provide to the Engineer documentation from the agency (e.g., wastewater treatment plant, local sewer owner) having jurisdiction, authorizing the Contractor to dispose of the liquid and describing the method of disposal. Discharges destined for the District's main wastewater treatment plant in Oakland can reference Special Discharge Permit (SDP) #50333261, issued to the District's Regulatory Compliance Office, when obtaining authorization from the pertinent local jurisdiction that owns the sewers to be used. Contractor shall, prior to the end of the Work, report to the Engineer the volumes of all discharges performed pursuant to the said SDP along with copies of any profile forms and/or correspondence between Contractor and disposal facility.

C. Construction and Demolition Waste Disposal Plan:

1. Prepare a Construction and Demolition Waste Disposal Plan and submit a copy of the plan for the Engineer's acceptance prior to disposing of any material (except for water wastes which shall be addressed in the Water Control and Disposal Plan).

a. The plan shall identify how the Contractor will remove, handle, transport, and dispose of all materials required to be removed under this contract in a safe, appropriate, and lawful manner in compliance with all applicable regulations of local, state, and federal agencies having jurisdiction over the disposal of removed materials.

b. The Contractor shall procure the necessary permits required by the local, state, and federal agencies having jurisdiction over the handling, transportation, and disposal of construction and demolition waste. At a minimum, the following permits are required:

1) _________

2) _________

3) _________

c. Include a list of reuse facilities, recycling facilities and processing facilities that will be receiving recovered materials.

d. Identify materials that are not recyclable or not recovered which will be disposed of in a landfill (or other means acceptable by the State of California and local ordinance and regulations).

e. Identify how the Contractor will comply with The California Department of Toxic Substances Control's (DTSC) Alternative Management Strategies (AMS) when handling and disposing of treated wood waste (TWW) in compliance with 22 CCR 66261.9.5.

f. TWW records including but not limited to manifests, bills of lading should be submitted to the Engineer within 5 working days of off-haul. Records should include: (1) name and address of the TWW facility to which the TWW was sent; (2) estimated weight of TWW, or the weight of the TWW as measured by the receiving TWW facility; and (3) date of the shipment of TWW. (Cal. Code Regs., tit. 22, §§ 67386.8(a) and (e)(1)).

g. List the permitted landfill, or other permitted disposal facilities, that will be accepting the disposed waste materials.

h. Identify each type of waste material to be reused, recycled or disposed of and estimate the amount, by weight.

i. Plan shall include the sampling and analytical program for characterization of any waste material, as needed, prior to reuse, recycle or disposal.

2. Materials or wastes shall only be recycled, reused, reclaimed, or disposed of at facilities approved of by the District, as provided in Appendix __________.

3. Submit permission to reuse, recycle, reclaim, or dispose of material from reuse, recycling, reclamation, or disposal site owner along with any other information needed by the District to evaluate the acceptability of the proposed reuse, recycling, or disposal site and obtain acceptance of the Engineer prior to removing any material from the project site.

4. All information pertinent to the characterization of the material or waste shall be disclosed to the District and the reuse, recycling, reclamation, or disposal facility. Submit copies of any profile forms and/or correspondence between the Contractor and the reuse, recycling, reclamation, or disposal facility.

5. Submit name and Environmental Laboratory Accreditation Program Certificate number of laboratory that will analyze samples for suspected hazardous substances. Include statement of laboratory's certified testing areas and analyses that laboratory is qualified to perform. Submit prior to any laboratory testing.

D. Spill Prevention and Response Plan

1. Submit plan detailing the means and methods for preventing and controlling the spilling of known hazardous substances used on the jobsite or staging areas. The plan shall include a list of the hazardous substances proposed for use or generated by the Contractor on site, including petroleum products, and measures that will be taken to prevent spills, monitor hazardous substances, and provide immediate response to spills. Spill response measures shall address notification of the Engineer and appropriate agencies including phone numbers; spill-related worker, public health, and safety issues; spill control, and spill cleanup.

2. Submit a Material Safety Data Sheet (MSDS) for each hazardous substance proposed to be used prior to delivery of the material to the jobsite.

E. Dust Control and Monitoring Plan:

1. Submit a plan detailing the means and methods for controlling and monitoring dust generated by demolition and other work on the site for the Engineer's acceptance prior to any work at the jobsite. The plan shall comply with all applicable regulations including but not limited to the Bay Area Air Quality Management District (BAAQMD) visible emissions regulation and Public Nuisance Rule. The plan shall include items such as mitigation measures to control fugitive dust emissions generated by construction activities. The Plan shall outline best management practices for preventing dust emissions, provide guidelines for training of employees, and procedures to be used during operations and maintenance activities. The plan shall also include measures for the control of paint overspray generated during the painting of exterior surfaces. The plan shall detail the equipment and methods used to monitor compliance with the plan. The handling and disposal of water used in compliance with the Dust Control Plan shall be addressed in the Water Control and Disposal Plan.

2. Containment, as described in Article 3.3, shall be utilized during any abrasive blasting of the exterior of structures.

F. Emissions Control

1. Submit a list of all combustion equipment with regulated emissions to be used on the Project, and a BAAQMD permit or proof of exemption for each piece of equipment.

G. Noise Control and Monitoring Plan

1. Submit a plan detailing the means and methods for controlling and monitoring noise generated by construction activities, including demolition, alteration, repair or remodeling of or to existing structures and construction of new structures, as well as by items of machinery, equipment or devices used during construction activities on the site for the Engineer's acceptance prior to any work at the jobsite. The plan shall detail the equipment and methods used to monitor compliance with the plan.

H. Vibration Control and Monitoring Plan

1. Submit a plan detailing the means and methods for controlling and monitoring surface vibration generated by demolition and other work on the site for the Engineer's acceptance prior to any work at the jobsite. The plan shall detail the equipment and methods used to monitor compliance with the plan.

I. Tuneup Logs

1. The Contractor shall submit a log of required tuneups for all construction equipment, particularly haul and delivery trucks, on a quarterly basis for review.

J. Hazardous Waste Manifests:

1. Contractor shall use the "Uniform Hazardous Waste Manifest," EPA form 8700-22. The manifest must be printed by a USEPA approved printer as listed at https://www.epa.gov/hwgenerators/approved-registered-printers-epas-manifest-registry. Contractor shall prepare and District will review all hazardous waste manifests for acceptability prior to use.

2. Submit the "Generator's Initial Copy" and a legible photocopy of the first page of hazardous waste manifests, land disposal restriction forms, or other documentation required by applicable regulations governing transport and disposal of hazardous wastes for disposal of hazardous substances within 5 days of offhaul.

3. Submit proof that the transporter is certified by the State to transport hazardous wastes prior to any offhaul of hazardous wastes.

4. Submit name of disposal site where hazardous waste will be disposed of for Engineer's approval. Hazardous waste may only be disposed of at hazardous waste disposal facilities approved by the District.

K. Analytical Test Results:

1. Submit laboratory analysis results of samples taken and analyzed, include collection methods, locations, and frequencies.

    a. Include analytical methods for each material sampled.

b. Include sampling chain of custody from testing laboratory and QA/QC reports.

c. Specify any follow-up analysis to be run based on results.

d. Submit results of all follow-up analysis.

2. Provide characterization of all solid wastes, liquid wastes, and imported fill materials to the Engineer prior to movement of those materials.

PART 2 - NOT USED

PART 3 - EXECUTION

3.1 SAMPLING AND ANALYSIS

A. Contractor is responsible for characterizing all solid wastes, liquid wastes, and imported fill materials as described in Article 1.2 above.

1. Imported fill materials shall be sampled and tested prior to delivering on site.

B. Sampling and Testing of Materials:

1. All sampling and testing shall be performed by a laboratory that complies with and is certified under the Environmental Laboratory Accreditation Program (ELAP) of the California Department of Health Services.

2. Sampling and analysis of wastes shall be conducted according to methods listed in Environmental Protection Agency Document SW 846. Sampling and analysis of wastes and solids shall be representative of total waste volume.

a. At a minimum, analytical work, conducted on spent abrasive, paint debris and soil shall include EPA 8080 STLC, TTLC, and TCLP; EPA 6010 and 7000 series for 17 metals (see below), STLC, TTLC, and TCLP.

b. Metal analysis shall include the following metals: Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Copper, Cobalt, Lead, Mercury, Molybdenum, Nickel, Selenium, Silver, Thallium, Vanadium and Zinc.

3. Each sample shall have an identifying sample number assigned by the Contractor when the sample is taken. Sample number shall be included on the sampling chain of custody and in all reports, correspondence, and other documentation related to the sample. Each sample shall have a sampling chain of custody. Chain of custody shall show the name and organization of each person having custody of the sample, and shall also show the sample number, job name and location, time of day and date sample taken, material sampled, and tests to be performed.

4. Engineer may witness sampling and may take samples for District records and for additional analyses if required. Notify the Engineer at least 3 working days prior to sampling.

3.2 WASTE DISPOSAL

A. Engineer will review laboratory analysis results for District acceptance of Contractor Characterization of waste classification.

B. Engineer will obtain a Hazardous Waste Generator's EPA ID Number if required for disposal of hazardous wastes.

C. Engineer will give Contractor written notice to dispose of all or a portion of the waste material at a Class I disposal site if the Engineer determines that such disposal is required based on review of Contractors waste characterization and the analytical results of samples collected. Additional payment for disposal (transport and dispose) at Class I site will be under Bid Items ___ . Additional payment for disposal (transport and dispose) at Class I site will be in accordance with Article 7 of the General Conditions. Non-hazardous waste shall be disposed as outlined in the approved Construction and Demolition Waste Disposal Plan.

D. Waste materials from different sites shall not be transported or mixed until the material is determined to be non-hazardous. Excavation materials shall be stored or stockpiled at each site until classified and accepted for movement by the Engineer.

E. Transport materials and/or wastes in accordance with all local, state, and federal laws, rules, and regulations.

F. Contractor shall be responsible for all costs of disposal of construction and demolition waste material and liquid wastes, along with any waste generated by the Contractor’s work including Hazardous Waste generated from hazardous materials identified in Document 00 31 24 Material Assessment Information except as outlined in paragraph C.

3.3 DUST CONTROL AND MONITORING

A. Dust Control during Abrasive Blasting:

1. Provide a containment system for the structure prior to beginning abrasive blasting operations. The system shall remain in place during the abrasive blasting operations and the painting of exterior surfaces.

B. Dust Control

1. Contractor shall implement all necessary dust control measures, including but not limited to the following:

a. Water and/or coarse rock all dust-generating construction areas as directed by Engineer to reduce the potential for airborne dust from leaving the site.

b. Cover all haul trucks entering/leaving the site and trim their loads as necessary.

c. Using wet power vacuum street sweepers to:

1) Sweep all paved access road, parking areas and staging areas at the construction site daily or as often as necessary.

2) Sweep public roads adjacent to the site at least twice daily or as often as necessary.

d. The use of dry power sweeping is prohibited.

e. All trucks and equipment, including their tires, shall be washed off prior to leaving the site.

f. Gravel or apply non-toxic soil stabilizers on all unpaved access roads, parking areas and staging areas at construction sites.

g. Water and/or cover soil stockpiles daily.

h. Site accesses to a distance of 100 feet from the paved road shall be treated with 12-inches layer of compacted coarse rock.

i. Sandbags or other erosion control measures shall be installed to prevent silt runoff to public roadways from sites with a slope greater than one percent.

j. All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible.

k. Building pads shall be laid as soon as possible after grading..

l. Vegetative ground cover (e.g., fast-germinating native grass seed) shall be planted in disturbed areas as soon as possible and watered appropriately until vegetation is established.

m. Wind breaks (e.g., fences) shall be installed on the windward sides(s) of actively disturbed areas of construction. Wind breaks should have a maximum 50 percent air porosity.

n. All vehicle speeds shall be limited to fifteen (15) mph or less on the construction site and any adjacent unpaved roads.

C. Dust Monitoring During Demolition and Construction:

1. Provide air monitoring per the Dust Control and Monitoring Plan along the perimeter of the job site. A minimum of 4 stations, one on each side of the

District property, shall be established, capable of continuous measurement of total particulate concentration when any dust generating activity is occurring.

a. Ringelmann No. 1 Limitation: Contractor shall not emit from any source for a period or periods aggregating more than three minutes in any hour, a visible emission which is as dark or darker than No. 1 on the Ringelmann Chart, or of such opacity as to obscure an observer's view to an equivalent or greater degree.

b. Opacity Limitation: Contractor shall not emit from any source for a period or periods aggregating more than three minutes in an hour an emission equal to or greater than 20% opacity as perceived by an opacity sensing device, where such device is required by Air Quality Management District regulations.

c. All environmental and personal air sampling equipment shall be in conformance with the Association of Industrial Hygiene and National Institute of Safety and Health (NIOSH) standards.

d. All analysis shall be completed by a California Department of Health Services certified laboratory for the specific parameters of interest.

e. The Contractor shall provide to the Engineer, within 72 hours of sampling all test results.

D. The dust control system shall comply with the Dust Control and Monitoring Plan, the requirements of this section, and any applicable laws and regulations.

3.4 EMISSIONS CONTROL

A. Air Quality and Emissions Control

1. The Contractor shall ensure that line power is used instead of diesel generators at all construction sites where line power is available.

2. The Contractor shall ensure that for operation of any stationary, compression-ignition engines as part of construction, 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.

3. Fixed temporary sources of air emissions (such as portable pumps, compressors, generators, etc.) shall be electrically powered unless the Contractor submits documentation and receives approval from the Engineer that the use of such equipment is not practical, feasible, or available. All portable engines and equipment units used as part of construction shall be properly registered with the California Air Resources Board or otherwise permitted by the appropriate local air district, as required.

4. Contractor shall implement standard air emissions controls such as:

a. Minimize the use of diesel generators where possible.

b. Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes as required by the California Airborne Toxics Control Measure (ATCM) Title 13, Section 2485 of California Code of Regulations. Clear signage shall be provided for construction workers at all access points.

c. Follow applicable regulations for fuel, fuel additives, and emission standards for stationary, diesel-fueled engines.

d. Locate generators at least 100 feet away from adjacent homes and ball fields.

e. Perform regular low-emission tune-ups on all construction equipment, particularly haul trucks and earthwork equipment.

5. Contractor shall implement the following measures to reduce greenhouse gas emissions from fuel combustion:

a. On road and off-road vehicle tire pressures shall be maintained to manufacturer specifications. Tires shall be checked and re-inflated at regular intervals.

b. Construction equipment engines shall be maintained to manufacturer's specifications. All equipment shall be checked by a certified mechanic and determined to be running in proper condition prior to operation.

c. All construction equipment, diesel trucks, and generators shall be equipped with Best Available Control Technology for emission reductions of Oxide of Nitrogen (NOx) and Particulate Matter (PM).

d. Demolition debris shall be recycled for reuse to the extent feasible. See the Construction and Demolition Waste Disposal Plan paragraphs above for requirements on wood treated with preservatives.

B. Architectural Coatings

1. Architectural coatings used shall comply with appropriate Volatile Organic Compound limits as established in the Bay Area Air Quality Management District's Regulation 8, Rule 3 and/or the San Joaquin Valley Air Pollution Control District's Regulation IV, Rule 4601, and any amendments thereto.

3.5 VIBRATION CONTROL

A. Limit surface vibration to no more than 0.5 in/sec PPV, measured at the nearest residence or other sensitive structure. See Section 01 14 00.

B. Upon homeowner request, and with homeowner permission, the District will conduct preconstruction surveys of homes, sensitive structures and other areas of concern within 15 feet of continuous vibration-generating activities (i.e. vibratory compaction). Any new cracks or other changes in structures will be compared to preconstruction conditions and a determination made as to whether the proposed project could have caused such damage. In the event that the project is demonstrated to have caused the damage, the District will have the damage repaired to the pre-existing condition.

3.6 NOISE CONTROL

A. Comply with sound control and noise level rules, regulations and ordinances as required herein and in the CEQA documents which apply to any work performed pursuant to the contract.

B. Contractor is responsible for taking appropriate measures, including muffling of equipment, selecting quieter equipment, erecting noise barriers, modifying work operations, and other measures as needed to bring construction noise into compliance.

C. Each internal combustion engine, used for any purpose on the job or related to the job, shall be equipped with a muffler of a type recommended by the manufacturer. No internal combustion engine shall be operated on the project without said muffler.

D. Best available noise control techniques (including mufflers, intake silencers, ducts, engine enclosures, and acoustically attenuating shields or shrouds) shall be used for all equipment and trucks, as necessary.

E. Truck operations (haul trucks and concrete delivery trucks) will be limited to the daytime hours specified in Section 01 14 00.

F. Stationary noise sources (e.g chippers, grinders, compressors) shall be located as far from sensitive receptors as possible. If they must be located near receptors, adequate muffling (with enclosures) shall be used. Enclosure opening or venting shall face away from sensitive receptors. Enclosures shall be designed by a registered engineer regularly involved in noise control analysis and design.

G. Material stockpiles as well as maintenance/equipment staging and parking areas (all on-site) shall be located as far as practicable from residential receptors.

H. If impact equipment (e.g., jack hammers, pavement breakers, rock drills etc.) is used during project construction, Contractor is responsible for taking appropriate measures, including but not limited to the following:

1. Hydraulically or electric-powered equipment shall be used wherever feasible 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 shall be used (a muffler can lower noise levels from the exhaust by up to about 10 dB). External jackets on the tools themselves shall 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. It is the Contractor's responsibility to implement any measures necessary to meet applicable noise requirements.

2. Impact construction including jackhammers, hydraulic backhoe, concrete crushing/recycling activities, vibratory pile drivers etc. shall be limited to the day time hours specified in Section 01 14 00.

3. Erect temporary noise barriers or noise control blankets around the construction site, particularly along areas adjacent to residential buildings.

4. Utilize noise control blankets around the major noise sources to reduce noise emission from the site.

5. Evaluate the feasibility of noise control at the receivers by temporarily improving the noise reduction capability of adjacent buildings by the use of sound blankets for example.

6. Limit the noisiest phases of construction to 10 work days at a time, where feasible.

7. Notify neighbors/occupants within 300 feet of project construction at least thirty days in advance of extreme noise generating activities about the estimated duration of the activity.

8. Noise Monitoring shall be conducted periodically during noise generating activities. Monitoring shall be conducted using a precision sound-level meter that is in conformance with the American National Standards Institute (ANSI) Standard S1.4, Specification for Sound Level Meters. Monitoring results shall be submitted weekly to the Engineer

3.7 PROTECTION OF NATIVE AND NON-NATIVE PROTECTED TREES

A. Tree Protection

1. Locations of trees to be removed and protected are shown in the construction drawings. Pruning and trimming shall be completed by the Contractor and approved by the Engineer. Pruning shall adhere to the Tree Pruning Guidelines of the International Society of Arboriculture.

2. Erect exclusion fencing five feet outside of the drip lines of trees to be protected. Erect and maintain a temporary minimum 3-foot high orange plastic mesh exclusion fence at the locations as shown in the drawings**.** The fence posts shall be six-foot minimum length steel shapes, installed at 10-feet minimum on center, and be driven into the ground. The Contractor shall be prohibited from entering or disturbing the protected area within the fence except as directed by the Engineer. Exclusion fencing shall remain in place until construction is completed and the Engineer approves its removal.

3. No grading, construction, demolition, trenching for irrigation, planting or other work, except as specified herein, shall occur within the tree protection zone established by the exclusion fencing installed shown in the drawings. In addition, no excess soil, chemicals, debris, equipment or other materials shall be dumped or stored within the tree protection zone.

4. In areas that are within the tree drip line and outside the tree protection zone that are to be traveled over by vehicles and equipment, the areas shall be covered with a protective mat composed of a 12-inch thickness of wood chips or gravel and covered by a minimum ¾-inch-thick steel traffic plate. The protective mat shall remain in place until construction is completed and the Engineer approves its removal.

5. Tree roots exposed during trench excavation shall be pruned cleanly at the edge of the excavation and treated to the satisfaction of a certified arborist provided by the District.

6. Any tree injured during construction shall be evaluated as soon as possible by a certified arborist provided by the District, and replaced as deemed necessary by the certified arborist.

3.8 PROTECTION OF BIRDS PROTECTED UNDER THE MIGRATORY BIRD TREATY ACT AND ROOSTING BATS

A. The District will conduct biological reconnaissance in advance of construction and will conduct biologic monitoring during construction as necessary.

B. Protected Species

1. If protected species or suitable habitat for protected species is found during biological reconnaissance surveys:

a. Before beginning construction, all Contractor construction personnel are required to attend an environmental training program provided by the District of up to one-day for site supervisors, foreman and project managers, and up to 30-minutes for non-supervisory contractor personnel. The training program will be completed in person or by watching a video at a District-designated location, conducted by a qualified biologist provided by the District. The program will discuss all sensitive habitats and sensitive species that may occur within the project work limits, including the responsibilities of Contractor's construction personnel, applicable mitigation measures, and notification requirements. The Contractor is responsible for ensuring that all workers requiring training are identified to the District. Prior to accessing or performing construction work, all Contractor personnel shall:

1) Sign a wallet card provided by the Engineer verifying that all Contractor construction personnel have attended the appropriate level of training relative to their position; have read and understood

the contents of the _________________________; and shall comply with all project environmental requirements.

2) Display an environmental training hard hat decal (provided by the District after completion of the training) at all times.

b. Birds Protected under the Migratory Bird Treaty Act (MBTA):

1) It is unlawful to pursue, hunt, take, capture, or kill any migratory bird without a permit issued by the U.S. Department of the Interior.

2) If construction commences between February 1 and August 31, during the nesting season, the District will conduct a preconstruction survey for nesting birds within 7 days prior to construction to ensure that no nest will be disturbed during construction.

3) If active nests of migratory bird species (listed in the MBTA) are found within the project site, or in areas subject to disturbance from construction activities, an avoidance buffer to avoid nest disturbance shall be constructed. The buffer size will be determined by the District in consultation with California Department of Fish and Wildlife (CDFW) and is based on the nest location, topography, cover and species' tolerance to disturbance.

4) If an avoidance buffer is not achievable, a qualified biologist provided by the District will monitor the nest(s) to document that no take of the nest (nest failure) has occurred. Active nests shall not be taken or destroyed under the MBTA and, for raptors, under the CDFW Code. If it is determined that construction activity is resulting in nest disturbance, work should cease immediately and the Contractor shall notify the Engineer who will consult with the qualified biologist and appropriate regulatory agencies.

5) If preconstruction surveys indicate that nests are inactive or potential habitat is unoccupied during the construction period, no further action 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 avoidance buffer for active nests may be removed. Nests initiated during construction (while significant disturbance from construction activities persist) may be presumed to be unaffected, and only a minimal buffer, determined by District's biologist, would be necessary.

c. Roosting Bats**:**

1) If construction commences between March 1 and July 31, during the bat maternity period, the District will conduct a preconstruction survey for roosting bats within two weeks prior to construction to ensure that no roosting bats will be disturbed during construction.

2) If roosting surveys indicate potential occupation by a special-status bat species, and/or identify a large day roosting population or maternity roost by any bat species within 200 feet of a construction work area, a qualified biologist provided by the District will conduct focused day- and/or night-emergence surveys, as appropriate.

3) If active maternity roosts or day roosts are found within the project site, or in areas subject to disturbance from construction activities, an avoidance buffers shall be constructed. The buffer size will be determined by the District in consultation with CDFW.

4) If a non-breeding bat roost is found in a structure scheduled for modification or removal, the bats shall be safety evicted, under the direction of a qualified biologist provided by the District in consultation with CDFWto ensure that the bats are not injured.

5) If preconstruction surveys indicate that no roosting is present, or potential roosting habitat is unoccupied during the construction period, no further action is required. Trees and shrubs within the construction footprint that have been determined to be unoccupied by roosting bats, or that are located outside the avoidance buffer for active roosting sites may be removed. Roosting initiated during construction is presumed to be unaffected, and no buffer would be necessary.

3.9 PROTECTION OF CULTURAL AND PALEONTOLOGICAL RESOURCES

A. Confidentiality of Information on Cultural Resources

1. Prior to, or during the course of the Contractor's performance under this contract, the Contractor may obtain information as to the location and/or nature of certain cultural resources, including Native American artifacts and remains. This information may be provided to the Contractor by the District or a third party, or may be discovered directly by the Contractor through its performance under the contract. All such information shall be considered "Confidential Information" for the purposes of this Article.

2. The Contractor agrees that the Contractor, its subcontractors of any tiers, and their respective agents and employees shall not publish or disclose any Confidential Information to any person, unless specifically authorized in advance, in writing by the Engineer.

3. The indemnity obligations of Document 00 72 00 - General Conditions Article 4.7.5 shall apply to any breach of this Article.

B. Conform to the requirements of statutes as they relate to the protection and preservation of cultural and paleontological resources. Unauthorized collection of prehistoric or historic artifacts or fossils along the Work Area, or at Work facilities, is strictly prohibited.

C. Before beginning construction, all Contractor construction personnel shall attend a cultural resources training course provided by the District of up to two hours for site supervisors, foreman, project managers, and non-supervisory contractor personnel. The training program will be completed in person or by watching a video, at a District designated location, conducted by a qualified archaeologist provided by the District, or by District staff. The program will discuss cultural resources awareness within the project work limits, including the responsibilities of Contractor's construction personnel, applicable mitigation measures, confidentiality, and notification requirements. The Contractor is responsible for ensuring that all workers requiring training are identified to the District. Prior to accessing the construction site, or performing site work, all Contractor personnel shall:

1. Sign an attendance sheet provided by the Engineer verifying that all Contractor construction personnel have attended the appropriate level of training; have read and understood the contents of the training; have read and understood the contents of the "Confidentiality of Information on Archaeological Resources" and shall comply with all project environmental requirements.

D. In the event that potential cultural or paleontological resources are discovered at the site of construction, the following procedures shall be instituted:

1. Discovery of prehistoric or historic-era archaeological resources requires that all construction activities shall immediately cease at the location of discovery and within 100 feet of the discovery.

    a. The Contractor shall immediately notify the Engineer who will engage a qualified archaeologist provided by the District to evaluate the find. The Contractor is responsible for stopping work and notifying the Engineer, and shall not recommence work until authorized to do so by the Engineer.

    b. The District will retain a qualified archaeologist to inspect the findings within 24 hours of discovery. If it is determined that the Project could damage a historical resource as defined by CEQA (or a historic property as defined by the National Historic Preservation Act of 1966, as amended), construction shall cease in an area determined by the archaeologist until a management plan has been prepared, approved by the District, and implemented to the satisfaction of the archaeologist (and Native American representative if the resource is prehistoric, who shall be identified by the Native American Heritage Commission [NAHC]). In consultation with the District, the archaeologist (and Native American representative) will determine when construction can resume.

2. Discovery of human remains requires that all construction activities immediately cease at, and within 100 feet of the location of discovery.

    a. The Contractor shall immediately notify the Engineer who will engage a qualified archaeologist provided by the District to evaluate the find. The Contractor is responsible for stopping work and notifying the Engineer, and shall not recommence work until authorized to do so by the Engineer.

b. The District will contact the County Coroner to determine whether or not the remains are Native American. If the remains are determined to be Native American, the Coroner will contact the Native American Heritage Commission (NAHC). The NAHC will then identify the person or persons it believes to be the most likely descendant from the deceased Native American, who in turn would make recommendations to the District for the appropriate means of treating the human remains and any associated funerary objects.

3. Discovery of paleontological resources requires that all construction activities immediately cease at, and within 100 feet of the location of discovery.

a. The Contractor shall immediately notify the Engineer who will engage a qualified paleontologist provided by the District to evaluate the find. The Contractor is responsible for stopping work and notifying the Engineer, and shall not recommence work until authorized to do so by the Engineer.

b. The District will retain a qualified paleontologist to inspect the findings within 24 hours of discovery. The qualified paleontologist, in accordance with Society of Vertebrate Paleontology guidelines (Society of Vertebrate Paleontology 2010), will assess the nature and importance of the find and recommend appropriate salvage, treatment, and future monitoring and management. If it is determined that construction activities could damage a paleontological resource as defined by the Society of Vertebrate Paleontology guidelines (Society of Vertebrate Paleontology 2010), construction shall cease in an area determined by the paleontologist until a salvage, treatment, and future monitoring and management plan has been prepared, approved by the District, and implemented to the satisfaction of the paleontologist. In consultation with the paleontologist, the District will determine when construction can resume.

E. If the District determines that the find requires further evaluation, at the direction of Engineer, the Contractor shall suspend all construction activities at the location of the find and within a larger radius, as required.

3.10 SUPPLEMENTS

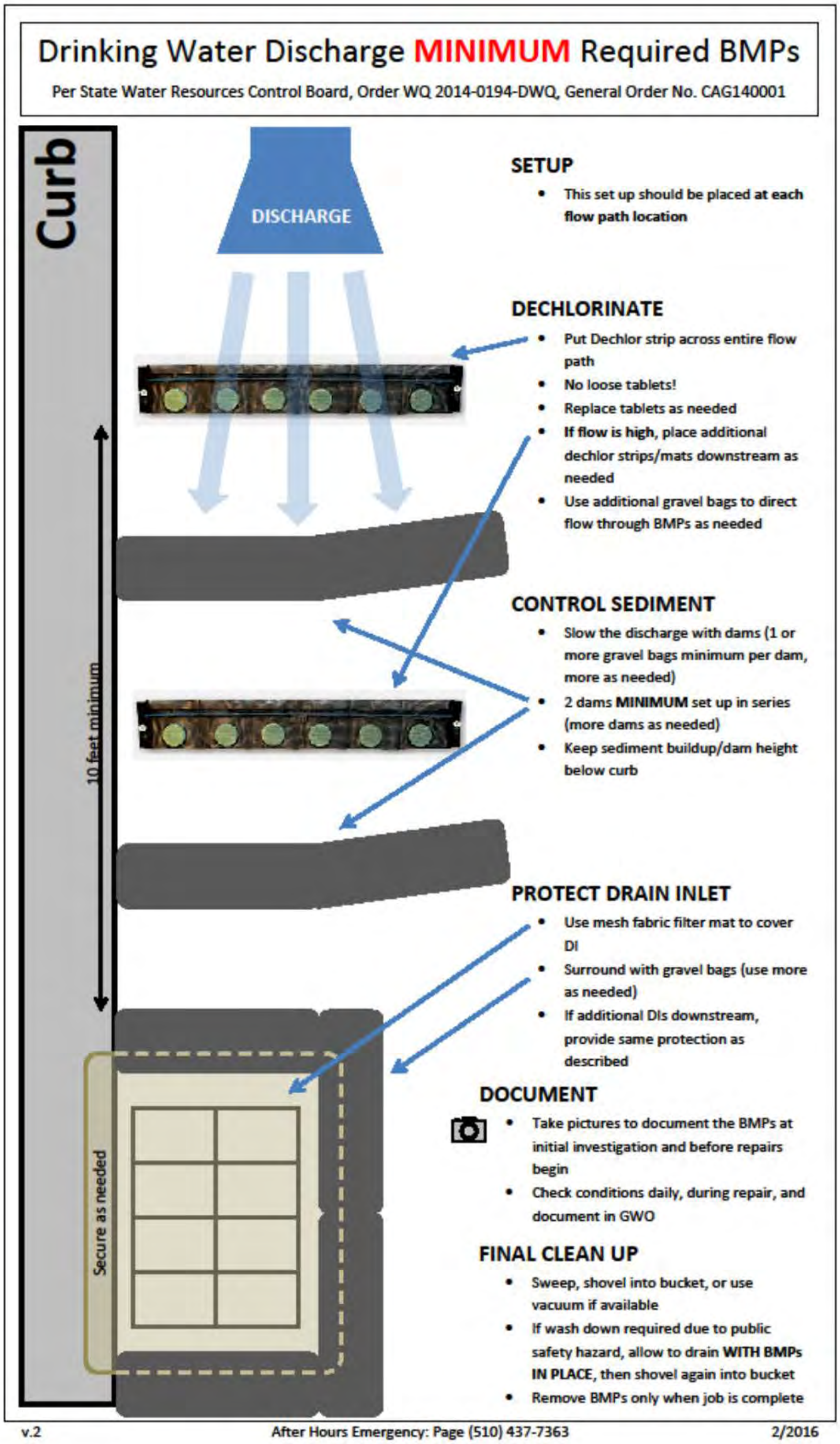
A. The following supplements follow END OF SECTION are a part of this Section:

1. Drinking Water Discharge Minimum Required BMPs.

2. Planned Potable Water Discharge Volume & WQ Data Tracking Form.

END OF SECTION

FIGURE 1 - Drinking Water DISCHARGE MINIMUM REQUIRED BMPs



EBMUD

EAST BAY MUNICIPAL UTILITY DISTRICT
BEST MANAGEMENT PRACTICES DISCHARGE CHECKLIST
FOR PLANNED DISCHARGES OF TREATED WATER

THIS FORM DOES NOT APPLY TO:
- Planned discharges < 1,500 gallons (except Superchlorinated)
- Flushing during a main break repair

BMPs shall be deployed for ALL planned discharges

This form shall be completed during the planning and execution of PLANNED discharges of treated water. The checklist is intended to prompt EBMUD staff of discharge requirements per applicable regulations including but not limited to State Water Resources Control Board, Order WQ 2014-0194-DWQ, General Order No. CAG140001 and to collect required reporting information.

DISCHARGE PLANNING

DISCHARGE LOCATION: ______________________

TYPE OF DISCHARGE: ☐ Reservoir Dewatering ☐ Pipe Dewatering ☐ Hydrant flushing ☐ Other ____________

STAFF PERSON PLANNING DISCHARGE (PRINT LEGIBLY): ______________________ ORG: ________

SCHEDULED DISCHARGE DATE: ____________ ESTIMATED TOTAL VOL. TO BE DISCHARGED: ____________ gallons

PROVIDE A RESPONSE TO ALL QUESTIONS BELOW	YES	NO	N/A
1. Can the entire discharge be put to multiple use/beneficial reuse? If *YES*, check all that apply. ☐ Use on construction site ☐ Irrigation ☐ Dust control ☐ Other: ______________________	☐ Proceed w/ discharge	☐ Proceed w/ checklist	☐ Proceed w/ checklist
2. *Notification to Environmental Compliance Services (ECS)?* The following discharge scenarios require notification to ECS before proceeding. *Check all that apply:* ☐ Discharge ≥ 325,850 gallons (see monitoring requirements on reverse), or ☐ Superchlorinated discharge to storm drain or receiving water (see monitoring requirements on reverse), or ☐ Discharge to sanitary sewer for SSD permit acquisition, or ☐ Discharge of water with pH ≥ 11 (see CHECKLIST INSTRUCTIONS for guidance), or ☐ Direct discharge to any waterbody or creek, or ☐ Indirect discharge to a priority reach "red line" creek	☐ Contact ECS before proceeding	☐ Proceed w/ checklist	☐ Proceed w/ checklist

DISCHARGE EXECUTION

STAFF PERSON EXECUTING DISCHARGE (PRINT LEGIBLY):
☐ Check if same as discharge planner ______________________ ORG: ________

ACTUAL DISCHARGE DATE: ____________ ACTUAL DISCHARGE TIME: ____________

PROVIDE A RESPONSE TO ALL QUESTIONS BELOW	YES	NO	N/A
3. Discharge flow path cleared of debris that can wash into storm drain and/or receiving water to the maximum extent practicable (MEP)?	☐	☐ Explain in comments	☐ Explain in comments
4. Dechlorination, sediment & erosion control BMPs deployed? Reference the *Drinking Water Discharge MINIMUM Required BMPs* card and/or Employee Field Guide. Document BMPs with camera.	☐	☐ Explain in comments	☐ Explain in comments

PROCEED WITH DISCHARGE AFTER BMPs HAVE BEEN DEPLOYED. CONTINUE TO MONITOR BMPs FOR EFFECTIVENESS

PROVIDE EXPLANTIONS FOR ANY 'N/A' OR 'NO' ANSWERS. NOTE COMMENTS and/or INSTRUCTIONS RECEIVED FROM ECS AFTER NOTIFICATION:

ESTIMATE OF ACTUAL TOTAL VOLUME(S) DISCHARGED	
Storm Drain	GALLONS
Sanitary Sewer	GALLONS
Directly to Receiving Water	GALLONS
Multiple Use/Beneficial Reuse	GALLONS

FURTHER INFORMATION ON REVERSE SIDE

V.1 December 2015

SECTION 01 55 26

TRAFFIC REGULATION

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work included: Comply with the traffic regulation requirements as specified herein.

B. Where specific requirements are not detailed herein or in permits, comply with the requirements of the most current version of the CalTrans Manual of Traffic Controls for Construction and Maintenance Work Zones.

C. All proposed street closures shall be clearly identified in the Traffic Control Plan (TCP) and shall conform to the section "Traffic Control Devices" below. Construction area signs for street closure and detours shall be posted a minimum of forty-eight (48) hours prior to the commencement of street closure. Contractor shall maintain safe access around the project limit at all times. Street closures shall be limited to those locations indicated on the construction documents.

D. Related requirements specified elsewhere:

1. Document 00 31 21.13 – Site Survey Information.

2. Section 01 14 00 - Work Restrictions.

1.2 SUBMITTALS

A. Submit at least 15 calendar days prior to work a detailed traffic control plan, that is approved by all agencies having jurisdiction and that conforms to all requirements of these specifications and the most recently adopted edition of the California Manual on Uniform Control Devices. Traffic Control Plan shall include:

1. Circulation and detour plans to minimize impacts to local street circulation. Use haul routes minimizing truck traffic on local roadways to the extent possible.

2. A description of emergency response vehicle access. If the road or area is completely blocked, preventing access by an emergency responder, a contingency plan must be included.

3. Procedures, to the extent feasible, to schedule construction of project elements to minimize overlapping construction phases that require truck hauling.

4. Designated Contractor staging areas for storage of all equipment and materials, in such a manner to minimize obstruction to traffic..

5. Locations for parking by construction workers.

1.3 QUALITY ASSURANCE

A. Detailed traffic control plan shall be prepared by a California licensed Traffic Engineer.

B. The Traffic Engineer who prepares the detailed traffic control plan shall be available at any time during the life of the contract to modify the traffic control plan if and as required by the agency having jurisdiction.

C. No changes or deviations from the approved detailed traffic control plan shall be made, except temporary changes in emergency situations, without prior approval of the Traffic Engineer, the District's Engineer, and all agencies having jurisdiction.

D. Immediately notify the Traffic Engineer, the District's Engineer, and the agencies having jurisdiction of occurrences that necessitate modification of the approved traffic control plan.

1.4 JOB CONDITIONS

A. A conceptual traffic control plan, prepared by _______________, is included with the _______ County Encroachment Permit in Appendix _.

B. The Contractor's detailed traffic control plan shall be based on the approved conceptual traffic control plan except where modifications to the plan have been approved by all agencies having jurisdiction.

PART 2 - PRODUCTS

2.1 TRAFFIC CONTROL DEVICES

A. Traffic signs, flashing lights, barricades and other traffic safety devices used to control traffic shall conform to the requirements of the most recently adopted edition of the California Manual on Uniform Control Devices and the agency having jurisdiction.

1. Portable signals shall not be used unless permission is given in writing by the agency having jurisdiction.

2. Warning signs used for nighttime conditions shall be reflectorized or illuminated. "Reflectorized signs" shall have a reflectorized background and shall conform to the current State of California Department of Transportation specification for reflective sheeting on highway signs.

PART 3 - EXECUTION

3.1 GENERAL

A. Except where public roads have been approved for closure, traffic shall be permitted to pass through designated traffic lanes with as little inconvenience and delay as possible.

B. Install temporary traffic markings where required to direct the flow of traffic. Maintain the traffic markings for the duration of need and remove by abrasive blasting when no longer required.

C. Convenient access to driveways and buildings in the vicinity of work shall be maintained as much as possible. Temporary approaches to, and crossing of, intersecting traffic lanes shall be provided and kept in good condition.

D. When leaving a work area and entering a roadway carrying public traffic, the Contractor's equipment, whether empty or loaded, shall in all cases yield to public traffic.

E. Provide temporary signs as required by the traffic control plan and remove signs when no longer required.

F. Haul routes for each construction phase shall be provided to all trucks serving the site during the construction period.

G. For complete road closures, immediate emergency access to be provided if needed to emergency response vehicles.

H. A minimum of twelve (12) foot travel lanes must be maintained unless otherwise approved.

3.2 ALTERNATING ONE-WAY TRAFFIC

A. Where alternating one-way traffic has been authorized, the following shall be posted at each end of the one-way traffic section at least one week prior to start of work:

1. The approximate beginning and ending dates that traffic delays will be encountered.

2. The maximum time that traffic will be delayed.

B. The maximum delay time shall be approved by the agency having jurisdiction.

3.3 FLAGGING

A. Provide flaggers to control traffic where required by the approved traffic control plan.

1. Flaggers shall perform their duties and shall be provided with the necessary equipment in accordance with the current "Instructions to Flaggers" of the California Department of Transportation.

2. Flaggers shall be employed full time on traffic control and shall have no other duties.

3.4 TEMPORARY TRAFFIC CONTROL

A. All traffic control devices shall conform to the latest edition of the Manual of Uniform Traffic Control Devices (MUTCD), and as amended by the latest edition of the MUTCD California supplement. Electronic signage board with changeable message shall be placed on a street in both direction 2 weeks in advance.

B. The Contractor shall replace within 72 hours, all traffic signal loop detectors damaged during construction. Any work that disturbs normal traffic signal operations and ensure proper temporary traffic control (lane shifts, lane closures, detours etc.) shall be coordinated with the agency having jurisdiction, at least 72 hours prior to commencing construction.

C. A minimum of twelve (12) foot travel lanes must be maintained unless otherwise approved.

D. Access to driveways will be maintained at all times unless other arrangements are made.

E. All traffic control devices shall be removed from view when not in use.

F. Before leaving a work area, ensure the area is left orderly. Trenches must be backfilled or plated during non-working hours.

G. Sidewalks for pedestrians will remain open if safe for pedestrians. Alternate routes and signing will be provided if pedestrian routes are to be closed.

END OF SECTION

SECTION 01 74 05

CLEANING

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work included: Perform the work necessary for cleaning during construction and final cleaning on completion of the work.

B. Cleaning for specific products or work is specified in the individual specification sections.

PART 2 - NOT USED

PART 3 - EXECUTION

3.1 GENERAL

A. At all times maintain areas covered by the Contract and public properties free from accumulations of waste, debris, and rubbish caused by construction operations.

B. Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws. Do not burn or bury rubbish and waste materials on project site. Do not dispose of volatile wastes such as mineral spirits, oil, or paint thinner in storm or sanitary drains. Do not dispose of wastes into streams or waterways.

C. Use only cleaning materials recommended by manufacturer of surface to be cleaned.

D. Use cleaning materials only on surfaces recommended by cleaning material manufacturers.

3.2 CLEANING DURING CONSTRUCTION

A. During execution of work, clean site and public properties and legally dispose of waste materials, debris, and rubbish to assure that buildings, grounds, and public properties are maintained free from accumulations of waste materials and rubbish. All soil and any other material tracked onto the streets by the Contractor shall be cleaned immediately. The Contractor shall comply with all rules and regulations as applicable for its cleaning method.

B. Dispose of all refuse off District property as often as necessary so that at no time shall there be any unsightly or unsafe accumulation of rubbish.

1. Pine needles, leaves, sticks, and other vegetative debris on the ground shall be removed if they are in the way of construction, present a safety hazard, or present a fire hazard. Otherwise they shall be left in place during construction and final cleaning

C. Wet down dry materials and rubbish to lay dust and prevent blowing dust.

D. Provide approved containers for collection and disposal of waste materials, debris, and rubbish.

E. Remove grease, dust, dirt, stains, labels, fingerprints, and other foreign materials from exposed and semi-exposed surfaces.

F. Repair, patch, and touch up marred surfaces to specified finish to match adjacent surfaces.

G. Vacuum clean all interior spaces, including inside cabinets. Broom clean paved surfaces; rake clean other surfaces of grounds.

H. Handle materials in a controlled manner with as few handlings as possible; do not drop or throw materials from heights.

I. Schedule cleaning operations so that dust and other contaminants resulting from cleaning process will not fall on wet, newly painted surfaces.

J. Vacuum clean interior of shop building areas when ready to receive finish painting and continue vacuum cleaning on an as-needed basis until successful completion of the Startup Test as defined in Section 01 75 17 Field Startup and Testing.

3.3 FINAL CLEANING

A. At the completion of work on all portions of the contract and immediately prior to final inspection, cleaning of the entire project will be accomplished according to the following provisions:

1. Thoroughly clean, sweep, wash, and polish all work and equipment, including finishes. The cleaning shall leave the structures and site in a complete and finished condition to the satisfaction of the Engineer.

2. Should the Contractor not remove rubbish or debris or not clean buildings and site as specified above, the District reserves the right to have the cleaning done at the expense of the Contractor.

B. Employ professional cleaners for final cleaning.

C. In preparation for contract completion, conduct final inspection of sight-exposed interior and exterior surfaces, and of concealed spaces.

D. Remove grease, dust, dirt, stains, labels, fingerprints, and other foreign materials from sight-exposed interior and exterior finished surfaces; polish surfaces so designated to shine finish.

E. Repair, patch, and touch up marred surfaces to specified finish, to match adjacent surfaces.

F. Broom clean paved surfaces; rake clean other surfaces of grounds.

G. Replace air-handling filters if units were operated during construction.

H. Clean ducts, blowers, and coils, if air-handling units were operated without filters during construction.

I. Clean luminaries in accordance with manufacturer's recommendations and relamp. Clean all light fixtures.

J. Clean debris from roofs, gutters, and downspouts.

K. Remove from District property all temporary structures and all material, equipment, and appurtenances not required as a part of, or appurtenant to, the completed work.

L. Leave watercourses, storm drains, inlets, and ditches open and clear.

END OF SECTION

SECTION 02 83 13

LEAD HAZARD CONTROL ACTIVITIES

PART 1 - GENERAL

1.1 COMPLIANCE AND INTENT

A. Furnish all labor, materials, facilities, equipment, services, employee training and testing, permits, and agreements necessary to perform the lead removal in accordance with these specifications and with the latest regulations from the U.S. Environmental Protection Agency (EPA), the Occupational Safety and Health Administration (OSHA), the Air Quality Management District with authority over the project, the Cal/EPA Department of Toxic Substance Control, the California Occupational Safety and Health Administration (Cal/OSHA), and other federal, state, county, and local agencies. Whenever there is a conflict or overlap of the above references, the most stringent provision is applicable.

B. During demolition procedures, the Contractor shall protect against contamination of soils, water, adjacent buildings and properties, and the airborne release of hazardous materials and dusts. The costs associated with the implementation of controls will be incurred by the Contractor.

C. Any information developed from exploratory work done by the District and any investigation done by the Contractor to acquaint himself with available information will not relieve the Contractor from the responsibility of properly estimating the difficulty or cost of successfully performing the work. The District is not responsible for any conclusions or interpretations made by the Contractor based on the information made available by the District or District's representative.

D. Hazardous materials uncovered during the demolition activities shall be disposed of in an approved manner complying with all applicable federal, state, and local regulations. Appropriate waste manifests shall be furnished to the Engineer as per Section 01 35 44, Environmental Requirements. Materials are conveyed to the Contractor "as is," without any warranty, expressed or implied, including but not limited to, any warranty to marketability or fitness for a particular purpose, or any purpose.

1.2 SCOPE OF WORK

A. The work covered by this specification includes the handling, removal, and proper disposal of lead-containing coating as required as a result of the work at ______________. See Appendix _ for laboratory test results of interior coating samples, including lead and other hazardous constituents.

B. The Contractor shall perform all work according to the procedures outlined in these specifications.

C. The hazardous materials removal and disposal include the following:

1. Properly remove and dispose of all lead-containing material as part of the demolition and disposal of the reservoir tank.

1.3 RELATED WORK IN OTHER SECTIONS

A. Section 01 35 24 - Project Safety Requirements

B. Section 01 35 44 - Environmental Requirements

C. Section 01 35 46 – Environmental Mitigation

D. Section 01 35 53 – Security Procedures

1.4 SUBMITTALS (PRE-JOB)

A. Site safety plan: The Contractor shall provide a site safety plan prior to project initiation as specified in Section 01 35 24.

B. Lead Demolition Plan: Lead-containing coating handling, engineering control, removal, and disposal procedures.

C. Cal/OSHA Lead Work Pre-Job Notification, if required.

D. Submittal of worker documentation for employees used on the job.

1. Lead-Containing Coating Demolition Work: All Contractor's supervisors and workers performing lead-containing coating work shall meet the requirements of the California Department of Health Services (DHS) lead-related construction interim certification (17 CCR 350001).

E. Licenses: Submit copies of state and local licenses and evidence of Cal-OSHA certification and permits necessary to perform the work of this contract.

F. Submit name and Environmental Laboratory Accreditation Program Certificate number of laboratory that will test samples collected during air monitoring. See Article 3.2 below.

1.5 SUBMITTALS (JOB IN PROGRESS)

A. The Contractor shall provide to the Engineer, within 72 hours of sampling, test results of the personal air sampling described in Article 3.2.

1.6 SUBMITTALS (POST-JOB)

A. Upon completion of on-site work, Contractor is to provide a detailed project summary which will include each of the items listed below. The project Summary shall be submitted and approved by the Engineer prior to contract acceptance and shall include the following:

1. Receipt and weight tickets from the landfill operator acknowledging the Contractor's delivery of wastes and including dates of delivery, waste container types, quantities, tared weight of waste delivered, and all appropriate signatures.

2. All completed waste manifests; and copies of all accident reports during the course of the project.

PART 2 - MATERIALS AND EQUIPMENT

2.1 SIGNS AND LABELS

A. Provide labeling in accordance with U.S. EPA requirements. Provide the required signs, labels, warnings, or posted instructions for containers used to transport contaminated material to the landfill.

B. Location of Caution Signs and Labels: Provide bilingual caution signs at all approaches to work area. Locate signs at such a distance that personnel may read them and take the necessary protective steps required before entering the area.

C. Warning Sign Format: Vertical format conforming to Title 8 CCR Section 1532.1:

WARNING
LEAD WORK AREA
POISON
NO SMOKING OR EATING

2.2 SCAFFOLDING

A. Scaffolding, as required to do the specified work, shall meet all applicable safety regulations and OSHA standards. A non-skid surface shall be furnished on all scaffold surfaces subject to foot traffic.

2.3 TRANSPORTATION EQUIPMENT

A. Transportation equipment, as required, shall be lockable and suitable for loading, temporary storage, transit and unloading of waste without exposure to persons or property. Any vehicle used to transport waste shall be properly registered with all applicable controlling agencies.

PART 3 - EXECUTION

3.1 INITIAL AREA ISOLATION (LEAD)

A. Establish designated limits for the lead work area with continuous barriers. Use caution tape for lead work. Provide signs around the perimeter of the work area according to EPA, OSHA and Cal-OSHA requirements.

B. Contractor shall secure the entire job site at all times. Area entrances and exits shall be secured by the Contractor during the abatement phase. Unauthorized visitors are strictly prohibited, only the Contractor and District's representatives are permitted at the job site. Contractor shall ensure that all doors, gates, windows, and potential entrances in the buildings and surrounding fences are secured and locked at the end of each work day. See also Site Access Control in Section 01 35 53 Security Procedures.

3.2 AIR MONITORING - LEAD

A. The purpose of any air monitoring conducted by the Engineer will be to detect possible release of dusts (lead) emanating from the work area. This testing will be conducted independently of the air monitoring described in Section 01 35 24.

B. The Contractor shall be responsible for all personal air sampling. During the performance of any work in the contaminated work area that is likely to create airborne lead exposure, sufficient personnel breathing zone samples shall be taken to constitute representative sampling. These samples shall be taken each shift and for each distinct crew operation, and shall be used to verify adequacy of respiratory protection. Personal breathing zone air sampling shall be in accordance with CAL/OSHA lead standards.

3.3 DECONTAMINATION - LEAD

A. Lead Decontamination: The Contractor shall remove all evidence of coating chips from the jobsite that are related to the project demolition.

END OF SECTION