Volume I

CENTRAL RESERVOIR REPLACEMENT PROJECT

Draft Environmental Impact Report
SCH #2018042078

Prepared for
East Bay Municipal Utility District

November 2019

EAST BAY MUNICIPAL UTILITY DISTRICT

ESA

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Appendices

ARCONYMS AND ABBREVIATIONS

$\mu g/m^3$	micrograms per cubic meter
2017 Plan	201 Clean Air Plan, Spare the Air, Cool the Climate
AB	Assembly Bill
ABAG	Association of Bay Area Governments
AC Transit	Alameda-Contra Costa Transit District
ACCWP	Alameda County Clean Water Program
ACDEH	Alameda County Department of Environmental Health
ACM	asbestos-containing materials
Action Items	action items from the City of Oakland ECAP's ten-year plan
ADT	average daily traffic
AERMOD	American Meteorological Society/Environmental Protection Agency Regulatory Model
Alameda CTC	Alameda County Transportation Commission
Alameda FCWCD	Alameda County Flood Control and Water Conservation District
Alquist-Priolo Act	Alquist-Priolo Earthquake Fault Zoning Act
APE	Area of Potential Effects
ATCM	Airborne Toxics Control Measure
AWSC	All-way stop controlled
AWWA	American Water Works Association
BAAQMD	Bay Area Air Quality Management District
BACT	Best Available Control Technology
BART	Bay Area Rapid Transit
Basin Plan	San Francisco Bay Water Quality Control Plan
Bay Area Air Basin	San Francisco Bay Area Air Basin
BMP	best management practice
BOE	State Board of Equalization
CA MUTCD	California Manual on Uniform Traffic Control Devices

CAA	Clean Air Act
Cal EPA	California Environmental Protection Agency
CAL FIRE	California Department of Forestry and Fire Protection
Cal/OSHA	California Division of Occupational Safety and Heath
CalEEMod	California Emissions Estimator Model
California Register	California Register of Historical Resources
Caltrans	California Department of Transportation
CAPCOA	California Air Pollution Control Officers Association
CARB	California Air Resources Board
CBC	California Building Code
CCR	California Code of Regulations
CDC	California Department of Conservation
CDFW	California Department of Fish and Wildlife
CDSM	Cement Deep Soil Mixing
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CERES	California Environmental Resources Evaluation System
CESA	California Endangered Species Act
CFGC	California Fish and Game Code
CFR	Code of Federal Regulations
cfs	cubic feet per second
CGS	California Geology Survey
CH_4	methane
CMP	Congestion Management Plan
CNDDB	California Natural Diversity Database
CNEL	Community Noise Equivalent Level
CNPS	California Native Plant Society
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide-equivalent
Corps	U.S. Army Corps of Engineers
Cortese List	Hazardous Waste and Substances Site List

CPUC	California Public Utilities Commission
Creek Ordinance	City of Oakland's Creek Protection, Storm Water Management, and Discharge Control Ordinance
CRPR	California Rare Plant Rank
CUPA	Certified Unified Program Agency
CWA	Clean Water Act
CY	cubic yards
db	decibel
dbA	A-weighted decibel
dbh	diameter at Breast Height
DPM	diesel particulate matter
DSOD	Division of Safety of Dams
DTSC	Department of Toxic Substances Control
DWR	Department of Water Resources
EBMUD	East Bay Municipal Utility District
EBRPD	East Bay Regional Park District
ECAP	Energy and Climate Action Plan
EIR	environmental impact report
Emissions Plan	Construction Emissions Minimization Plan
EPP	Existing Plus Project
ESA	Environmental Science Associates
ESL	Environmental Screening Levels
Fed/OSHA	United State Department of Labor Occupational Safety and Health Administration
FEMA	Federal Emergency Management Agency
FESA	Federal Endangered Species Act
FHWA	Federal Highway Association
FIRM	flood insurance rate map
FOSC	Friends of Sausal Creek
FTA	Federal Transit Administration
GHG	greenhouse gas
gpm	gallons per minute

Guidelines	BAAQMD *CEQA Air Quality Guidelines*
GWh	gigawatt hours
HCP	Habitat Conservation Plan
HEPA	high efficiency particulate air
HFC	hydrofluorocarbons
HI	hazard index
HPE	Historic Preservation Element
HRA	Heath Risk Assessment
I-5	Interstate 5
I-580	Interstate 580
I-80	Interstate 80
I-880	Interstate 880
in/sec	inches per second
IPCC	International Panel on Climate Change
IS	Initial Study
LBP	lead-based paint
LCFS	Low Carbon Fuel Standard
L_{dn}	day-night noise level
L_{eq}	steady-state energy level
LID	Low Impact Design
L_{max}	maximum, instantaneous noise level registered during a measurement period
LOS	level of service
LUTE	Land Use and Transportation Element
MBTA	Migratory Bird Treaty Act
MBTA	Migratory Bird Treaty Act
MEIR	Maximum Exposed Individual Receptor
MG	million gallon
mgd	million gallons per day
ML	local magnitude
mph	miles per hour
MS4	Municipal Separate Storm Sewer Systems

MT	metric tons
MT CO2e	metric tons CO2e
MTC	Metropolitan Transportation Commission
MW	moment magnitude
MWh	megawatt-hours
N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NAHC	Native American Heritage Commission
National Register	National Register of Historic Places
NCCP	Natural Community Conservation Plan
NHPA	National Historic Preservation Act
NIOSH	National Institute of Safety and Health
NO	nitric oxide
NO_2	nitrogen dioxide
NOx	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NPPA	Native Plant Protection Act
NRCS	National Resources Conservation Service
NWIC	Northwest Information Center
O_3	ozone
OEHHA	Office of Environmental Health Hazard Assessment
OHSES	Alameda County Office of Homeland Security and Emergency Services
OMC	Oakland Municipal Code
OPR	Governor's Office of Planning and Research
OSH	Occupational Safety and Health Administration
Pb	lead
PCBs	polychlorinated biphenyls
PCE	tetrachloroethylene
PFCs	perfluorocarbons
PG&E	Pacific Gas & Electric
PM	particulate matter
PM_{10}	particulate matter (10 microns or less in diameter)

$PM_{2.5}$	particulate matter (2.5 microns or less in diameter)
Porter-Cologne Act	Porter-Cologne Water Quality Control Act
ppm	parts per million
PPV	peak particle velocity
Project	Central Reservoir Replacement Project
PSD	Prevention of Significant Deterioration
Qpaf	Pleistocene-age alluvial fan and fluvial deposits
RCNM	Roadway Construction Noise Model
RCRA	Resource Conservation and Recovery Act
RCS	rate control station
RDS	Redwood Day School
Risk MAP	Risk Mapping, Assessment, and Planning
ROG	reactive organic gases
RWQCB	Regional Water Quality Control Board
SAAQS	State Ambient Air Quality Standards
SB	Senate Bill
SCA	Standard Conditions Approval
SF_6	sulfur hexafluoride
SFBAAB	San Francisco Bay Area Air Basin
SFBRWQCB	San Francisco Bay Area Regional Water Quality Control Board
SFRWQCB	San Francisco Bay Regional Water Quality Control Board
SIP	State Implementation Plan
SO_2	sulfur dioxide
STC	sound transmission class
STLC	Soluble Threshold Limit Concentrations
SVP	Society of Vertebrate Paleontology
SWPPP	Stormwater Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TACs	toxic air contaminants
TCE	trichloroethylene
TCLP	Toxic Characteristic Leaching Procedure
TMDL	Total Maximum Daily Load

TTLC	Total Threshold Limit Concentration
U.S.	United States
U.S. EPA	United States Environmental Protection Agency
U.S.C.	United States Code
Unified Program	Unified Hazardous Waste and Hazardous Materials Management Regulatory Program
US EPA	United States Environmental Protection Agency
USC	United States Code
USDOT	United State Department of Transportation
USFWS	United States Fish and Wildlife Service
USGS	U.S. Geological Survey
VDCES	Verified Diesel Emissions Control Strategies
VegCAMP	California Vegetation Classification and Mapping
VHFHSZ	Very High Fire Hazard Severity Zone
VMT	vehicle miles traveled
VOC	Volatile Organic Compound
WDR	Waste Discharge Requirements
WGCEP	Working Group on California Earthquake Probabilities
WTP	water treatment plant

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EXECUTIVE SUMMARY

S.1 Introduction

The East Bay Municipal Utility District (EBMUD) is proposing the Central Reservoir Replacement Project (Project), which includes replacement of the existing 154-million gallon (MG), open-cut Central Reservoir with three new 17-MG concrete tanks within the existing reservoir basin as shown on Figure ES-1. The Project includes removal of vegetation and demolition of the existing reservoir, roof, lining, and material storage building, followed by removal of a portion of the reservoir's main embankment, construction of a reinforced tank foundation system, three 17-MG concrete tanks approximately 20 feet higher than the existing reservoir, a new rate control station, a valve structure, service road and site paving, a bioretention area, and security fencing all within the existing reservoir property. The Project site design, with community input, incorporates existing landscaping, a mix of earthen berms, trees and shrubs to screen the tanks and emphasize the natural setting at the perimeter of the site while balancing earthwork. The Project also includes an access driveway to connect the Redwood Day School parking area to Ardley Avenue.

EBMUD prepared an Initial Study (IS) to provide the public and Responsible and Trustee Agencies reviewing the Project with information about the Project's potential impacts on the environment. The IS evaluated the Project relative to various environmental resource areas and identified potentially significant impacts to several resource areas that required further study to determine whether such impacts are significant and, if so, whether they can be mitigated to less than significant levels. Based on the IS completed for the Project, the following areas of potentially significant environmental impact are addressed in detail in this Environmental Impact Report (EIR): Aesthetics, Air Quality, Biological Resources, Cultural Resources, Energy, Geology and Soils, Greenhouse Gas Emissions, Hazards and Hazardous Materials, Hydrology and Water Quality, Noise, Recreation, and Traffic and Transportation. Potential cumulative impacts and potential for growth inducement are addressed and alternatives, including the No Project Alternative, are evaluated.

Based on the evaluation of impacts in the IS, it was determined that the Project would have no impacts on Agriculture and Forestry Resources, Mineral Resources, Population and Housing, Public Services, and less than significant impacts on Land Use and Utilities and Service Systems. Therefore, a detailed discussion of these resources has been excluded from this EIR. EBMUD is the lead agency for compliance with the California Environmental Quality Act (CEQA) environmental review process for the Project.

The EIR considers the Project, as described above. In addition, the EIR considers the following alternatives:

- No Project Alternative: This alternative assumes that the Central Reservoir would not be replaced, and the current reservoir would remain in service. This option would require substantial repair work to the existing reservoir liner and roof.

- Three Steel Tanks Alternative: This alternative would involve construction of three 17-MG welded steel tanks. The overall design and layout of the Project site under this alternative would be similar to the Project design, however, the welded steel tanks would require a more pronounced domed roof structure, with a final peak roof elevation of 245 feet (13 feet taller than the Project tanks). Because of the different construction techniques and materials used, overall, there would be about 10 percent fewer construction truck trips and 90 fewer construction days under this alternative than under the Project.

S.2 Project Location

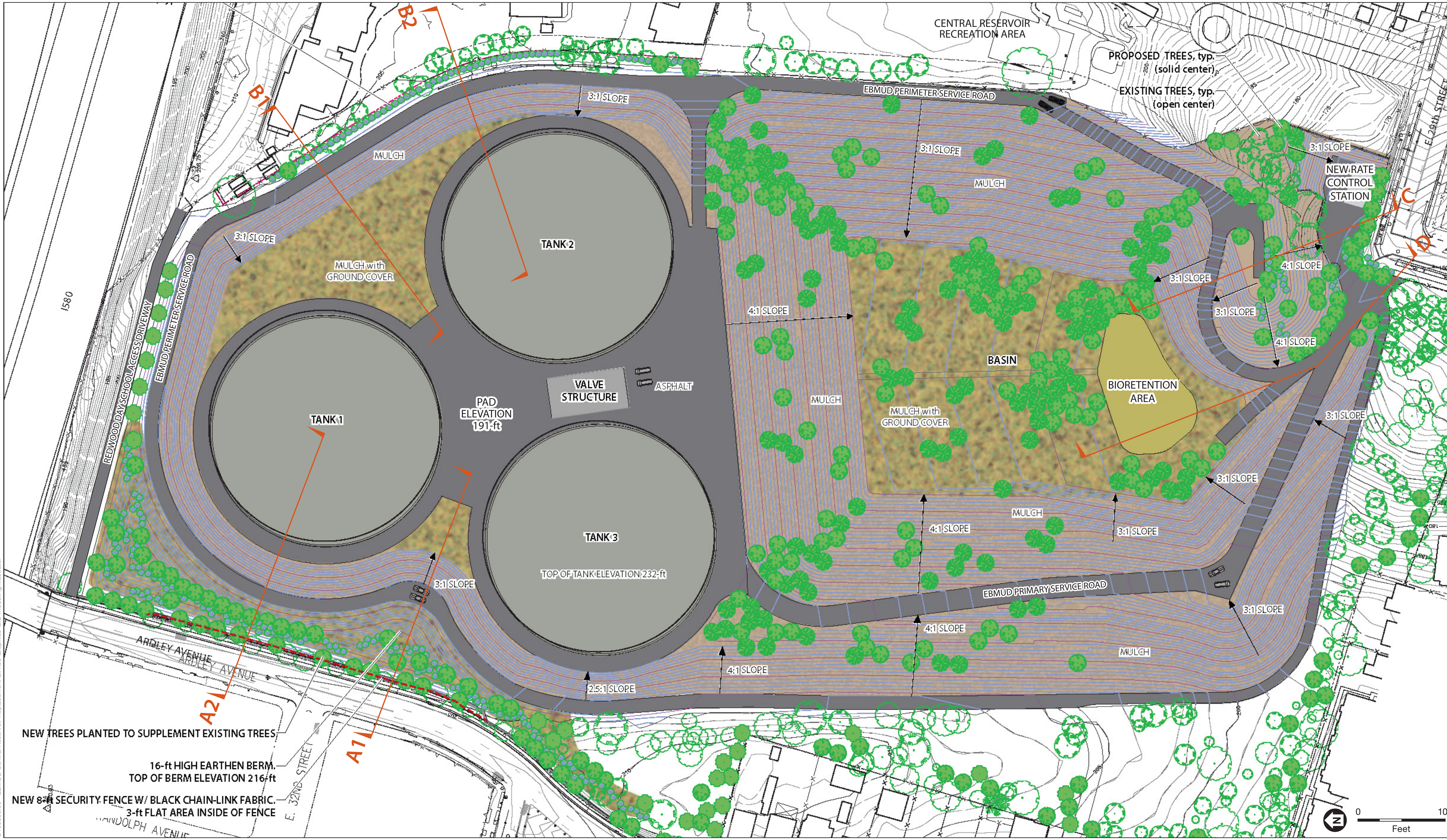
Central Reservoir is located in the city of Oakland, California, as shown on Figure ES-2. The Project site is bordered by I-580 to the north, Ardley Avenue and 23rd Avenue to the west, the intersection of 25th Avenue and East 29th Street to the south, and Sheffield Avenue to the east. The Central Reservoir site is surrounded to the west and south by single- and multi-family residential homes. The Central Reservoir Recreation Area and Redwood Day School are adjacent to the east boundary of the reservoir site. Oakland Heights Nursing and Rehabilitation is also located to the south of the site.

S.3 Purpose and Need

Replacement of the Central Reservoir is required as the reservoir has reached the end of its useful life and requires removal and disposal of PCBs in the reservoir's interior coating. Reservoir concerns also include a failing lining; a roof that does not meet current seismic codes; potential leakage in the upper areas of the panel craft lining, resulting in reduced operating levels; and difficult water quality operations as the existing reservoir is about three times larger than required and is located at an elevation that is too low relative to the customers it serves and other reservoirs in the Central Pressure Zone, creating unusable storage.

S.4 CEQA Objectives

The specific primary operational and construction impact objectives of the Project are as presented in Table ES-1.



SOURCE: EBMUD, 2018; Dillingham Associates, 2018

D160330.00 - EBMUD Central Reservoir Replacement EIR/05 Graphics-GIS-Modeling/Illustrator

EBMUD Central Reservoir Replacement Project

Figure ES-1
Proposed Site Plan

ESA

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SOURCE: ESRI World Imagery; EBMUD, 2017; ESA, 2017

EBMUD Central Reservoir Replacement Project

Figure ES-2
Project Location

TABLE ES-1
PROJECT OBJECTIVES

Issue	Objective
Primary Operational Objectives	Replace a reservoir at the end of its useful life and remove PCBs in the reservoir interior coating.
	Improve water service reliability and water quality by: • Providing storage capacity in multiple tanks at the Central Reservoir site, each of which can be removed from service for unplanned and planned outages, or in response to seasonal reductions in demand or reductions in demand during droughts, while the other tank(s) remain in service. • Reducing storage capacity at the Central Reservoir site so the resulting capacity is proportionate to anticipated demand and the entire depth of that capacity may be utilized. • Raising the elevation of storage capacity at the Central Reservoir site so that reservoirs within the central and southern portion of the Central Pressure Zone are capable of providing water service anywhere within that area of the pressure zone.
Secondary Operational Objectives	Maintain a similar and acceptable aesthetic site-environment after construction.
	Minimize life-cycle costs (capital, operating, and maintenance) to EBMUD's customers.
	Maximize the useful life of existing facilities in a manner that reduces costs for customers.
	Maintain a safe facility while reducing monitoring, permitting, and other operational costs associated with managing a dam.
Construction Objectives	Minimize environmental impacts on the community during construction.
	Reuse or recycle building materials on site to the extent feasible, including concrete demolition materials and excavated earth.
	Maintain water service and emergency flows during construction.
	Protect the local community from construction hazards.
	Provide safe travel routes for motorists and pedestrians.
	Provide safe construction site conditions.

S.5 Summary of Impacts

Table ES-2 below provides a summary of potential Project impacts by environmental resource topic area, and EBMUD Practices and Procedures that would be applied to the Project. Table ES-3 is a summary of all significant impacts following implementation of EBMUD's Practices and Procedures and required mitigation measures identified for the Project. For all significant impacts, the significance after mitigation is determined.

TABLE ES-2
SUMMARY OF IMPACTS AND EBMUD PRACTICES AND PROCEDURES

Impact Area	Significance Before Practices & Procedures	EBMUD Practices and Procedures[1]	Significance After Practices & Procedures
Aesthetics			
Impact AES-3: In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings (Public views are those that are experienced from publicly accessible vantage points), or in an urbanized area, conflict with applicable zoning and other regulations governing scenic quality.	PS	**EBMUD's Standard Construction Specification 01 35 44, Environmental Requirements** *Section 1.1, Summary* 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.	LTS

TABLE ES-2 (CONTINUED)
SUMMARY OF IMPACTS AND EBMUD PRACTICES AND PROCEDURES

Impact Area	Significance Before Practices & Procedures	EBMUD Practices and Procedures[1]	Significance After Practices & Procedures
Aesthetics (cont.)			
Impact AES-3 (cont.)		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. *Section 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. **EBMUD's Standard Construction Specification 01 74 05, Cleaning** *Section 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.	

TABLE ES-2 (CONTINUED)
SUMMARY OF IMPACTS AND EBMUD PRACTICES AND PROCEDURES

Impact Area	Significance Before Practices & Procedures	EBMUD Practices and Procedures[1]	Significance After Practices & Procedures
Aesthetics (cont.)			
Impact AES-3 (cont.)		*Section 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. *Section 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. *Section 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:	

TABLE ES-2 (CONTINUED)
SUMMARY OF IMPACTS AND EBMUD PRACTICES AND PROCEDURES

Impact Area	Significance Before Practices & Procedures	EBMUD Practices and Procedures[1]	Significance After Practices & Procedures
Aesthetics (cont.)			
Impact AES-3 (cont.)		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 luminaires 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.	
Air Quality			
Impact AIR-1: Conflict with or obstruct implementation of the applicable air quality plan.	PS	**EBMUD's Standard Construction Specification 01 35 44, Environmental Requirements** *Section 1.3.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.	LTS

TABLE ES-2 (CONTINUED)
SUMMARY OF IMPACTS AND EBMUD PRACTICES AND PROCEDURES

Impact Area	Significance Before Practices & Procedures	EBMUD Practices and Procedures[1]	Significance After Practices & Procedures
Air Quality (cont.)			
Impact AIR-1 (cont.)		*Section 3.3. Dust Control and Monitoring* B. Dust Control 1. Contractor shall implement all necessary dust control measures, including but not limited to the following: a. All exposed surfaces with the potential of dust-generating shall be watered at least twice daily, or be covered with coarse rock, or as directed by the Engineer to reduce the potential for airborne dust from leaving the site. b. The simultaneous occurrence of more than two ground disturbing construction phases 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, as appropriate. c. Cover all haul trucks entering/leaving the site and trim their loads as necessary. d. 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. e. The use of dry power sweeping is prohibited. f. All trucks and equipment, including their tires, shall be washed off prior to leaving the site. g. Gravel or apply non-toxic soil stabilizers on all unpaved access roads, parking areas and staging areas at construction sites. h. Water and/or cover soil stockpiles daily. i. Site accesses to a distance of 100 feet from the paved road shall be treated with 12-inches layer of compacted coarse rock. j. 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. k. All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible. l. Building pads shall be laid as soon as possible after grading. m. 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. n. 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. o. All vehicle speeds shall be limited to fifteen (15) mph or less on the construction site and any adjacent unpaved roads.	

TABLE ES-2 (CONTINUED)
SUMMARY OF IMPACTS AND EBMUD PRACTICES AND PROCEDURES

Impact Area	Significance Before Practices & Procedures	EBMUD Practices and Procedures[1]	Significance After Practices & Procedures
Air Quality (cont.)			
Impact AIR-1 (cont.)		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. *Section 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.	

TABLE ES-2 (CONTINUED)
SUMMARY OF IMPACTS AND EBMUD PRACTICES AND PROCEDURES

Impact Area	Significance Before Practices & Procedures	EBMUD Practices and Procedures[1]	Significance After Practices & Procedures
Air Quality (cont.)			
Impact AIR-1 (cont.)		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. **EBMUD's Standard Construction Specification 02 82 13, Asbestos Control Activities** *Section 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 specification 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. The Central Reservoir is known to contain asbestos materials. Notify the BAAQMD at (415) 749-4762 regarding the demolition of the Central Reservoir at least ten (10) work days prior to beginning demolition activities. *Section 1.5, Submittals (Pre-Job)* B. Plan of Action 1. Asbestos Abatement: a. Submit a detailed plan of the procedures proposed for use in complying with the regulations included in this specification. The plan shall include the location and layout of decontamination areas, the sequencing of asbestos	

TABLE ES-2 (CONTINUED)
SUMMARY OF IMPACTS AND EBMUD PRACTICES AND PROCEDURES

Impact Area	Significance Before Practices & Procedures	EBMUD Practices and Procedures[1]	Significance After Practices & Procedures
Air Quality (cont.)			
Impact AIR-1 (cont.)		work, the interface of trades involved in the performance of work, disposal plan including location of approved disposal site, and a detailed description of the methods to be employed to control pollution. Expand upon the use of portable HEPA ventilation system, method of removal to prohibit visible emissions in work area, and packaging of removed asbestos debris. Include asbestos abatement in the Construction and Demolition Waste Disposal Plan, in accordance with Section 01 35 44.	
Impact AIR-2: Expose sensitive receptors to substantial pollutant concentrations.	PS	**EBMUD's Standard Construction Specification 01 35 44, Environmental Requirements** *Section 3.4(A) Air Quality and Emissions Control* (Details as listed under Impact AIR-1)	LTS
Biological Resources			
Impact BIO-1: 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 CDFW or USFWS.	PS	**EBMUD's Standard Construction Specification 01 35 44, Environmental Requirements** *Section 1.1(B), Site Activities* (Details as listed under Impact AES-3) *Section 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.	PS

TABLE ES-2 (CONTINUED)
SUMMARY OF IMPACTS AND EBMUD PRACTICES AND PROCEDURES

Impact Area	Significance Before Practices & Procedures	EBMUD Practices and Procedures[1]	Significance After Practices & Procedures
Biological Resources (cont.)			
Impact BIO-1 (cont.)		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. B. Water Control and Disposal Plan a. The Contractor shall submit a detailed Water Control and Disposal Plan for the Engineer's acceptance prior to any work at the jobsite. b. 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. c. 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.	

TABLE ES-2 (CONTINUED)
SUMMARY OF IMPACTS AND EBMUD PRACTICES AND PROCEDURES

Impact Area	Significance Before Practices & Procedures	EBMUD Practices and Procedures[1]	Significance After Practices & Procedures
Biological Resources (cont.)			
Impact BIO-1 (cont.)		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. *Section 3.6, Noise Control* (Details as listed under Impact NOI-1)	

TABLE ES-2 (CONTINUED)
SUMMARY OF IMPACTS AND EBMUD PRACTICES AND PROCEDURES

Impact Area	Significance Before Practices & Procedures	EBMUD Practices and Procedures[1]	Significance After Practices & Procedures
Biological Resources (cont.)			
Impact BIO-1 (cont.)		*Section 3.8, Protection of Birds Protected under the Migratory 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 a. If protected species or suitable habitat for protected species is found during biological reconnaissance surveys: b. 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 environmental training; 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. c. 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.	

TABLE ES-2 (CONTINUED)
SUMMARY OF IMPACTS AND EBMUD PRACTICES AND PROCEDURES

Impact Area	Significance Before Practices & Procedures	EBMUD Practices and Procedures[1]	Significance After Practices & Procedures
Biological Resources (cont.)			
Impact BIO-1 (cont.)		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. d. 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 CDFW to 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.	
Impact BIO-2: Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the CDFW or USFWS.	PS	**EBMUD's Standard Construction Specification 01 35 44, Environmental Requirements** *Section 1.1(B), Site Activities* (Details as listed under Impact AES-3) *Section 1.3(A), Storm Water Management* (Details as listed under Impact BIO-1) *Section 1.3(B), Water Control and Disposal Plan* (Details as listed under Impact BIO-1)	LTS
Impact BIO-3: Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means.	PS	**EBMUD's Standard Construction Specification 01 35 44, Environmental Requirements** *Section 1.1(B), Site Activities* (Details as listed under Impact AES-3) *Section 1.3(A), Storm Water Management* (Details as listed under Impact BIO-1) *Section 1.3(B), Water Control and Disposal Plan* (Details as listed under Impact BIO-1)	LTS

Table ES-2 (continued)
Summary of Impacts and EBMUD Practices and Procedures

Impact Area	Significance Before Practices & Procedures	EBMUD Practices and Procedures[1]	Significance After Practices & Procedures
Biological Resources (cont.)			
Impact BIO-5: Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.	PS	**EBMUD's Standard Construction Specification 01 35 44, Environmental Requirements** *Section 1.1(B), Site Activities* (Details as listed under Impact AES-3) *Section 1.3(A), Storm Water Management* (Details as listed under Impact BIO-1) *Section 1.3(B), Water Control and Disposal Plan* (Details as listed under Impact BIO-1) *Section 3.7, Protection of Native and Non-Native Protected Trees* (Details as listed under Impact AES-3) *Section 3.8, Protection of Birds Protected Under the Migratory Bird Treaty Act and Roosting Bats* (Details as listed under Impact BIO-1)	LTS
Cultural Resources			
Impact CUL-2: Cause a substantial adverse change in the significance of an archaeological resource, pursuant to *CEQA Guidelines* Section 15064.5.	LTS	**EBMUD's Standard Construction Specification 01 35 44, Environmental Requirements** *Section 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:	LTS

TABLE ES-2 (CONTINUED)
SUMMARY OF IMPACTS AND EBMUD PRACTICES AND PROCEDURES

Impact Area	Significance Before Practices & Procedures	EBMUD Practices and Procedures[1]	Significance After Practices & Procedures
Cultural Resources			
Impact CUL-2 (cont.)		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	

TABLE ES-2 (CONTINUED)
SUMMARY OF IMPACTS AND EBMUD PRACTICES AND PROCEDURES

Impact Area	Significance Before Practices & Procedures	EBMUD Practices and Procedures[1]	Significance After Practices & Procedures
Cultural Resources			
Impact CUL-2 (cont.)		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.	
Impact CUL-3: Disturb any human remains, including those interred outside of dedicated cemeteries.	LTS	**EBMUD's Standard Construction Specification 01 35 44, Environmental Requirements** *Section 3.9, Protection of Cultural and Paleontological Resources* (Details as listed under Impact CUL-2)	LTS
Impact CUL-4: Cause a substantial adverse change in the significance of a tribal cultural resource as defined in PRC Section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe.	LTS	**EBMUD's Standard Construction Specification 01 35 44, Environmental Requirements** *Section 3.9, Protection of Cultural and Paleontological Resources* (Details as listed under Impact CUL-2)	LTS
Energy			
Impact EN-1: Result in wasteful, inefficient, or unnecessary consumption of energy resources during Project construction or operation.	PS	**EBMUD's Standard Construction Specification 01 35 44, Environmental Requirements** *Section 3.4(A), Air Quality and Emissions Control* (Details as listed under Impact AIR-1)	LTS

TABLE ES-2 (CONTINUED)
SUMMARY OF IMPACTS AND EBMUD PRACTICES AND PROCEDURES

Impact Area	Significance Before Practices & Procedures	EBMUD Practices and Procedures[1]	Significance After Practices & Procedures
Geology, Soils, and Seismicity			
Impact GEO-1: Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving: strong seismic groundshaking; seismic-related ground failure (liquefaction, lateral spreading); or landslides.	PS	**EBMUD's Engineering Standard Practice 550.1, Seismic Design Requirements and 512.1, Water Main and Services Design Criteria** EBMUD uses two primary Engineering Standard Practices for the design of water pipelines in its distribution system to address geologic hazards. Engineering Standard Practice 512.1, Water Main and Services Design Criteria, establishes basic criteria for the design of water pipelines and establishes minimum requirements for pipeline construction materials. Engineering Standard Practice 550.1, Seismic Design Requirements, addresses seismic design of the pipelines to withstand seismic hazards, including fault rupture, ground shaking, liquefaction-related phenomena, landslides, seiches and tsunamis and requires that EBMUD establish project-specific seismic design criteria for pipelines with a diameter of greater than 12 inches.	LTS
Impact GEO-2: Result in substantial soil erosion or the loss of topsoil.	PS	**EBMUD's Standard Construction Specification 01 35 44, Environmental Requirements** *Section 1.1(B), Site Activities* (Details as listed under Impact AES-3) *Section 1.3(A) Storm Water Management* (Details as listed under Impact BIO-1)	LTS
Impact GEO-3: Be located on strata or soil that is unstable or that would become unstable as a result of the Project, and potentially could result in on-site or off-site landslides, lateral spreading, subsidence (i.e., settlement), liquefaction, or collapse.	PS	**EBMUD's Standard Construction Specification 01 35 24, Project Safety Requirements** *Section 1.3(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.	LTS
Impact GEO-4: Be located on expansive soil creating substantial direct or indirect risks to life or property.	PS	**EBMUD's Engineering Standard Practice 550.1, Seismic Design Requirements and 512.1, Water Main and Services Design Criteria** (Details as listed under Impact GEO-1)	LTS
Impact GEO-5: Directly or indirectly destroy a unique paleontological resources or site or unique geologic feature.	PS	**EBMUD's Standard Construction Specification 01 35 44, Environmental Requirements** *Section 3.9, Protection of Cultural and Paleontological Resources* (Details as listed under Impact CUL-2)	LTS

TABLE ES-2 (CONTINUED)
SUMMARY OF IMPACTS AND EBMUD PRACTICES AND PROCEDURES

Impact Area	Significance Before Practices & Procedures	EBMUD Practices and Procedures[1]	Significance After Practices & Procedures
Greenhouse Gas Emissions			
Impact GHG-1: Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment.	PS	**EBMUD's Standard Construction Specification 01 35 44, Environmental Requirements** *Section 3.4(A), Air Quality and Emissions Control* (Details as listed under Impact AIR-1)	LTS
Impact GHG-2: Conflict with a plan, policy, or regulation adopted for the purpose of reducing GHG emissions.	PS	**EBMUD's Standard Construction Specification 01 35 44, Environmental Requirements** *Section 3.4(A), Air Quality and Emissions Control* (Details as listed under Impact AIR-1)	LTS
Hazards and Hazardous Materials			
Impact HAZ-1 and **HAZ-2:** 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 likely release of hazardous materials into the environment.	PS	**EBMUD's Standard Construction Specification 01 35 24, Project Safety Requirements** *Section 1.3, Submittal of Plans and Procedures* 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). **EBMUD's Standard Construction Specification 01 35 44, Environmental Requirements** *Section 1.1(B) Site Activities* (Details as listed under Impact AES-3) *Section 1.3(A), Storm Water Management* (Details as listed under Impact BIO-1) *Section 1.3(B), Water Control and Disposal Plan* (Details as listed under Impact BIO-1)	LTS

Table ES-2 (continued)
Summary of Impacts and EBMUD Practices and Procedures

Impact Area	Significance Before Practices & Procedures	EBMUD Practices and Procedures[1]	Significance After Practices & Procedures
Hazards and Hazardous Materials (cont.)			
Impact HAZ-1 and **HAZ-2** (cont.)		*Section 1.3(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. 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. 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.	

TABLE ES-2 (CONTINUED)
SUMMARY OF IMPACTS AND EBMUD PRACTICES AND PROCEDURES

Impact Area	Significance Before Practices & Procedures	EBMUD Practices and Procedures[1]	Significance After Practices & Procedures
Hazards and Hazardous Materials (cont.)			
Impact HAZ-1 and **HAZ-2** (cont.)		*Section 1.3(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 Safety Data Sheet (SDS) for each hazardous substance proposed to be used prior to delivery of the material to the jobsite. **EBMUD's Standard Construction Specification 02 82 13, Asbestos Control Activities** *Section 1.1, Compliance and Intent* (Details as listed under Impact AIR-1) *Section 1.5(B), Plan of Action* (Details as listed under Impact AIR-1) **EBMUD's Standard Construction Specification 02 83 13, Lead Hazard Control Activities** *Section 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.	

TABLE ES-2 (CONTINUED)
SUMMARY OF IMPACTS AND EBMUD PRACTICES AND PROCEDURES

Impact Area	Significance Before Practices & Procedures	EBMUD Practices and Procedures[1]	Significance After Practices & Procedures
Hazards and Hazardous Materials (cont.)			
Impact HAZ-1 and **HAZ-2** (cont.)		*Section 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.	
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.	PS	**EBMUD's Standard Construction Specification 01 35 24, Project Safety Requirements** *Section 1.3(B), Project Safety and Health Plan* (Details as listed under Impact HAZ-1 and HAZ-2) **EBMUD's Standard Construction Specification 01 35 44, Environmental Requirements** *Section 1.3(C) Construction and Demolition Waste Disposal Plan* (Details as listed under Impact HAZ-1 and HAZ-2) *Section 1.3(D), Spill Prevention and Response Plan* (Details as listed under Impact HAZ-1 and HAZ-2)	LTS
Impact HAZ-4: Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.	PS	**EBMUD's Standard Construction Specification 01 35 24, Project Safety Requirements** *Section 1.3(B), Project Safety and Health Plan* (Details as listed under Impact HAZ-1 and HAZ-2) **EBMUD's Standard Construction Specification 01 55 26, Traffic Regulation** *Section 1.2, Submittals* (Details listed under Impact TRA-1)	LTS
Hydrology and Water Quality			
Impact HYD-1: Violate water quality standards or waste discharge requirements, or otherwise substantially degrade water quality.	PS	**EBMUD's Standard Construction Specification 01 35 44, Environmental Requirements** *Section 1.1(B), Site Activities* (Details as listed under Impact AES-3) *Section 1.3(A), Storm Water Management* (Details as listed under Impact BIO-1) *Section 1.3(B), Water Control and Disposal Plan* (Details as listed under Impact BIO-1)	LTS

TABLE ES-2 (CONTINUED)
SUMMARY OF IMPACTS AND EBMUD PRACTICES AND PROCEDURES

Impact Area	Significance Before Practices & Procedures	EBMUD Practices and Procedures[1]	Significance After Practices & Procedures
Hydrology and Water Quality (cont.)			
Impact HYD-3a: Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner that would result in substantial erosion or siltation on or off site.	PS	**EBMUD's Standard Construction Specification 01 35 44, Environmental Requirements** *Section 1.3(A), Storm Water Management (*Details as listed under Impact BIO-1) *Section 1.3(B), Water Control and Disposal Plan* (Details as listed under Impact BIO-1)	LTS
Impact HYD-3b: Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or through the addition of impervious surfaces, in a manner that would substantially increase the rate or amount of surface run-off and result in flooding on or off site.	PS	**EBMUD's Standard Construction Specification 01 35 44, Environmental Requirements** *Section 1.1(B), Site Activities* (Details as listed under Impact AES-3)	LTS
Impact HYD-3c: Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or through the addition of impervious surfaces, in a manner that would create or contribute run-off water that exceeds the capacity of existing or planned stormwater drainage systems, or provide substantial additional sources of polluted run-off.	PS	**EBMUD's Standard Construction Specification 01 35 44, Environmental Requirements** *Section 1.1(B), Site Activities* (Details as listed under Impact AES-3) *Section 1.3(A), Storm Water Management* (Details as listed under Impact BIO-1) *Section 1.3(B), Water Control and Disposal Plan* (Details as listed under Impact BIO-1) *Section 1.3(D), Spill Prevention and Response Plan* (Details as listed under Impact HAZ-1 and HAZ-2)	LTS

TABLE ES-2 (CONTINUED)
SUMMARY OF IMPACTS AND EBMUD PRACTICES AND PROCEDURES

Impact Area	Significance Before Practices & Procedures	EBMUD Practices and Procedures[1]	Significance After Practices & Procedures
Hydrology and Water Quality (cont.)			
Impact HYD-3d: Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or through the addition of impervious surfaces, in a manner that would impede or redirect flood flows.	PS	**EBMUD's Standard Construction Specification 01 35 44, Environmental Requirements** *Section 1.3(A), Storm Water Management* (Details as listed under Impact BIO-1) *Section 1.3(B), Water Control and Disposal Plan* (Details as listed under Impact BIO-1) *Section 1.3(D), Spill Prevention and Response Plan* (Details as listed under Impact HAZ-1 and HAZ-2)	LTS
Impact HYD-4: Conflict with or obstruct implementation of a Water Quality Control Plan or Sustainable Groundwater Management Plan.	PS	**EBMUD's Standard Construction Specification 01 35 44, Environmental Requirements** *Section 1.3(A), Storm Water Management* (Details as listed under Impact BIO-1)	LTS
Noise			
Impact NOI-1: Result in the generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the Project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.	S	**EBMUD's Standard Construction Specification 01 14 00, Work Restrictions** *Section 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 8:00 a.m. and 4:00 p.m., Monday through Friday. **EBMUD's Standard Construction Specification 01 35 44, Environmental Requirements** *Section 1.3(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. *Section 3.3(B), Dust Control and Monitoring* (Details as listed under Impact AIR-1) *Section 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.	S

TABLE ES-2 (CONTINUED)
SUMMARY OF IMPACTS AND EBMUD PRACTICES AND PROCEDURES

Impact Area	Significance Before Practices & Procedures	EBMUD Practices and Procedures[1]	Significance After Practices & Procedures
Noise (cont.)			
Impact NOI-1 (cont.)		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. Limit the noisiest phases of construction to 10 work days at a time, where feasible. 4. 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. 5. 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.	
Impact NOI-2: Result in the generation of excessive groundborne vibration or groundborne noise levels.	PS	**EBMUD's Standard Construction Specification 01 35 44, Environmental Requirements** *Section 1.3(H), Vibration Control and Monitoring Plan* 1. Submit a plan detailing the means and methods for controlling and monitoring surface vibration generated by demolition or other work on 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.	LTS

TABLE ES-2 (CONTINUED)
SUMMARY OF IMPACTS AND EBMUD PRACTICES AND PROCEDURES

Impact Area	Significance Before Practices & Procedures	EBMUD Practices and Procedures[1]	Significance After Practices & Procedures
Noise (cont.)			
Impact NOI-2 (cont.)		*Section 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.	
Transportation and Circulation			
Impact TRA-1: Conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities.	PS	**EBMUD's Standard Construction Specification 01 55 26, Traffic Regulation** *Section 1.1, Description* A. 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. *Section 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. *Section 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.	PS

TABLE ES-2 (CONTINUED)
SUMMARY OF IMPACTS AND EBMUD PRACTICES AND PROCEDURES

Impact Area	Significance Before Practices & Procedures	EBMUD Practices and Procedures[1]	Significance After Practices & Procedures
Transportation and Circulation (cont.)			
Impact TRA-1 (cont.)		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. *Section 3.1, General* A. 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. *Section 3.2, Alternating On-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. *Section 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.	
Impact TRA-3: Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).	PS	**EBMUD’s Standard Construction Specification 01 55 26, Traffic Regulation** (Details as listed under Impact TRA-1)	PS
Impact TRA-4: Result in inadequate emergency access.	PS	**EBMUD’s Standard Construction Specification 01 55 26, Traffic Regulation** (Details as listed under Impact TRA-1)	LTS

Notes: LTS = Less than significant; PS = Potentially Significant; S = Significant

[1] In EBMUD Standard Specifications, “District” = EBMUD; “Engineer” = EBMUD Engineer; “Contractor” = EBMUD Contractor; “Work” = Scope of Work for the Project

TABLE ES-3
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Impact Area	Significance Before Mitigation	Mitigation Measure	Significance After Mitigation
Aesthetics			
Impact AES-4: Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area.	PS	**Mitigation Measure AES-1: Nighttime Lighting Controls.** To the extent possible, EBMUD shall 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.	LTS
Biological Resources			
Impact BIO-1: 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 CDFW or USFWS.	PS	**Mitigation Measure AES-1: Nighttime Lighting Controls.** (Details as listed under Impact AES-4)	LTS
Noise			
Impact NOI-1: Result in the generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the Project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.	S	**Mitigation Measure NOI-1: Noise Control Measures** EBMUD shall erect a 16-foot tall temporary noise barrier along EBMUD's property adjacent to the Redwood Day School for the entire construction duration. The noise barrier will be Sound Transmission Class (STC) rated and specific to sound attenuation applications. There may be some periods of construction when the noise barrier may be temporarily moved or dismantled to accommodate the Project construction area. EBMUD will schedule construction activities outside of normal school hours when it is feasible to do so if heavy construction equipment, including but not limited to impact equipment, is operated within 100 feet of the closest classroom or if the noise barrier needs to be temporarily removed to accommodate construction. **Mitigation Measure NOI-2: Off-site Accommodations for Affected Nighttime Receptors** At least ten (10) days in advance, EBMUD will notify residents of the Southern Residences that could be affected by nighttime (10:00 p.m. to 7:00 a.m.) pipeline connection construction near the 25th Avenue/East 29th Street intersection. Residences within 500-feet of the pipeline connection 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 5 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.). This measure would only be implemented if nighttime construction occurs.	SU

TABLE ES-3 (CONTINUED)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Impact Area	Significance Before Mitigation	Mitigation Measure	Significance After Mitigation
Transportation and Circulation			
Impact TRA-1: Conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities.	PS	**Mitigation Measure TRA-1: Conduct an operational and safety analysis by a traffic engineer for the Ardley Avenue/new Redwood Day School Driveway intersection for the Redwood Day School Access Driveway Design Option**. To minimize potential conflicts between the existing traffic on Ardley Avenue and the diverted traffic exiting onto Ardley Avenue from the new Redwood Day School Access Driveway Design Option, EBMUD shall as part of any agreement with Redwood Day School require that the school conduct an operational and safety analysis by a traffic engineer for the Ardley Avenue/new Redwood Day School access driveway intersection. The performance standard for the analysis is to minimize potential vehicular, pedestrian, and bicycle conflicts, based on the professional opinion of the traffic engineer and in accordance with City of Oakland Public Works Department standards. At a minimum, the analysis would evaluate the following: • Traffic operational analysis consistent with City of Oakland Public Works Department standards to determine what type of stop-control (e.g., stop sign, traffic signal, etc.) is appropriate. • An evaluation of sight distances for vehicles turning out of the Redwood Day School access driveway to ensure that any turns out of the driveway can be made safely. • An evaluation of pedestrian and bicycle volumes along Ardley Avenue to determine whether signage and/or flashing beacons are warranted to alert driveway users to the presence of pedestrians and bicyclists on Ardley Avenue. • An evaluation of whether signage is warranted along both travel directions of Ardley Avenue in advance of the driveway to alert roadway users of "Driveway Ahead." • An evaluation of vehicular travel speeds on Ardley Avenue to determine whether traffic calming features such as school signage and/or speed bumps are warranted to slow traffic in the vicinity of the driveway. If the operational and safety analysis concludes that turns out of the driveway can be safely accommodated, and this finding is endorsed by City of Oakland Public Works Department staff, then EBMUD could allow vehicular movements from the driveway onto Ardley Avenue.	LTS
Impact TRA-3: Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).	PS	**Mitigation Measure TRA-2: As part of the Traffic Control Plan, include traffic control measures for trucks traveling along East 27th Street.** The following measures shall be implemented during the entire duration of the Project construction, to reduce the Project's temporary impacts on traffic circulation: • Hauling and material delivery trucks and equipment delivery trucks traveling to and from the Project site during construction shall be restricted in both travel directions along East 27th Street between Fruitvale Avenue and 23rd Avenue during the typical Manzanita Community School (2409 East 27th Street) drop-off and pick-up hours. Manzanita Community School is open between 8:30 a.m. and 3:00 p.m., and the peak drop-off and pick-up hours are from 7:30 a.m. to 8:30 a.m. and from 3:00 p.m. to 4:00 p.m., respectively. The construction contractor shall confirm the start and dismissal times prior to the beginning of each school year. • If it is not feasible to avoid hauling and material delivery trucks and equipment delivery trucks during school drop-off and pick-up hours, the construction contractor shall provide flaggers at the crosswalks of the East 27th Street/25th Avenue intersections to manage traffic flow and maintain traffic safety. If construction trucks travel along East 27th Street, between 25th Avenue and 23rd Avenue, the construction contractor shall also provide flaggers near the existing white passenger loading zone on East 27th Street between the gate of Manzanita Community School and 25th Avenue.	LTS

NOTES: LTS = Less than significant; PS = Potentially Significant; S = Significant; SU = Significant and Unavoidable

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CHAPTER 1
Introduction

1.1 Overview, Purpose, and Authority

The California Environmental Quality Act (CEQA) requires that all state and local government agencies consider the environmental consequences over which they have discretionary authority before taking an action that has the potential to affect the environment. This Environmental Impact Report (EIR) assesses the potential impacts associated with the Central Reservoir Replacement Project (Project) proposed by the East Bay Municipal Utility District (EBMUD). This document was prepared in conformance with CEQA (California Public Resources Code, Section 21000 et seq.), *CEQA Guidelines* (CCR Title 14 Section 15000 et seq.), and EBMUD policies and procedures. This EIR is intended to serve as an informational document for agency decision-makers and the public regarding the Project.

1.1.1 Overview

The existing 154-million gallon (MG), open-cut Central Reservoir was constructed in 1910 and is EBMUD's oldest and largest distribution reservoir in operation. The reservoir provides emergency and operational water storage to EBMUD customers from Oakland and Emeryville to the north and the Oakland/San Leandro border to the south, including most of the city of Alameda. Central Reservoir has reached the end of its useful life and its replacement is necessary due to aging infrastructure and water quality issues.

The Project includes removal of vegetation and demolition of the existing reservoir, roof, lining, and material storage building, followed by removal of a portion of the reservoir's main embankment, construction of a reinforced tank foundation system, three 17-MG concrete tanks, a new rate control station, a valve structure, service road and site paving, a bioretention area, and security fencing all within the existing reservoir property. The Project site design, with community input, incorporates existing landscaping, a mix of earthen berms, trees, and shrubs to screen the tanks and emphasize the natural setting at the perimeter of the site while balancing earthwork. The Project may also include an access driveway to connect the Redwood Day School parking area to Ardley Avenue.

1.1.2 Purpose and Authority

This EIR provides an analysis of the potential environmental effects of the Project. The environmental impacts of the Project are analyzed to the appropriate degree of specificity, in accordance with Section 15146 of the *CEQA Guidelines*. This document addresses the potentially significant adverse environmental impacts that may be associated with construction and operation of the Project and identifies appropriate and feasible mitigation measures and alternatives that may be adopted to reduce or avoid significant impacts.

1.2 Lead Agency Determination

EBMUD is designated as the lead agency for the purposes of this EIR. *CEQA Guidelines* Section 15367 defines the lead agency as "…the public agency, which has the principal responsibility for carrying out or approving a project." Other public agencies may use this EIR in the decision-making or permitting process and consider the information in this EIR along with other information that may be presented during the CEQA process.

1.3 Notice of Preparation

In accordance with Sections 15082(a), 15103, and 15375 of the *CEQA Guidelines*, EBMUD prepared and circulated a Notice of Preparation (NOP) of an EIR for the Project for a 30-day comment period between April 26, 2018 and May 29, 2018. A postcard mailer was sent to approximately 3,200 residents and property owners notifying them of the NOP. The full NOP was sent to an additional 27 individuals representing agencies and special interest stakeholders.

EBMUD conducted two public outreach and scoping meetings to discuss the Project and to solicit public input. The first public meeting was held on September 28, 2017 and the second meeting was conducted on February 13, 2018. Both meetings were held at Manzanita Community School located at 2409 E 27th Street, Oakland, to receive public comments on the scope and content of the EIR. Appendix A contains a copy of the NOP and Initial Study (IS) for the Project, and Appendix B contains the comment letters submitted by agencies and the public in response to the NOP and during the public outreach meetings. Comment letters were received from two residents and five agencies/organizations.

Residents	Agencies/Organizations
Cynthia Isom Dorsey	Caltrans
Lisa Lemus and Phillip Wong	City of Oakland
	Department of Toxic Substance Control
	Pacific Gas & Electric
	State Water Resources Control Board

1.4 Issues Raised During Public Outreach and Scoping

Issues and concerns raised during the public outreach and scoping meeting conducted by EBMUD include, but are not limited to the following:

- Noise and traffic during construction
- Visual impacts of the new tanks
- Hydraulic features of the existing reservoir
- Seismic safety of the new tanks
- Public access

1.5 Review and Use of the EIR

Upon completion of this EIR, EBMUD filed a Notice of Completion (NOC) with the Governor's Office of Planning and Research to begin the 45-day public review period (Public Resources Code, Section 21161). Concurrent with the NOC, this EIR has been distributed to responsible and trustee agencies, other affected agencies, surrounding cities, and interested parties, as well as all parties requesting a copy of the EIR in accordance with Public Resources Code 21092(b)(3). During the public review period, the EIR and technical appendices are available for review at EBMUD's main office during regular business hours (8:00 a.m. to 4:30 p.m., Monday through Friday), located at the address provided below, at the Oakland Public Library, Dimond Branch at 3565 Fruitvale Avenue, and on EBMUD's website (ebmud.com/about-us/construction-my-neighborhood/central-reservoir-replacement-project/). Agencies, organizations, and interested parties, including those not previously contacted, or who did not respond to the NOP, currently have the opportunity to comment on the EIR during the public review period.

Written comments on this EIR should be addressed to:

Aaron Hope, Project Manager
East Bay Municipal Utility District
375 Eleventh Street, MS 701
Oakland, CA 94607-4240

Phone: (510) 287-1496
Email: centralreservoir@ebmud.com

1.6 Organization of the EIR

The EIR is organized into the following main chapters:

Executive Summary. This chapter includes a summary of the Project evaluated in this EIR. It includes a table that summarizes the impacts, mitigation measures, and level of significance after mitigation measures are incorporated.

Chapter 1: Introduction. This chapter provides an introduction and overview describing the Project, purpose and scope of this EIR, brief explanation of the areas of consideration and issues to be resolved, and a summary of the CEQA review process.

Chapter 2: Project Description. This chapter describes the Project including objectives, location, construction methods, and operations and maintenance activities. A list of responsible agencies and required approvals is included.

Chapter 3: Environmental Analysis. This chapter analyzes the environmental impacts of the Project. Each topic area includes a description of the environmental setting, methodology, significance criteria, impacts, mitigation measures, and significance after mitigation.

Section 3.0: Introduction to Environmental Analysis. This section provides an overview of the environmental analysis and presents the format for each topical section. It describes issues that have been determined to have no or less-than-significant impacts and therefore are not carried forward for further analysis. The approach for the analysis of cumulative impacts is also described.

Section 3.1: Aesthetics. This section evaluates impacts on visual and scenic resources.

Section 3.2: Air Quality. This section addresses local and regional air quality impacts as well as consistency with Bay Area Air Quality Management District rules and regulations.

Section 3.3 Biological Resources. This section addresses impacts on habitat, vegetation, and wildlife; the potential degradation or elimination of important habitat; and impacts on listed, proposed, and candidate threatened and endangered species.

Section 3.4: Cultural Resources. This section addresses impacts on known historical resources and potential archaeological and paleontological resources.

Section 3.5: Energy. This section evaluates energy consumption.

Section 3.6: Geology, Soils, and Seismicity. This section evaluates the potential for local geological hazards to impact facilities.

Section 3.7: Greenhouse Gas Emissions. This section addresses the potential for construction and operation of the Project to generate greenhouse gases.

Section 3.8: Hazards and Hazardous Materials. This section addresses the likelihood of the presence of hazards and hazardous materials or conditions on the Project site that may have the potential to impact human health.

Section 3.9: Hydrology and Water Quality. This section addresses impacts on local hydrological conditions, including drainage areas, and changes in water quality.

Section 3.10: Noise. This section addresses potential construction noise impacts from mobile and stationary sources and also addresses the impact of noise generation on neighboring uses.

Section 3.11: Recreation. This section evaluates Project impacts on existing recreational facilities.

Section 3.12: Transportation and Circulation. This section addresses impacts on the local and regional roadway system, public transportation, bicycle, and pedestrian access.

Chapter 4: Alternatives. This chapter compares the impacts of the Project with other alternatives considered by EBMUD, including the No Project Alternative. The environmentally superior alternative is evaluated.

Chapter 5 Other CEQA Considerations. This chapter describes potential growth-inducing impacts associated with the Project, a summary of significant environmental impacts, including unavoidable and cumulative effects, and the Project's irreversible and irretrievable commitment of resources.

Chapter 6: EIR Preparers. This chapter lists the authors that assisted in the preparation of the EIR, by name and company or agency affiliation.

Appendices. This section includes all notices and other procedural documents pertinent to the EIR, as well as all technical material prepared to support the analysis.

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CHAPTER 2
Project Description

2.1 Overview and Background

The East Bay Municipal Utility District (EBMUD) is replacing Central Reservoir, a 154-million gallon (MG) open-cut reservoir under the jurisdiction of the California Division of Safety of Dams (DSOD), located in the city of Oakland, California. Central Reservoir occupies a 27-acre site that is bounded by 23rd Avenue to the west, Sheffield Avenue to the east, and Interstate 580 (I-580) to the north (Figure 2-1). Constructed in 1910, it is EBMUD's oldest and largest distribution reservoir[1] in operation and provides emergency and operational water storage to approximately 52,000 EBMUD customers, from Oakland and Emeryville to the north and the Oakland/San Leandro border to the south, including most of the city of Alameda.

In 2010, EBMUD prepared the *West of Hills Master Plan* to address water treatment plant, storage, and transmission capacity for the EBMUD West of Hills service area (EBMUD, 2010b) to ensure reliable water supply for current and future customers. The *West of Hills Master Plan* identified the need for new and modified storage, new major transmission pipelines, new or upgraded pumping plants, and an array of modifications to some of the water treatment plants. For the Central Reservoir site, the *West of Hills Master Plan* proposed replacing the existing reservoir with new tanks totaling 50-MG that would be approximately 20-feet higher than the existing reservoir.

The Central Reservoir Replacement Project (Project) includes demolition of the existing reservoir, roof, lining, and material storage building (Figure 2-2), followed by construction of a reinforced tank foundation system, three 17-MG concrete tanks approximately 20 feet higher than the existing reservoir[2], a new rate control station (RCS)[3], a valve structure, service road and site paving, landscaping, a bioretention area, and security fencing all within the existing reservoir property (Figure 2-3 and Figure 2-4). Figure 2-5 shows cross-sections of the proposed site plan along Ardley Avenue, which includes a planted berm above the adjacent sidewalk. Figure 2-6 shows cross-sections of the proposed site plan adjacent to Redwood Day School, and Figure 2-7 shows cross-sections of the proposed site plan at the intersection of 25th Avenue and East 29th Street.

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1 Distribution reservoirs are facilities designed to deliver water to customers. They are part of EBMUD's water transmission system.

2 The three tanks provide a total of 51-MG of storage capacity (roughly equivalent to the 50-MG of storage identified in the West of Hills Master Plan).

3 The Central RCS is a remotely operated valve that is used to fill the Central Reservoir.

Path: U:\GIS\GIS\Projects\16xxxx\D160330_EBMUDCentralRes\03_MXDs_Projects\Fig2-1_ProjectLocation.mxd, rt 7/16/2018

SOURCE: ESRI World Imagery; EBMUD, 2017; ESA, 2017

EBMUD Central Reservoir Replacement Project

Figure 2-1
Project Location

SOURCE: ESRI Imagery, 2018; ESA, 2018

EBMUD Central Reservoir Replacement Project

Figure 2-2
Existing Reservoir Site

ESA

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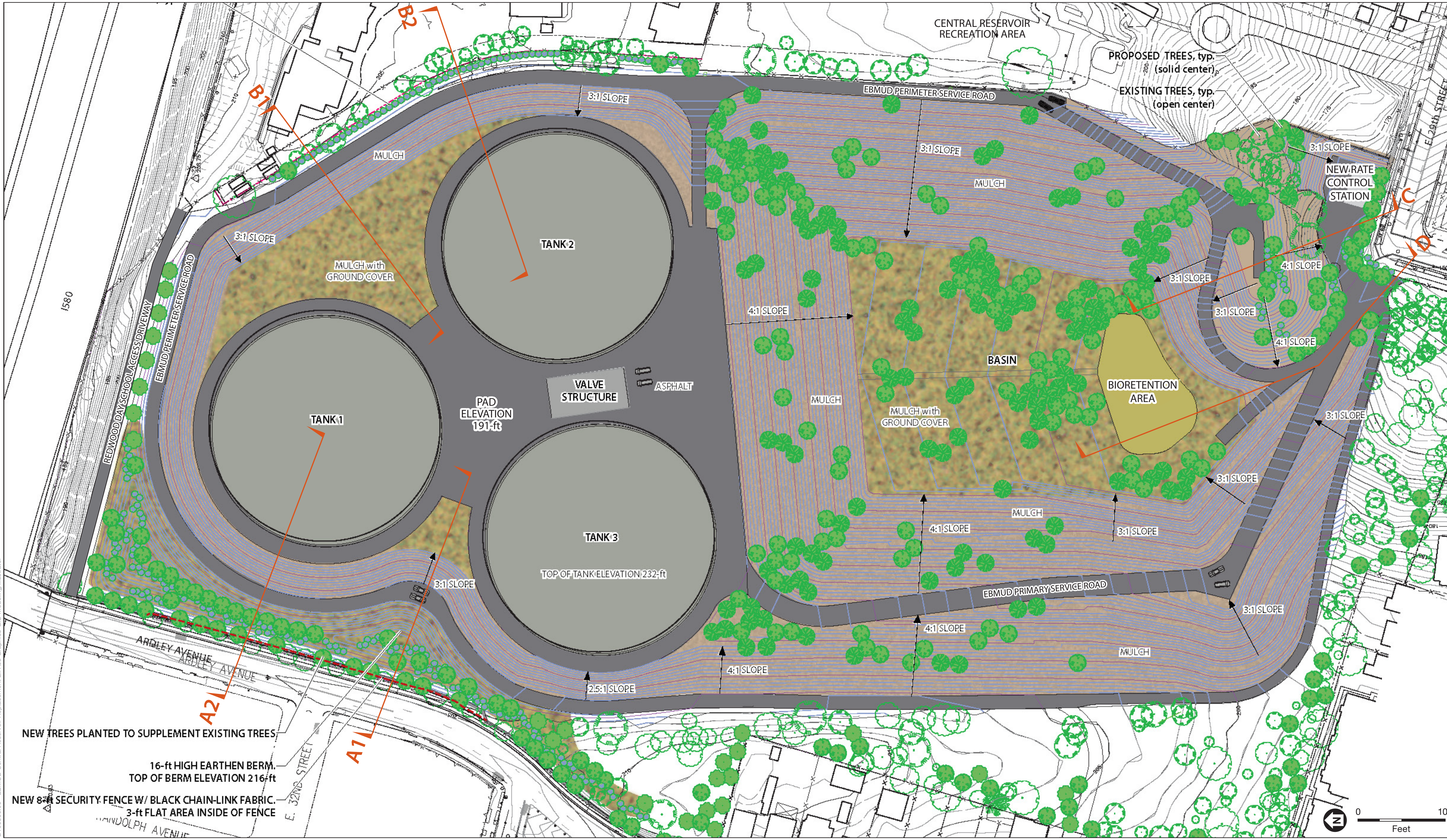

SOURCE: EBMUD, 2018; Dillingham Associates, 2018

Figure 2-3
Proposed Site Plan

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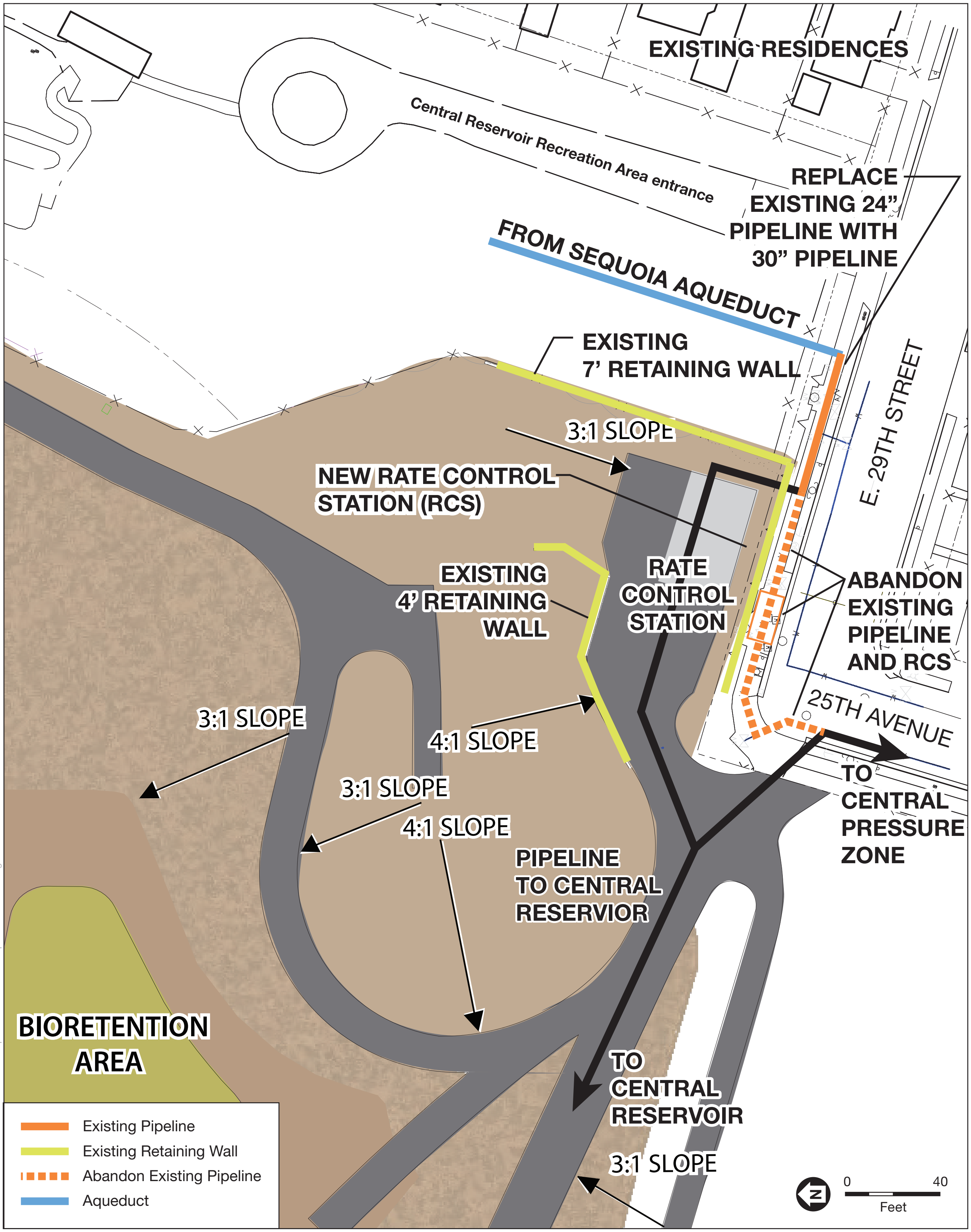
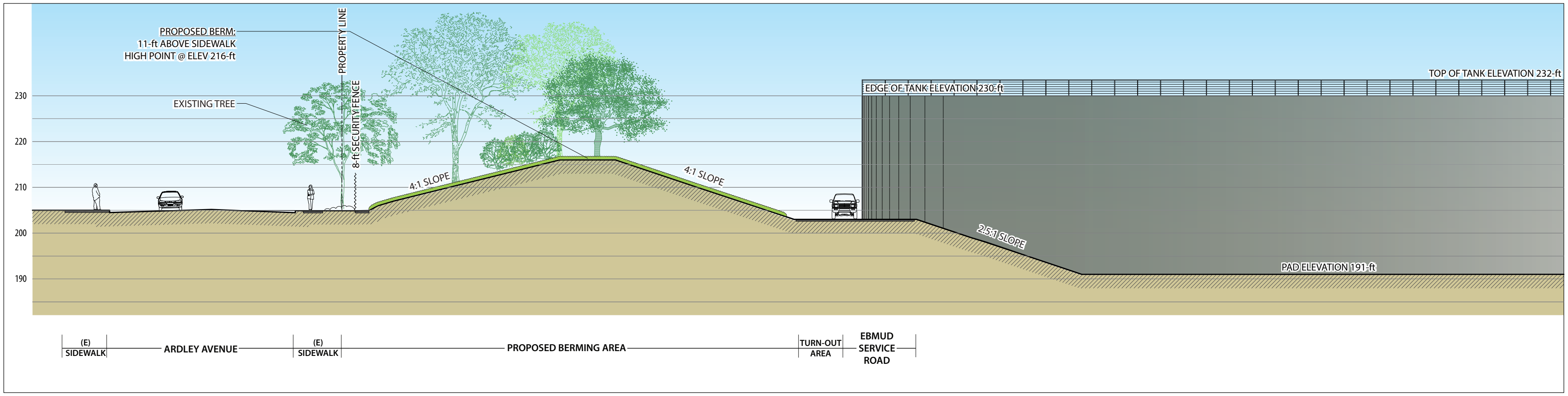


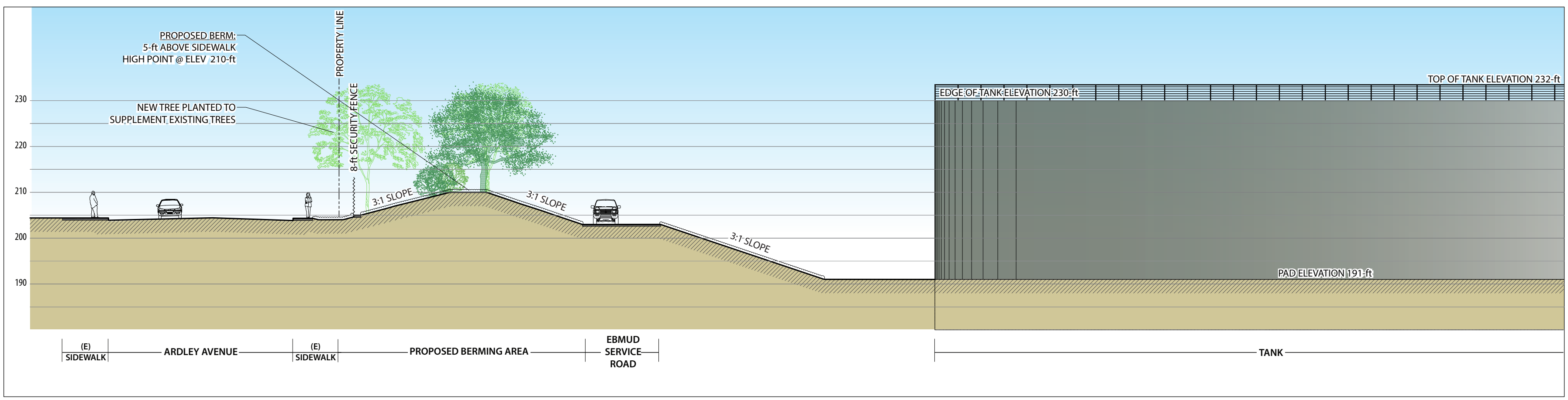
SOURCE: EBMUD, 2018

EBMUD Central Reservoir Replacement Project

Figure 2-4
Proposed Central Rate Control Station Replacement



Section A1 - Ardley Avenue



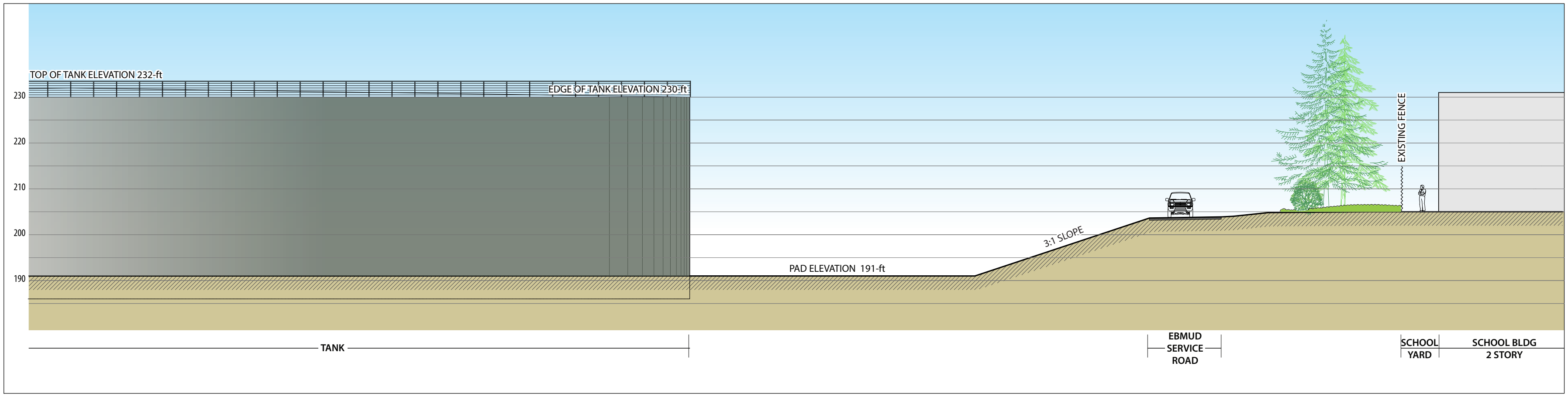
Section A2 - Ardley Avenue

SOURCE: EBMUD, 2018; Dillingham Associates, 2018

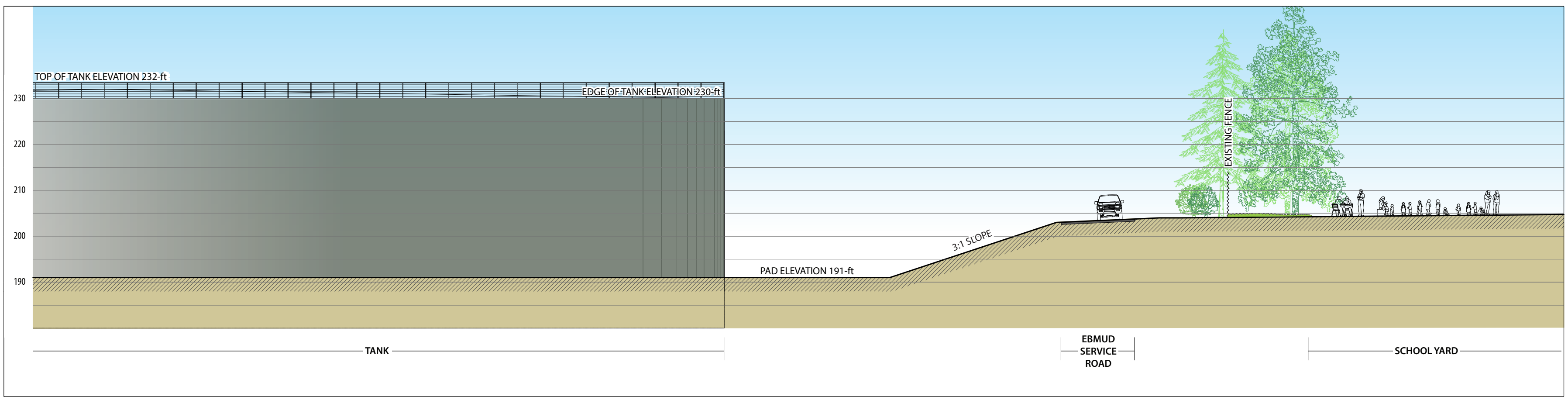
EBMUD Central Reservoir Replacement Project

Figure 2-5
Cross-Sections of Proposed Site Plan at Ardley Avenue

ESA



Section B1 - Redwood Day School



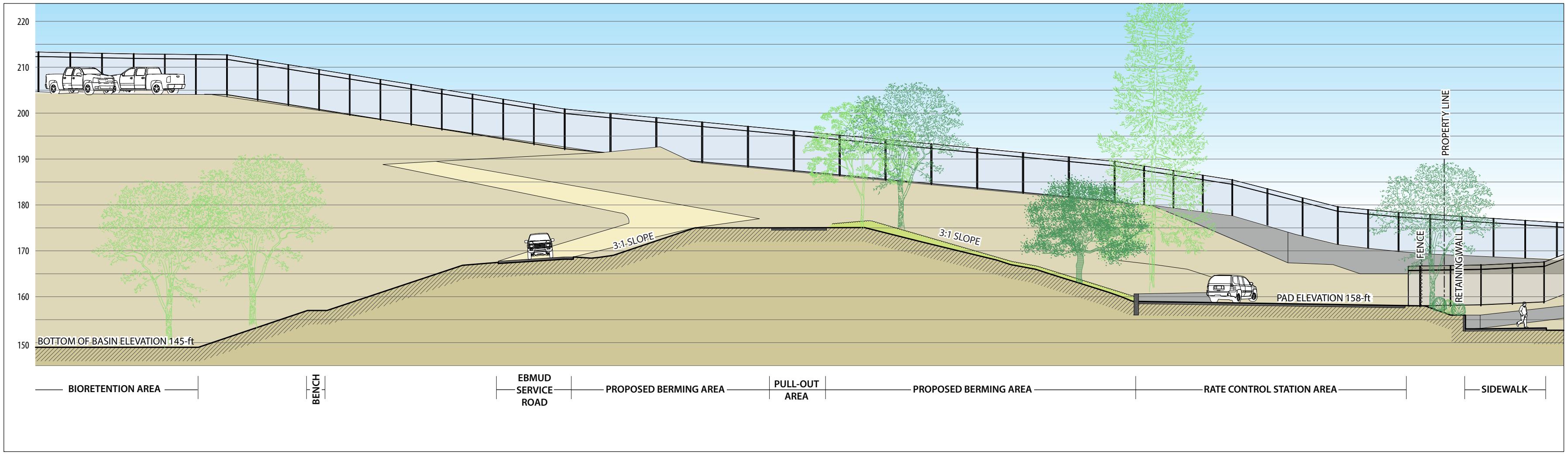
Section B2 - Redwood Day School

SOURCE: EBMUD, 2018; Dillingham Associates, 2018

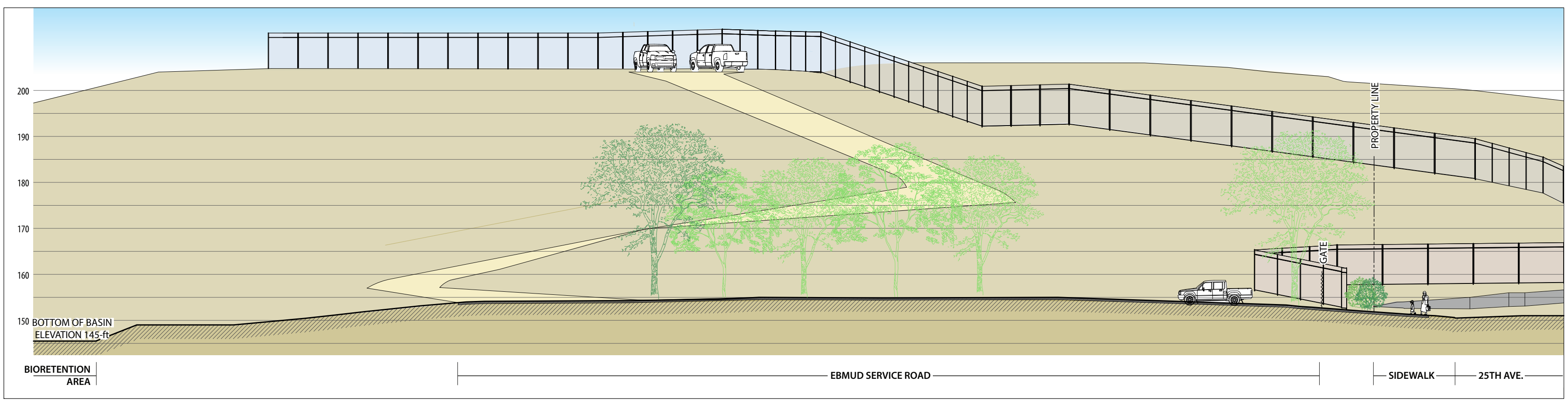
EBMUD Central Reservoir Replacement Project

Figure 2-6
Cross-Sections of Proposed Site Plan Adjacent to Redwood Day School

ESA



Section C - 25th Avenue & East 29th Street



Section D - South Entrance at 25th Avenue & East 29th Street

SOURCE: EBMUD, 2018; Dillingham Associates, 2018

EBMUD Central Reservoir Replacement Project

Figure 2-7
Cross-Sections of Proposed Site Plan at 25th Avenue and East 29th Street

ESA

A portion of the existing embankment would remain on the north side of the East 29th Street and 25th Avenue entrance to the site. The Project would also demolish and relocate the existing Central RCS currently located below ground at the corner of 25th Avenue and East 29th Street, and abandon groundwater monitoring wells located on site and in an EBMUD right-of-way on the east side of the Central Reservoir Recreation Area. The Project may also include an access driveway to connect Redwood Day School parking area to Ardley Avenue.

2.2 Project Background

2.2.1 Service Area

EBMUD's water system serves approximately 1.4-million people in a 332-square-mile area in Alameda and Contra Costa Counties, serving 20 incorporated cities and 15 unincorporated areas. The service area is divided by the Oakland-Berkeley Hills into the West of Hills and East of Hills service areas. The Project is located within the West of Hills service area. Figure 2-8 show the boundaries of EBMUD’s service area.

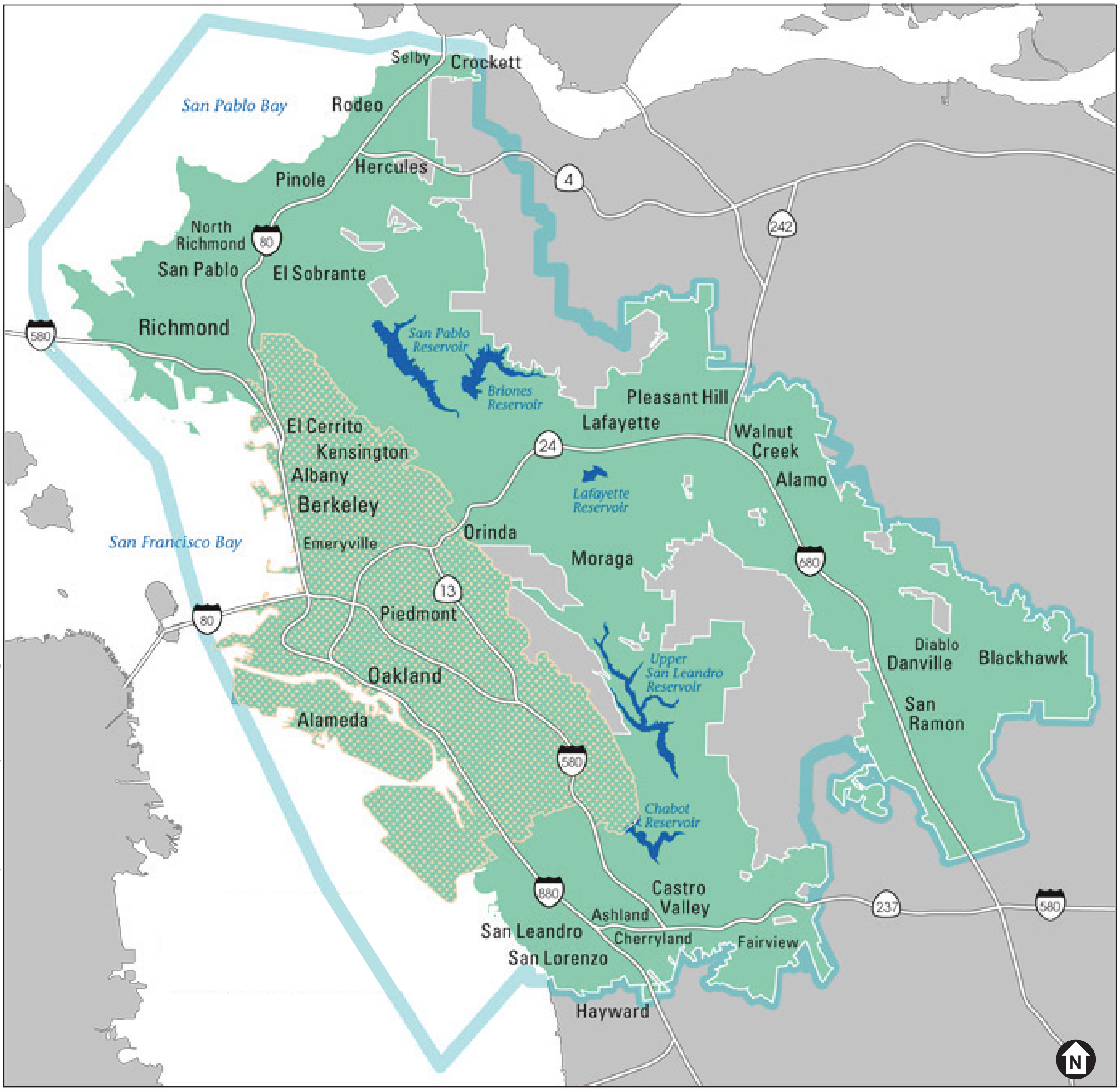
2.2.2 Overview of Existing Water System Operations

Water Supply

EBMUD’s principal water source is the Mokelumne River watershed, a 575-square-mile area of the Sierra Nevada mountains in Alpine, Amador, and Calaveras Counties. Mokelumne River water is stored at the Pardee and Camanche Reservoirs, about 40-miles northeast of the city of Stockton. Untreated water flows by gravity via the Mokelumne Aqueducts from Pardee Reservoir to the San Francisco Bay area. Additional water (less than 10-percent of total supply) comes from local watersheds in Alameda and Contra Costa Counties. During droughts, EBMUD is able to draw water from the Sacramento River via the Freeport Regional Water Project, which connects to the Mokelumne Aqueducts (EBMUD, 2016a).

Water Treatment

EBMUD operates five water treatment plants (WTPs): Walnut Creek, Lafayette, Orinda, Sobrante, and Upper San Leandro. EBMUD also operates a sixth WTP, the San Pablo WTP, a facility used during drought operations and planned outages of key facilities such as the Claremont Tunnel, which is used to transport water from the Orinda WTP to the west side of the Berkley-Oakland Hills. Substantial overlap occurs in the service areas of the Sobrante, Orinda, and Upper San Leandro WTPs, as well as between the service areas of the Lafayette and Orinda WTPs. The overlap notwithstanding, on any given day, production from one WTP could offset some or all of the production from another depending on actual demands and daily operations decisions.



Water Service Area

Ultimate Water Service Boundary

Wastewater Service Area

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SOURCE: EBMUD, 2018

EBMUD Central Reservoir Replacement Project

Figure 2-8
EBMUD Service Area

ESA

Treated Water Transmission and Distribution

The WTPs and transmission pipelines are the backbone of EBMUD's water treatment and transmission system. After passing through the WTPs, water is distributed to customers throughout EBMUD's service area via a network of transmission and distribution pipelines and distribution reservoirs. The water distribution network contains approximately 4,200-miles of distribution pipelines, 140 pumping plants, and 170 distribution reservoirs, the largest of which is Central Reservoir (EBMUD, 2016a).

Pressure Zones

EBMUD's service area is divided into about 120 pressure zones ranging in elevation from sea level to approximately 1,450-feet above sea level. A pressure zone is an area within a specific elevation band where storage and distribution facilities are designed to deliver water at a pressure range suitable for customer use. Coordination among facilities in different pressure zones is important for maintaining system operations. Generally, the pumping plant(s) in one pressure zone pumps water up to reservoir(s) in the next higher pressure zone. Pumping plant(s) in that pressure zone in turn pump water up to higher pressure zones. RCSs are used to provide water by gravity from higher pressure zones and water treatment plants to lower pressure zones.

Central Reservoir Service Area

The Central Pressure Zone, which is EBMUD's largest pressure zone, provides potable water to customers on the west side of the Oakland-Berkeley Hills between 0- and 100-feet in elevation above sea level. To improve system operations, the Central Pressure Zone is isolated into four smaller service areas with different reservoir elevations. The largest, the Central Reservoir service area, is bounded by Emeryville to the north and San Leandro to the south (Figure 2-9). The Central Reservoir service area generally receives water from the Orinda WTP through a tunnel and multiple large-diameter pipelines and RCSs.

2.2.3 Condition of Existing Central Reservoir

Central Reservoir is an aging facility that is a key component in the operation of the West of Hills distribution system and the Central Pressure Zone. Central Reservoir is impounded by two earthen embankments: a main embankment constructed in 1910 and an auxiliary embankment constructed in 1961. The main and auxiliary embankments have undergone seismic evaluations and have been found to be safe (EBMUD, 2018). The most recent seismic evaluation was completed for the main embankment in 2008.

The reservoir was originally lined with 4-inch-thick concrete slabs and was subsequently covered with asphalt (panelcraft) in 1961. The roof system was installed in 1961 and includes concrete columns, timber girders, and a transite roof that was later encapsulated with a corrugated metal roof. Supporting studies conducted by EBMUD have identified the following deficiencies with the reservoir: the reservoir liner leaks and the reservoir roof does not meet current seismic code.

D160330.00 - EBMUD Central Reservoir Replacement EIR\05 Graphics-GIS-Modeling\Illustrator

SOURCE: EBMUD, 2018

EBMUD Central Reservoir Replacement Project

Figure 2-9
System Operations and Pressure Zone Layout

In addition, hazardous materials exist at the reservoir site including: the panel craft lining system contains polychlorinated biphenyls (PCBs), the reservoir roof contains asbestos, the reservoir timber girders may contain pentachlorophenol, and the on-site material storage building may contain lead-based paint (EBMUD, 2018b). Although tests have shown that the presence of these materials in Central Reservoir do not pose a water quality health risk, they need to be properly handled during maintenance and demolition activities.

2.2.4 Operational Issues with the Existing Central Reservoir

Central Reservoir has a bottom and designed maximum operational elevation of 151-feet and 201-feet, respectively. However, operational issues severely limit the reservoir operation and that lead to reduced operating flexibility, system reliability, and water quality challenges. These issues are described in more detail below.

1. To avoid the potential for leakage in the upper portion of the reservoir lining, the reservoir water level is operated at or below 190-feet elevation.

2. The operating elevation of Central Reservoir relative to other reservoirs in the Central Pressure Zone is lower and prevents EBMUD from utilizing storage between Central Reservoir and other reservoirs in the Central Pressure Zone, which reduces operating flexibility and system reliability and limits EBMUD's ability to respond to emergencies.

3. The reservoir is located at an elevation that is too low relative to the customers it serves; therefore, the reservoir water level is kept at or above approximately 180-feet elevation to prevent low pressures. Approximately one-third of the storage in Central Reservoir cannot be cycled under normal operations, which leads to water quality operational challenges.

4. The reservoir is too large for its service area, limiting the ability for the reservoir to cycle (i.e., turnover of water), which leads to water quality operational challenges.

5. The Central RCS is undersized, which further reduces reservoir cycle time and exacerbates water quality operational challenges.

2.3 Project Purpose and Objectives

2.3.1 Purpose and Need

Central Reservoir is at the end of its useful life and requires removal and disposal of PCBs in the reservoir's interior coating. Reservoir concerns also include a failing lining; a roof that does not meet current seismic codes; potential leakage in the upper areas of the panel craft lining, resulting in reduced operating levels; and difficult water quality operations as the existing reservoir is about three times larger than required and is located at an elevation that is too low relative to the customers it serves and other reservoirs in the Central Pressure Zone, creating unusable storage.

The Project would improve water service reliability, water quality, and operations and maintenance by replacing an aging facility with an optimally sized facility at a higher elevation. The new facility would be constructed on reinforced fill to achieve an overflow elevation about 20-feet higher than the existing reservoir, thereby matching the elevations of other reservoirs in the Central Pressure Zone. The design of the Project (specifically, the higher overflow elevation and storage in three smaller-capacity tanks) would improve operational flexibility by allowing Central Reservoir to support future planned and unplanned outages of other facilities, improve reliability by providing buffer storage to the West of Hills distribution system, and improve water quality by decreasing the amount of storage and increasing the operating range of Central Reservoir without affecting customer levels of service (e.g., pressure). Replacement would also eliminate an embankment reservoir with its associated long-term monitoring, permitting, and other operational costs.

2.3.2 Project Objectives

The primary purpose of the Project is to resolve operational constraints associated with the existing reservoir, as described above. Specific Project objectives related to operations, water quality, water service reliability, maintenance, the environment, and cost are listed in Table 2-1.

TABLE 2-1
PROJECT OBJECTIVES

Issue	Objective
Primary Operational Objectives	Replace a reservoir at the end of its useful life and remove PCBs in the reservoir interior coating.
	Improve water service reliability and water quality by: • Providing storage capacity in multiple tanks at the Central Reservoir site, each of which can be removed from service for unplanned and planned outages, or in response to seasonal reductions in demand or reductions in demand during droughts, while the other tank(s) remain in service. • Reducing storage capacity at the Central Reservoir site so the resulting capacity is proportionate to anticipated demand and the entire depth of that capacity may be utilized. • Raising the elevation of storage capacity at the Central Reservoir site so that reservoirs within the central and southern portion of the Central Pressure Zone are capable of providing water service anywhere within that area of the pressure zone.
Secondary Operational Objectives	Maintain a similar and acceptable aesthetic site-environment after construction.
	Minimize life-cycle costs (capital, operating, and maintenance) to EBMUD's customers.
	Maximize the useful life of existing facilities in a manner that reduces costs for customers.
	Maintain a safe facility while reducing monitoring, permitting, and other operational costs associated with managing a dam.
Construction Objectives	Minimize environmental impacts on the community during construction.
	Reuse or recycle building materials on site to the extent feasible, including concrete demolition materials and excavated earth.
	Maintain water service and emergency flows during construction.
	Protect the local community from construction hazards.
	Provide safe travel routes for motorists and pedestrians.
	Provide safe construction site conditions.

2.4 Project Location

Central Reservoir is located in the city of Oakland, California, as shown on Figure 2-1. The Project site is bordered by I-580 to the north, Ardley Avenue and 23rd Avenue to the west, the intersection of 25th Avenue and East 29th Street to the south, and Sheffield Avenue to the east. The Central Reservoir site is surrounded to the west and south by single- and multi-family residential homes. The Central Reservoir Recreation Area and Redwood Day School are adjacent to the east boundary of the reservoir site. Oakland Heights Nursing and Rehabilitation is also located to the south of the site.

2.5 Project Characteristics

The primary components of the Project are shown on Figure 2-3 and Figure 2-4 and include replacement of the existing reservoir with three 17-MG pre-stressed concrete tanks, a new valve structure, a replacement Central RCS, a bioretention area, service road and site paving, and restoring and landscaping the site following construction. All Project elements would be designed and constructed based on current seismic code. The Project would also replace the perimeter security fencing, demolish the existing material storage building, demolish and replace the existing belowground Central RCS, and abandon groundwater monitoring wells on the Central Reservoir site and in the Central Reservoir Recreation Area. The Project may also include an access driveway to connect the Redwood Day School parking area to Ardley Avenue, as shown in Figure 2-3.

2.5.1 Tanks and Appurtenances

The Project would include construction of three 17-MG green[4], pre-stressed concrete tanks with concrete roofs on the north end of the existing basin with each tank having a diameter of approximately 270-feet. The top of the new tanks would be approximately 15-feet taller than the existing Central Reservoir roof at the center of the reservoir and approximately 22-feet higher than the existing Central Reservoir roof at the location closest to Ardley Avenue.

The roof would have a 42-inch high guardrail around the perimeter. Approximately 2-foot wide, painted steel wrap-around stairs would be installed on each tank to provide maintenance access the tops of the tanks. The stairs would be located on the outside of the tanks, but on the interior of the site so that so that the majority of each staircase would not be visible from the perimeter of the site. Approximately three vents would be located on the roof of each tank for ventilation; each vent would be approximately 5-feet by 6-feet and 2-feet high. Each tank would have a water quality cabinet for testing and managing water quality, located on the outside and facing the interior of the site. The water quality cabinet, approximately 3-feet by 5-feet, would be adjacent to the stair landing, and both would be enclosed with security fencing. An approximately 15-foot-

[4] The tank color would be consistent with EBMUD's standard color, Federal Color Number FS-14159.

high communication mast (antenna) would also be included at the edge of the roof of the northernmost tank.

2.5.2 Tank Foundation

The foundation for the new tanks would consist of the existing soil foundation reinforced with Cement Deep Soil Mixing (CDSM) columns, overlain with a 30-foot thick fill pad consisting of soil reinforced with cement and/or lime ("fill" refers to soil added or "filled in" on top of existing soil or the existing grade). A new underdrain system would be constructed immediately beneath the new tanks to collect any leaked water. If leaking occurs, water would be transported to the bioretention area as discussed in Section 2.5.6. An additional drain system may be constructed below the fill pad to prevent hydrostatic uplift on the fill pad, pending detailed design information and geotechnical data that would be collected when the existing reservoir is demolished. The drain system beneath the fill pad would collect and transport groundwater to the bioretention area, as described in Section 2.5.6.

2.5.3 Tank Valve Structure

A new valve structure that houses the tank inlet/outlet valve assembly and associated facilities would be constructed between the three tanks (Figure 2-3). The valve assembly would include one remotely operated isolation valve for each tank that could be closed to reserve water in the tanks for firefighting and other critical uses after a major earthquake. The valve structure would be approximately 5,000-square feet, and would extend approximately 15-feet above finish grade. The valve structure would have a 42-inch high guardrail around the perimeter of the roof, following the same design as the tank guardrail. Ventilation equipment would also be placed on the roof. The valve structure would have a 12-foot by 12-foot roll-up door at the entry side of the structure. Parking for maintenance and other service vehicles would be provided at and near the valve structure.

2.5.4 Rate Control Station

The Central RCS is a remotely operated valve used to fill Central Reservoir. The current Central RCS would be demolished and replaced with a new, larger Central RCS. To accommodate the larger size, the new RCS would be relocated to the Central Reservoir site as shown on Figure 2-4. The RCS vault would be approximately 1,500-square feet, and all but approximately the top 2-feet of the structure would be buried below the pavement. The RCS would include a level pad with a retaining wall on the north and east sides of the pad. The RCS pad would accommodate parking for maintenance and for portable pumping units if needed for an emergency. The total RCS area (including the vault and parking area) is approximately 4,800-square feet.

As part of the RCS construction, an approximate 80-foot section of 24-inch pipeline in the sidewalk and road of East 29th Street would be abandoned and replaced with a 30-inch pipeline, and a 100-foot section of transmission pipeline serving the existing RCS would be abandoned. See Figure 2-4.

2.5.5 Pipelines

Steel pipelines would be installed to fill the new tanks from the new Central RCS and to deliver water from the new tanks to customers within the Central Pressure Zone. The pipeline that connects the tank valve structure to the Central RCS and the Central Pressure Zone distribution system would be 42-inches in diameter, and would be approximately 4-feet below the ground surface in the main service road (on the west side of the basin). The pipelines between the tanks and the tank valve structure would be 30-inches in diameter and located approximately 15-feet below the fill pad.

2.5.6 Storm Drain System

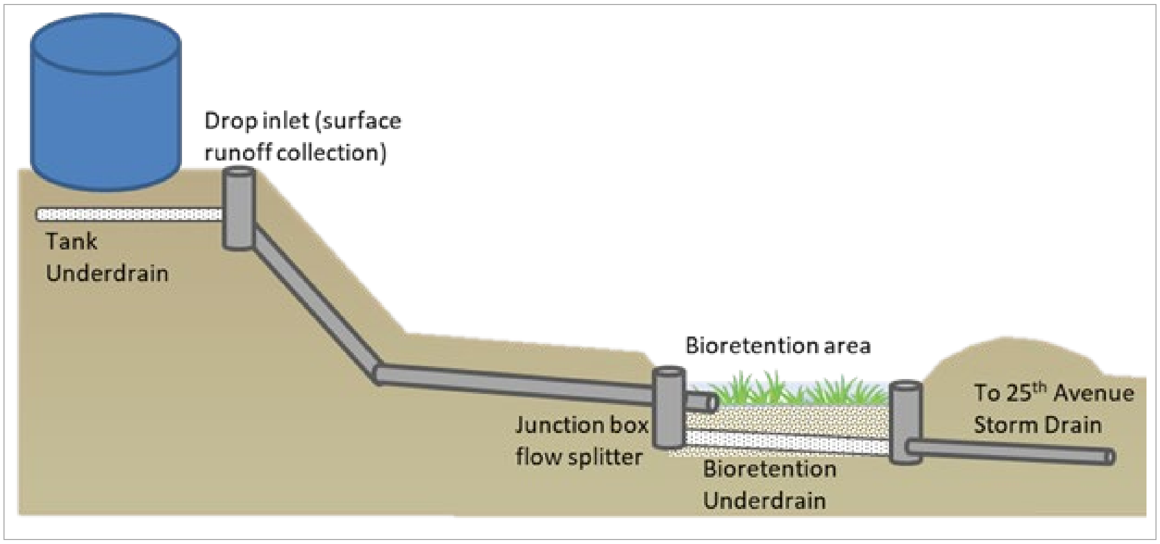
The storm drain system collects stormwater from the roof of the reservoir and along the site perimeter and transports it into the City of Oakland's stormwater system at the corner of 25th Avenue/East 29th Street. The Project would reduce the amount of impervious surface on the Project site from 18.0- to 4.2-acres. After Project construction, the interior areas of the site would generate the most surface run-off, and the stormwater from the interior of the site would be directed to a new storm drain system and bioretention area.

The existing on-site storm drain system consists of multiple 12- to 30-inch reinforced concrete pipelines along the existing perimeter road on the east and west sides of the reservoir. The existing storm drain system on the Central Reservoir property would remain in place and continue to operate after the Project is constructed to collect stormwater along the perimeter of the site. After the Project is completed, the existing storm drain would no longer be the primary drainage system for the site.

The new storm drain system would consist of drop inlets, pipelines, and a bioretention area (the location of which is shown in Figure 2-3). New drop inlets around the tanks would route stormwater to a single storm drain pipeline and down to a junction box in the lower basin. The junction box serves two purposes: to split stormwater flows evenly across the bioretention area, and to route high-flow stormwater directly to the storm system at the corner of 25th Avenue and East 29th Street. Figure 2-10 shows a schematic profile of the stormwater facility and storm drain network design.

The bioretention area at the south end of the Project site (the corner of 25th Avenue and East 29th Street, as shown in Figure 2-3) was chosen as the preferred stormwater facility because bioretention facilities both slow down the delivery of stormwater to the storm drain system and provide filtration and water quality treatment, mimicking the natural watershed. The bioretention area would be designed to meet three main hydrology design goals (as further described in the Hydrology Report [Appendix I]) to manage stormwater and groundwater infiltration on site (ESA, 2018):

1. Include appropriate site design and stormwater treatment measures to reduce stormwater run-off pollutant discharges and run-off flows using low impact development (LID) techniques.
2. Manage groundwater percolation to avoid increasing off-site groundwater levels.
3. Manage stormwater run-off to avoid changes in hydrology in Sausal Creek.



SOURCE: ESA, 2018

EBMUD Central Reservoir Replacement Project

Figure 2-10
Conceptual Bioretention Facility and Storm Network Design – Profile View

The bioretention area would be designed as a LID facility. The bioretention area would be approximately 14,000-square feet. The facility would be designed to treat stormwater from the impervious areas through bioretention and plant phytoremediation (phytoremediation is the direct use of living green plants for in-situ removal, breakdown, or containment of contaminants in surface water). The bioretention area would treat stormwater run-off and reduce peak discharge to the storm system. To promote water retention and filtration, plants would be in at least 18-inches of bio-treatment soil overlaying at least 12-inches of treatment rock and 6-inch risers above the treatment soil to promote ponding and retention. To prevent vector issues (e.g., mosquito breeding), the facility would be designed to drain within 72-hours of a storm event. The bioretention area would have a bioretention drain to prevent groundwater recharge from exceeding current rates.

2.5.7 Removal of the Existing Embankment and Utility Relocation

The Project includes removing the existing Central Reservoir from DSOD's jurisdiction by excavating a portion of the main embankment and reusing the material for the new fill pad beneath and around the tanks. To remove the site from DSOD's jurisdiction, the final basin must have a maximum capacity of no more than 50-acre-feet when confining water less than 25-feet high. The estimated maximum possible confinement of water for the proposed site plan is less than 25-acre-feet at a height of approximately 8-feet, which complies with DSOD requirements to remove the existing reservoir from its jurisdiction.

2.5.8 Site Security

The valve structure between the tanks would have outdoor security lighting with motion detectors along with manual switches and timers (lights would typically be used in the manual mode). Luminaire shields would be installed such that no light is directed off site or into the sky.

With the exception of the fence adjacent to Redwood Day School (which was recently replaced), all property fencing would be replaced with EBMUD's standard security fencing: 8-feet high, black vinyl coated, 1-inch mesh, with double v-arm three-strand barbed wire, and a maximum post spacing of 10-feet (Figure 2-11). Where existing fencing is higher than 8-feet, such as along the boundary with the Central Reservoir Recreation Area, the existing fencing would be replaced to match the existing height, but with the standard 1-inch mesh and v-arm barbed wire style fence.

SOURCE: EBMUD, 2018 EBMUD Central Reservoir Replacement Project

Figure 2-11
Security Fence

2.5.9 Screening and Landscaping

The tanks and other infrastructure on site would be partially screened from views from the surrounding neighborhood with earthen berms planted with vegetation. Where berms are not feasible, views of the tanks would be screened with vegetation only, including existing trees and supplemental trees and shrubs. EBMUD would implement the design elements outlined in the Project's *Planning Phase Architectural Design Report*, which is included in Appendix C (Dillingham and Associates, 2019). The proposed landscaping is shown on Figure 2-3 and would include the following elements:

- Approximately 337 new trees would be planted to supplement existing trees and to replace trees removed during construction. Trees would be planted along Ardley Avenue, the north boundary of the site, at the corner of 25th Avenue and East 29th Street, within the area around the bioretention area, and on the site slopes.

- Trees and shrubs would be placed on the site in a layout that maintains a naturalized pattern and addresses views into the site and slope compatibility. The unpaved portions of the site would be hydroseeded to provide cover for erosion control. To provide weed control, the site would also be mulched.

The plants for landscaping would include primarily drought-tolerant native tree and shrub species with the inclusion of Gingko (a non-native, deciduous tree) as an accent. Evergreen trees would be planted along the site perimeter; deciduous trees would also be included for seasonal interest and may be used in interior portions of the site where they are not needed for screening the tanks. The proposed trees provide a mix of fast- and slow-growing species to promote screening after installation. Because fast-growing trees often have shorter lives, the plant mix would also include longer lived, but slower growing trees. The result is that the volume of screening would increase over time without the need to replace the trees and shrubs. The proposed trees and shrubs also require limited maintenance in terms of pruning in a naturalized setting and provide sufficient coverage to reduce the need for weed control. EBMUD would manage vegetation and provide weed control to mitigate the risk of fire on the site. To provide weed control, the site would be mulched with 3- to 6-inches of mulch underlain with a compost layer. Because mulch breaks down, it requires replacement approximately every 3-years to maintain ground coverage. The part of the fill pad around the tanks that does not contain paving would be mulched as shown on Figure 2-3.

The proposed shrubs and trees would require minimal irrigation and maintenance, although temporary irrigation would be required for plant establishment. Depending on the time of year when plants are installed, irrigation may be required for approximately 18- to 24-months. Subsequent to this time frame, irrigation would be provided via rainfall and run-off.

No plants or shrubs would be planted within 6-feet of the fence line on the exterior side of the site for security reasons (i.e., to prevent intruders from using the trees to climb the fence or to conceal entry). Plants and/or shrubs planted near the fence line on the interior side would be low density to promote visibility into the site for site security purposes.

In addition to the landscaping described above, the bioretention area would also include plantings. The bioretention area design would be based on Alameda County *C.3 Stormwater Technical Guidance* documentation (Alameda County, 2017), which includes a plant list and planting guidance for landscape-based stormwater measures including bioretention areas specific to Alameda County. Overall, plants chosen would be native and drought tolerant and could include transplants (plugs), pole cuttings, and seed mixes. Shrubs and trees would only be planted around the perimeter of the bioretention area, above the frequently inundated base. The newly planted area would be monitored and maintained until plants are well established.

2.5.10 Service Roads and Site Paving

The principal site access would continue to be via the existing south entrance at 25th Avenue with a new service road, the alignment of which is shown on Figure 2-3. The existing alternate site access at East 30th Street would also remain. The area around each tank would include a 20-foot wide road. The primary service road would be approximately 14-feet wide paved with two 5-foot shoulders (total of 24 feet). All perimeter roads (all roads other than the primary service road) would be approximately 12-foot wide paved roads, with the exception of the rim along the south side of property, which would be an approximate 12-foot wide gravel road. Paved roads would have an approximate 2-foot wide shoulder on each side. The gravel road along the south side of the property would not have a shoulder.

An existing Pacific Gas & Electric (PG&E) utility pole at the corner of 25th Avenue and East 29th Street would be relocated approximately 20-feet to the north to accommodate the proposed driveway. The existing driveway would be relocated to the south to accommodate a 60-foot turning radius into the site from 25th Avenue to the Central RCS parking area.

2.5.11 Redwood Day School Access Driveway (Design Option)

As part of the Project, EBMUD is considering a design option to potentially lease a strip of property and authorize Redwood Day School to construct a private one-way driveway along the north end of the existing reservoir property to Ardley Avenue. If this design option is approved by the City of Oakland, Redwood Day School would be responsible for implementing a design that addresses all traffic control, security, safety, regulatory, and permitting requirements.

2.6 Project Construction

2.6.1 Construction Activities

Table 2-2 identifies specific activities that would occur and the estimated duration of each construction phase.

Construction staging during the demolition and substructure and tank construction phases would be within the existing reservoir property, at the East 30th Street entrance and along the existing auxiliary embankment at the north end of the site. Staging for the Project during the tank construction phase would also be located within the existing reservoir property, at the 25th Avenue entrance, which would also be used during the site restoration phase. The construction staging and laydown, parking, and trailer locations are shown on Figure 2-12.

TABLE 2-2
CONSTRUCTION PHASES, MAJOR ACTIVITIES, AND DURATION

Construction Phase	Construction Activity		Approximate Duration (Calendar months)
Site Preparation and Demolition	• Mobilization (mobilize crew and set-up construction trailer) • Site preparation • Tree removal • Reservoir dewatering • Well abandonment • Demolish material storage building	• Demolish RCS • Demolish liner • Demolish roof • Demolish columns • Conduct geotechnical investigation	21
Substructure Construction	• Grading and excavation • Cement Deep Soil Mixing foundation	• Cement treated fill	19
Tank and Valve Structure Construction	• Construct tank foundation • Construct tank walls and columns • Construct tank roof slab • Apply pre-stressed and shotcrete concrete	• Construct valve structure • Construct new RCS and pipeline • Conduct field testing and startup	26
Site Restoration[a]	• Final grading and excavation • Site landscaping • Install irrigation system • Install bioretention area • Install security fencing	• Implement service road improvements • Construct Redwood Day School access driveway	5

NOTES:
[a] The site restoration phase overlaps with the last 3-months of the tank and valve structure construction phase, during field testing and startup.

Site Preparation and Demolition

Site preparation will begin with setting up the construction trailer and mobilizing the construction crew. Trees in poor condition, as well as those in locations that conflict with Project construction, would be removed. Where possible, the existing mature trees would be preserved. Of the 377 existing trees on site, approximately 22 would be removed because they are in poor health. Approximately 121 trees would be removed to accommodate Project construction. Table 2-3 shows the trees that would be removed as part of the Project and existing trees that are protected by City Ordinance[5]. Additional information regarding these trees can be found in Appendix D (Arborist Report). Approximately 337 new trees would be planted, resulting in a total of approximately 571 trees after construction is complete.

The existing reservoir water would be drained by gravity or pumped using a temporary diesel pump to the distribution system as customers use water. Water at the bottom of the reservoir may have high turbidity and therefore would be sent to the existing stormwater system. EBMUD would pretreat (e.g., if necessary for high turbidity) and dechlorinate the water before discharge into the stormwater system in compliance with EBMUD's *Environmental Compliance Manual* (EBMUD, 2010a) and state and federal regulations.

[5] City of Oakland Tree Preservation and Removal Ordinance (Oakland Municipal Code [OMC] Chapter 12.36.

Legend:

Construction Material Stockpile Footprints

Laydown, Parking and Trailers

NOTE: The initial stockpile location is shown on this figure.
This area will expand toward the northern end of the site as demolition continues.

D160330.00 - EBMUD Central Reservoir Replacement EIR\05 Graphics-GIS-Modeling\Illustrator

SOURCE: AECOM, 2017

EBMUD Central Reservoir Replacement Project

Figure 2-12
Construction Staging Areas

ESA

TABLE 2-3
TREE REMOVAL FOR PROJECT AND NUMBER OF PROTECTED TREES

Common Name	Scientific Name	Quantity to be Removed	Number of Protected Trees per the City Ordinance
Coast Live Oak	*Quercus agrifolia*	22	22
Redflower gum	*Eucalyptus ficifolia*	6	N/A
Blackwood acacia	*Acacia melanoxylon*	11	11
Silver dollar gum	*Eucalyptus polyanthemos*	2	N/A
Eucalyptus sp.	*Eucalyptus* sp.	3	N/A
White ironbark	*Eucalyptus leucoxylon*	1	N/A
Monterey pine	*Pinus radiata*	10	N/A
Coast redwood	*Sequoia sempervirens*	54	54
Deodar cedar	*Cedrus deodara*	5	5
Victorian box	*Pittosporum undulatum*	19	3
Myoporum	*Myoporum laetum*	1	1
Douglas fir	*Pseudotsuga menziesii*	1	1
Monterey cypress	*Hesperocyparis macrocarpa*	1	1
Cherry plum	*Prunus cerasifera*	2	1
Canary Island Pine	*Pinus canariensis*	5	5
Total Trees		**143**	**104**

SOURCE: Orion Environmental Associates, 2017.

Once the reservoir is drained, various components of the reservoir would be demolished and removed, including the reservoir liner, columns, and roof system. Also, the existing groundwater monitoring wells located on site around the auxiliary dam, the main embankment, and on the east side of the Central Reservoir Recreation Area would be abandoned by filling the well with bentonite clay. As the roof contains asbestos, an asbestos abatement plan would be prepared with procedures to comply the latest regulations from U.S. Environmental Protection Agency, the Occupational Safety and Health Administration, the Bay Area Air Quality Management District (BAAQMD), the Cal/EPA Department of Toxic Substances Control, the California Department of Occupational Safety and Health, and other federal, state, county, and local agencies. The asphalt panel liner, concrete liner, and treated wood elements would be tested, characterized, and properly handled and disposed of during demolition. The processed demolition debris would be transported temporarily to a stockpile location on site prior to off-haul and disposal.

During the dry months (approximately 8-months per year), approximately 20,000-gallons of water per day would be used for dust suppression. During the demolition phase, an additional 30,000-gallons per day of water would be used to suppress demolition dust (total of 50,000-gallons per day during demolition in the dry season). Potential sources of water for construction and dust suppression include hydrants near the East 30th Street or the 25th Avenue entrance, and recycled water from EBMUD’s Wastewater Treatment Plant.

In compliance with the *EBMUD Reservoir Design Guide* (EBMUD, 2017e), a design-level geotechnical investigation would also be conducted subsequent to the reservoir demolition to confirm the characteristics of the subsurface. EBMUD would incorporate into the Project design the recommendations outlined in the geotechnical investigation.

Substructure Construction

Once demolition is complete, the next phase of construction would include site grading, excavation, and building the reinforced substructure (i.e., foundation) for the new tanks. The substructure design would include CDSM strengthening of the existing soil and a new 30-foot thick fill pad constructed out of soil reinforced with cement and/or lime.

In the first stage of substructure construction, soil at the north of end of the site would be excavated to create a level pad from which the CDSM columns can be built. Temporary retaining walls would be needed, ranging from approximately 10- to 40-feet high, while the CDSM is being constructed. Excavated soils would be temporarily stockpiled elsewhere on site, including the south part of the basin. CDSM columns would be installed beneath the entire footprint of the fill pad. CDSM is a process by which soils are improved in place by mixing with cement or lime grout, using large (2- to 5-foot-diameter) mixing augers. The CDSM columns would penetrate through the foundation soils approximately 30-feet below the existing ground surface. Before beginning CDSM construction, site grading would create a level surface in the basin for the CDSM drill rig. A demonstration test section would be performed to verify that the equipment, procedures, and CDSM mix design could mix the foundation soils uniformly and achieve the required strengths. Based on the laboratory test results and visual inspection of cores taken from the in-place CDSM treated soil, a determination would be made as to whether the test section yielded acceptable results or if design modifications are required.

The CDSM area would be overlain with a 30-foot thick fill pad consisting of soil reinforced with cement and/or lime. The cement and/or lime would be blended into the excavated materials to form a cement/lime treated fill pad for construction of the tanks and valve structure. Once the CDSM columns are installed, soil from the site grading temporary stockpile and a portion of the main embankment would be moved above the CDSM columns, placed in layers, and reinforced with cement and/or lime until a level pad is created for the new tanks at the correct elevation (approximately183-feet). Similar to the CDSM columns, a demonstration test section would be performed to verify that the equipment, procedures, and fill pad mix design could mix the soils uniformly and achieve the required strengths. Based on the laboratory test results and visual inspection of cores taken from the soil reinforced fill pad, a determination would be made as to whether the test section yielded acceptable results or if modifications to the design are required.

After the CDSM columns and the cement/lime treated fill pad construction phase, the main embankment would be fully breached to provide access into the existing basin.

The total volume of soil that would be excavated on site is approximately 400,000-cubic yards (CY). All of the excavated soil would be reused on site for the fill pad and final site grading. The final site elevations would be adjusted so that no soil would be imported or exported from the site. Temporary stockpiling of the excavated soil would occur on site within the existing reservoir property, as shown on Figure 2-4. Excavated soil would be temporarily stockpiled and reused. The temporary soil stockpile height would vary throughout the substructure construction phase, with an estimated maximum height of approximately 10- to 15-feet higher than the existing main embankment.

Nighttime lighting would be required during CDSM construction in the winter, as up to two CDSM soil mixing rigs would be in operation for one 12-hour shift per day. For the CDSM work, nighttime lighting would be located around the tank pad area, on the north end of the site next to the CDSM drilled piers. Stationary lighting used during nighttime construction would be shielded and directed downward or oriented such that the light source is not directed toward residential areas or beyond the immediate work area.

Tank and Valve Structure Construction

The tank construction would include the foundation, wall, roof, pre-stressing and shotcrete (sprayable concrete) for the concrete tanks, the tank valve structure and new RCS, the pipelines between the tanks and the valve structure, and the pipeline between the RCS and the valve structure.

The existing RCS would be demolished by filling the RCS underground vault with structural backfill materials (gravel, earth fill, and/or concrete). The existing reservoir valve structure and material storage building, which is located on the southeast corner of the reservoir site, would also be demolished.

As part of the replacement RCS construction, some work would be required at the 25th Avenue/East 29th Street intersection (Figure 2-4). An approximate 80-foot section of 24-inch pipeline in the sidewalk and road of East 29th Street would be abandoned and replaced with a 30-inch pipeline, and a 100-foot section of transmission pipeline serving the existing RCS would be abandoned. Pipeline replacement would occur by excavating an approximate 10-foot wide by 80-foot long trench, removing the existing pipeline, and installing the new pipeline. Abandonment would be accomplished by accessing the pipeline via two trenches (approximately 10-feet by 10-feet) and filling the pipeline with lightweight concrete.

Nighttime lighting for a maximum of 2 nights may be required when the new pipelines are connected to the existing distribution system. For the pipeline connections, nighttime lighting would be located at the corner of 25th Avenue and East 29th Street. Stationary lighting used during nighttime construction would be shielded and directed downward or oriented such that the light source is not directed toward residential areas or beyond the immediate work area.

Once all of the components are constructed, EBMUD would conduct field testing and start-up activities for the Project.

Site Restoration

Once construction is complete, the site would be restored and graded and landscaped, as described above in Section 2.5.9. To minimize erosion and to provide safe access for landscape maintenance, permanent cut-and-fill slopes would be designed to be generally no steeper than 3:1 (3-foot horizontal to 1-foot vertical). To control weeds, the site would be mulched and underlain with a compost layer. Temporary irrigation for trees and shrubs would be installed for plant establishment. The site restoration would also include the installation of the bioretention area, as well as the security fencing, and the service road improvements. As an optional component of the Project, if fully approved, EBMUD may authorize Redwood Day School to construct a private driveway along the north end of the existing reservoir property at Ardley Avenue.

2.6.2 Construction Equipment and Trips

Project Equipment

Project construction is expected to involve the following equipment:

- Air compressor
- Generator
- Backhoe
- Wheel loader
- Wood chipper
- Dewatering pump
- Telehandler
- Excavator
- Wire-winding machine
- Crusher
- Portable conveyer
- Water truck
- Soil mixing rig
- Spreader truck
- Soil compactor
- Tractor/trailer
- Crane
- Pavers
- Paving equipment
- Rollers

Vehicle Trips

Truck traffic for off-hauling, large equipment deliveries (e.g., CDSM drill rig), and material deliveries would more than likely access the Project site via the most direct route using the City of Oakland designated truck routes on 23rd Avenue and Fruitvale Avenue between the Project site and I-880. While large truck access to and from the Project site would be limited to I-880[6], construction workers would likely access the Project site via I-580. Both the main entrance to the reservoir, at the northwest corner of the 25th Avenue and East 29th Street intersection, as well as the auxiliary entrance on East 30th Street would be used during construction.

[6] California Vehicle Code Section 35655.5 prohibits trucks over 4.5 tons from traveling on I-580 between Grand Avenue and the San Leandro border.

Table 2-4 indicates the approximate number of truck trips per construction phase associated with hauling materials to and from the site. The materials would be hauled in loads ranging from 15- to 20-CY, depending on the type of materials being hauled.

TABLE 2-4
MATERIAL TRUCK TRIPS PER CONSTRUCTION PHASE

Construction Phase	Construction Activity	Truck Trips per Day[a]	Number of Work Days	Material Truck Trips Total per Phase[a]
Site Preparation and Demolition	• Mobilization (mobilize crew and set-up construction trailer) • Site preparation • Tree removal • Dewatering • Well abandonment • Demolish material storage building	12	15	180
	Demolish liner	197	30	5,910
	Demolish roof	4	180	720
	Demolish columns	7	80	560
Substructure Construction	Grading and excavation	0	131	0
	CDSM foundation	11	196	2,156
	Cement-treated fill	45	79	3,555
Tank and Valve Structure Construction	Construct tank foundation	19	72	1,368
	Construct tank walls and columns	14	97	1,358
	Construct tank roof slab	7	182	1,274
	Apply pre-stressed and shotcrete concrete	19	72	1,368
	Construct valve structure[b]	5	120	600
	Construct new RCS and pipeline	2	120	240
Site Restoration	Final excavation & grading	0	53	0
	• Site landscaping • Install irrigation system • Bioretention area • Install security fencing	6	15	90
	Apply service road improvements	64	15	960
	Pave Redwood Day School access driveway	4	15	60

NOTES:
[a] One-way truck trips.
[b] The material would likely all be delivered during a 1-week period.
[c] The material would likely all be delivered over a two-day period.

There would be a maximum of approximately 26 one-way worker vehicle trips per day (13 commute trips in the morning and 13 commute trips in the afternoon) to and from the Project construction site during Project construction, as shown in Table 2-5.

TABLE 2-5
WORKER TRIPS PER CONSTRUCTION PHASE

Construction Phase	Construction Activity	Worker Trips per Day[a]
Site Preparation and Demolition	• Mobilization (mobilize crew and set-up construction trailer) • Site preparation • Tree removal • Dewatering • Well abandonment • Demolish material storage building	18
	Demolish liner	18
	Demolish roof	18
	Demolish columns	18
Substructure Construction	Grading and excavation	26
	CDSM foundation	24
	Cement-treated fill	14
Tank and Valve Structure Construction	Construct tank foundation	22
	Construct tank walls and columns	26
	Construct tank roof slab	22
	Apply pre-stressed and shotcrete concrete	22
	Construct valve structure	6
	Construct new rate control station & pipeline construction	10
Site Restoration	Final Excavation & Grading	26
	• Site landscaping • Install irrigation system • Bioretention area • Install security fencing	14
	Apply service road improvements	14
	Pave Redwood Day School access driveway	14

NOTES:
[a] One-way trips.

2.6.3 Construction Schedule and Hours

For purposes of analysis in the Draft EIR, construction is estimated to take approximately 6-years, beginning with the demolition phase occurring approximately in 2026. After reservoir demolition, a geotechnical investigation would be completed to confirm the characteristics of the subsurface. The construction would begin in approximately 2028, following demolition and the geotechnical investigation. The construction is expected to be completed in approximately 2030, with start-up and testing, and site restoration to be completed in approximately 2031.

Construction would typically occur between 7:00 a.m. and 7:00 p.m., Monday through Friday, with the exception of pipeline connection activities described below, and with afterhours or weekend construction activity limited to unplanned/unexpected occurrences or critical shutdowns and emergencies. Although a 12-hour window is proposed, a typical 8-hour work day serves as the basis of the production rates in all analysis completed for this Draft EIR, except for the CDSM installation and pipeline connection activities. If the contractor elects to work extended hours for any non-CDSM work, productivity would increase and the construction duration could be shortened.

Construction trucks and personnel could report to the site at 7:00 a.m. for minor tasks and meetings, but as required by EBMUD Standard Specification 01 14 00, Work Restrictions, subsection 1.8A, Construction Noise, no construction work that generates noise over 90 A-weighted decibels (dBA) would occur until 8:00 a.m.

Construction personnel may arrive on site and depart approximately one-half-hour prior to or after regular construction times. In addition, oversized trucks are not allowed on San Francisco vicinity freeways between the hours of 7:00 a.m. and 9:00 a.m. per Section 502.2 of the Transportation Permits Manual (California Department of Transportation [Caltrans] 1995). Therefore, periodically over the course of construction (approximately 24 times over the 6-years of construction), very large trucks delivering construction equipment may arrive at the Project site as early as 6:00 a.m. On the days when large continuous concrete pours are required for tank construction (approximately 170 days over the 6-years of construction), construction may also need to begin at 6:00 a.m. and concrete delivery trucks could arrive at the site as early as 6:00 a.m.

Installation of the CDSM columns is expected to take place over one 12-hour shift from approximately 7:00 a.m. to 7:00 p.m. Pipeline connection activities, which are described under Section 2.6.1, would occur during the Tank and Valve Structure Construction Phase during daytime (7:00 a.m. to 7:00 p.m.) and potentially evening (7:00 p.m. to 10:00 p.m.) and nighttime (10:00 p.m. to 7:00 a.m.) hours. Trench construction for the pipeline would be performed during daytime hours (7:00 a.m. to 7:00 p.m.) and would not occur at night. After trench construction, if the connection cannot be completed within the daytime hours, construction may extend into the evening (7:00 p.m. to 10:00 p.m.) and nighttime (10:00 p.m. to 7:00 a.m.). As stated in Section 2.6.1, the connections would be conducted at the corner of 25th Avenue and East 29th Street over approximately 2 consecutive nights.

2.7 Operations and Maintenance

Once constructed, the tanks and associated facilities (valve structure, RCS, and pipelines) would operate in the same way as the existing facilities. The new tanks would continue to be operated and monitored remotely. The reservoir site would be routinely inspected by EBMUD’s operations and maintenance staff. Worker vehicle trips for operations and maintenance would remain the same as existing, with up to 4-trips per month. Long-term site maintenance would continue, and would involve management of vegetation on site including controlling the growth of annual grasses, keeping the site clean and free of trash and other debris, and trimming shrubbery and trees to maintain clear views into the site for both fire prevention and public safety. EBMUD maintains its properties to comply with City and County fire prevention vegetation management standards as part of its ongoing site maintenance program.

2.7.1 Flushing

EBMUD would conduct periodic pipeline flushing to remove particles, rust, or old water that has lost its chlorine residual. In the event of a pipeline break that presents the possibility of contamination, EBMUD determines whether flushing the pipeline with chlorinated water is needed to remove any biological contamination and/or particles that may have entered the pipeline during the break. Transmission pipelines, such as those identified for the Project, generally carry a high flow of water that prevents sediment buildup, removes rust, and keeps the water fresh. As a result, transmission pipelines would typically be flushed only when there is a reported water quality problem or following a pipeline break. Flushed water would be disposed of to the storm drain through a drain inlet or sewer through a manhole consistent with City of Oakland permit requirements and statewide requirements, and in accordance with local municipal permits for water discharge.

2.7.2 Anode Replacement

Welded steel pipeline would be installed for the Project. Welded steel pipelines are often protected from corrosion by a cathodic protection system. The anodes used in a cathodic protection system require replacement about once every 25 years. Anode replacement would involve using a drill rig or backhoe to make a hole for the anode, placing the anode underground, connecting wires to the cathodic protection system, and backfilling the hole.

2.7.3 Leak Detection

EBMUD conducts routine leak detection on its pipelines. Several different methods would be used, including the deployment of internal pipeline probes and external listening devices. These methods could be performed while the pipeline is in service and would be employed by small crews driving pickup trucks or vans.

2.7.4 Right-of-Way Maintenance

EBMUD conducts routine inspections and maintenance to identify and remove vegetation from areas above water pipelines. For pipelines installed in roadways, the valve pots would be adjusted for height whenever the road was repaved or otherwise reconstructed so that the valve pots would not sit too low or too high.

2.7.5 Valve Preventive Maintenance

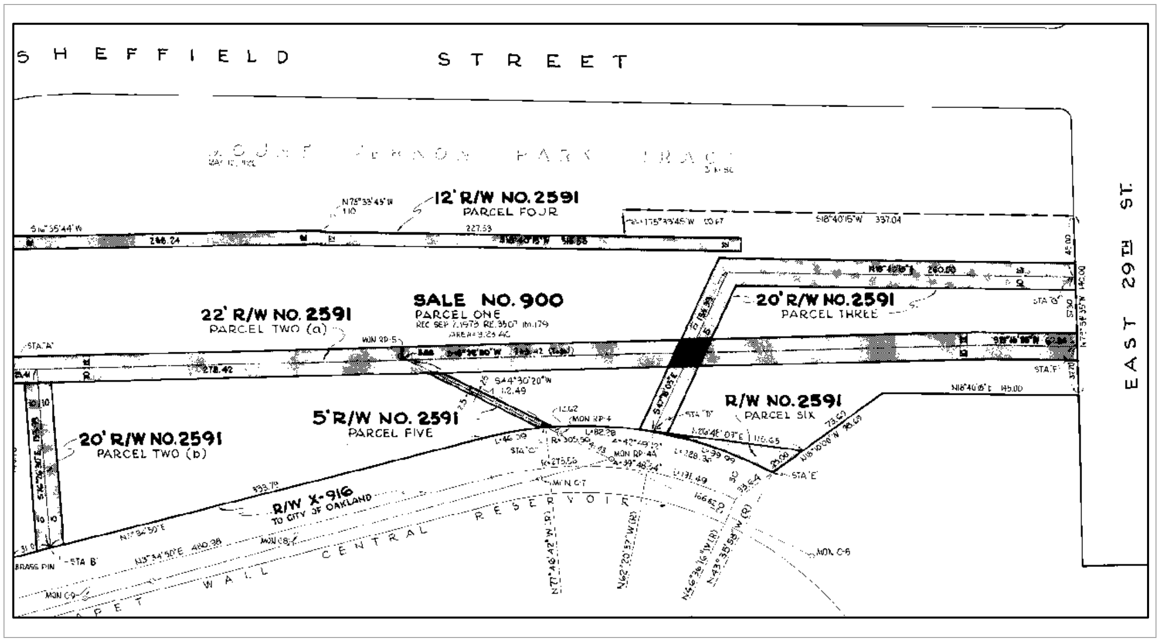
Valves would be installed along the pipelines to allow EBMUD to isolate a reach of pipeline for maintenance activities or repairs. The maintenance program for these valves would consist of locating, cleaning, and exercising the valves attached to distribution mains. Maintenance activities would be conducted approximately every 2 years, and any broken valves would be repaired or replaced.

2.8 Changes in Easements and Rights-of-Way

No permanent property acquisition would be required for the Project. Several property considerations are associated with the Project, as further described below.

2.8.1 Relinquish Right-of-Way Associated with Test Wells and Well Abandonment

EBMUD would relinquish its right-of-way 2591 (Parcel 4) associated with monitoring wells in the Central Reservoir Recreation Area (Figure 2-13). These wells are currently not being used and will be abandoned as part of the Project, and therefore EBMUD will not need right-of-way 2591.



SOURCE: EBMUD, 2018

EBMUD Central Reservoir Replacement Project

Figure 2-13
Right-of-Way 2591 (Parcel 4)

2.8.2 Redwood Day School Access Driveway

As part of the Project, EBMUD is considering a design option to potentially lease a strip of property and authorize Redwood Day School to construct a private driveway along the north end of the existing reservoir property at Ardley Avenue. The potential driveway is shown on Figure 2-3. The driveway would be approximately 500-feet long and 10-feet wide.

2.9 EBMUD Practices and Procedures

EBMUD has incorporated a number of standard construction specifications, standard practices from EBMUD's *Environmental Compliance Manual* (EBMUD, 2010a), and Engineering Standard Practices into the Project. These standard specifications and practices are designed to address typical characteristics of EBMUD construction projects and are not project-specific or tailored to the unique characteristics of the Project. These standard specifications and practices, which are applicable to all EBMUD construction projects and reflect generally applicable EBMUD standard operating procedures, are described below and included in Appendix E.

EBMUD maintains several Standard Specifications related to environmental conditions, including the following:

- **00 31 21.13, Site Survey Information.** This section requires the Contractor to provide documentation of both pre- and post-construction pavement conditions in the project vicinity, and includes provisions for long-term transportation safety (EBMUD. 2017a).
- **01 14 00, Work Restrictions.** This section sets limits on construction hours and on noise generating activities (EBMUD, 2017b).
- **01 35 44, Environmental Requirements.** This section includes provisions related to water quality, dust and emissions control, noise and vibration control, hazardous materials control, and protection of biological and cultural resources (EBMUD, 2018a).
- **01 55 26, Traffic Regulation.** This section includes provisions for the regulation of traffic during construction and compliance with applicable traffic regulations requirements (EBMUD, 2017d).
- **01 35 24, Project Safety Requirements.** This section includes provisions for the safety of the public and construction workers regarding hazards and hazardous materials (EBMUD, 2017c).
- **01 74 05, Cleaning.** This section requires compliance with local ordinances and anti-pollution laws and that the construction site be kept free of waste materials and rubbish (EBMUD, 2015).
- **02 83 13, Lead Hazard Control Activities.** This section includes requirements for the handling, removal, and proper disposal of lead-containing hazardous materials required as a result of construction activities, and includes provisions for hazardous materials controls (EBMUD, 2016b).
- **02 82 13, Asbestos Control Activities.** This section includes requirements for the handling, removal, and proper disposal of asbestos-containing materials required as a result of construction activities (EBMUD, 2014).

EBMUD's *Environmental Compliance Manual* includes best management practices (BMPs) that have been incorporated into the Project, including provisions regarding water quality, hazardous waste, trench spoil, and reservoir rehabilitation (EBMUD, 2010a).

EBMUD's *Reservoir Design Guide* (EBMUD, 2017e) establishes minimum requirements for the design of EBMUD drinking water reservoirs, details design criteria and conditions for above- and belowground water reservoirs, and outlines applicable codes and design standards.

2.10 Permits and Approvals

Table 2-6 provides a summary of the approvals and permits that EBMUD would be required to obtain prior to construction.

TABLE 2-6
AGENCY-REQUIRED APPROVALS AND PERMITS

Agency/Stakeholder	Type of Jurisdiction	Type of Approval
City of Oakland	Local	Encroachment permit for construction within city streets, sidewalk, and Central Reservoir Recreation Area. Approval for use of storm drains and/or sewer lines for dewatering activities. Approval for Redwood Day School driveway, which is proposed as a design option, *Redwood Day School (not EBMUD) would be required to obtain permit.*
Division of Safety of Dams (DSOD)	State	Review and approval of plans for removal of the Central Reservoir embankment and monitoring wells.
California Department of Toxic Substances Control (DTSC)	State	Approval of location for hazardous materials and hazardous waste disposal in California.
California Air Resources Board (CARB) and Bay Area Air Quality Management District (BAAQMD)	State	Permit for portable equipment registration.
San Francisco Bay Regional Water Quality Control Board (SFBRWQCB)	State and Federal	National Pollutant Discharge Elimination System (NPDES) Construction General Permit and Waste Discharge Requirements for dewatering and work within the bed and banks of waters of the U.S. and state.
Alameda County Public Works	Local	Permit for abandonment of the monitoring wells.
State Water Resources Control Board (SWRCB)	State	Amended water supply permit in accordance with 22 CCR §64556.

Under Section 53091 of the California Government Code, EBMUD, as a local agency and utility district, is not subject to building and land use zoning ordinances (such as tree ordinances) for projects involving facilities for the production, generation, storage, treatment, or transmission of water. However, EBMUD's practice is to work with local jurisdictions and neighboring communities during project planning and to consider local environmental protection policies for guidance.

2.11 References

Alameda County. 2017. C.3 Stormwater Technical Guidance. October 2017.

Caltrans (California Department of Transportation). 1995. Transportation Permit Manual. Revisions to Chapter 5, dated February 15, 1995.

Dillingham and Associates. 2019. *EBMUD Planning Phase Architectural Design Report*, Central Reservoir Replacement Project. February 2019.

EBMUD (East Bay Municipal Utility District). 2010a. Environmental Compliance Manual. 2010 Edition.

EBMUD 2010b. West of Hills Master Plan. March 2010.

EBMUD. 2014. Standard Specification Number 02 82 13, Asbestos Control Activities. May 2014.

EBMUD. 2015. Standard Specification Number 01 74 05, Cleaning. December 2015.

EBMUD. 2016a. Urban Water Management Plan 2015. Adopted June 28, 2016.

EBMUD. 2016b. Standard Specification Number 02 83 13, Lead Hazard Control Activities. May 2016.

EBMUD. 2017a. Standard Specification Number 00 31 21.13, Site Survey Information. April 2017.

EBMUD. 2017b. Standard Specification Number 01 14 00, Work Restrictions. May 2017.

EBMUD. 2017c. Standard Specification Number 01 35 24, Project Safety Requirements. November 2017.

EBMUD. 2017d. Standard Specification Number 01 55 26, Traffic Regulation. March 2017.

EBMUD. 2017e. EBMUD Reservoir Design Guide. December 2017.

EBMUD. 2018a. Standard Specification Number 01 35 44, Environmental Requirements. March 2018.

EBMUD. 2018b. Central Reservoir Replacement Facilities Plan. September 2018.

ESA (Environmental Science Associates). 2018. Central Reservoir Replacement Project Hydrology Report. August 2018.

Orion Environmental Associates. 2017. Final Arborist Report. June 2017.

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CHAPTER 3

Environmental Setting, Impacts, and Mitigation Measures

3.0 Introduction and Environmental Analysis

3.0.1 Impacts Not Found to be Significant

An Initial Study (IS) was prepared to determine which environmental resources required detailed evaluation in the Draft Environmental Impact Report (EIR). Based on the evaluation of impacts in the IS, it was determined that the Central Reservoir Replacement Project (Project) would have no impacts on: Agriculture and Forestry Resources, Land Use and Planning, Mineral Resources, Population and Housing, Public Services, and Utilities and Service Systems. A detailed discussion of these resources has been excluded from this Draft EIR.

3.0.2 Organization of Chapter 3

Chapter 3 includes evaluation of each environmental resource area as follows:

- 3.1 Aesthetics
- 3.2 Air Quality
- 3.3 Biological Resources
- 3.4 Cultural Resources
- 3.5 Energy
- 3.6 Geology and Soils
- 3.7 Greenhouse Gas Emissions
- 3.8 Hazards and Hazardous Materials
- 3.9 Hydrology and Water Quality
- 3.10 Noise
- 3.11 Recreation
- 3.12 Transportation and Circulation

3.0.3 Organization of Discussion of Environmental Issue Area

For each resource area, this Draft EIR evaluates the environmental impacts of the proposed Project. Sections 3.1 through 3.12 discuss the environmental impacts that may result with approval and implementation of the proposed Project. The IS, which is included in Appendix A, includes a discussion of all of the other environmental resources and explains why the Project would have no impact on those resources. Each environmental resource section contains the following components:

1. **Environmental Setting** describes the setting as it relates to the specific resource topic. The setting information covers the areas affected by the proposed Project: the Central Reservoir site, East 29th Street, and the surrounding neighborhood.
2. **Regulatory Framework** provides an overview of relevant Federal, state, and local laws, regulations, ordinances, and EBMUD standard construction specifications, practices, and procedures applicable to each resource area.
3. **Impact Analysis** includes the following subsections:
   - *Methodology for Analysis* which describes the approach used in analyzing the potential impacts;
   - *Significance Criteria* is based on those identified in the IS Checklist in Appendix G of the California Environmental Quality Act (CEQA) Guidelines, but are modified or supplemented as appropriate to address the proposed Project impacts; and
   - *Impacts and Mitigation Measures* provide an evaluation of impacts and identification of mitigation measures, if needed. The impact analysis is presented by a numbered impact summary statement that corresponds to the resource area.

The end of each impact statement includes a determination of the level of significance before and after any identified mitigation measures are implemented. Impacts that exceed identified threshold levels of significance criteria would be considered significant. In describing the significance of impacts, the following categories of significance are used:

- **Significant and Unavoidable.** Adverse environmental consequences that exceed the significance criteria identified for the resource, even after feasible mitigation measures are applied and/or an adverse effect that could be significant and for which no feasible mitigation measure has been identified.
- **Less than Significant with Implementation of Mitigation Measures.** Adverse environmental consequences with the potential to be significant, but can be reduced to less than significant levels through the application of identified mitigation measures for the relevant alternative.
- **Less than Significant.** Potential adverse environmental consequences have been identified. However, they are not so adverse as to meet the significance criteria for a resource. Therefore, no mitigation measures are required.

- **No Impact.** No adverse environmental consequences have been identified for the resource, or the consequences are negligible or undetectable. Therefore, no mitigation measures are required.

3.0.4 Approach to Analysis of Cumulative Impacts

CEQA Requirements

CEQA requires consideration of cumulative impacts. A cumulative impact is created as a result of the combination of the project evaluated in the EIR together with other projects causing related impacts. Cumulative impacts, as defined in Section 15355 of the CEQA Guidelines, refer to two or more individual effects that, when considered together, are considerable or that compound or increase other environmental impacts. The cumulative impact from several projects is the change in the environment that results from the incremental impact of the Project when added to other closely related past, present, or reasonably foreseeable future projects. Pertinent guidance for cumulative impact analysis is provided in Section 15130 of the CEQA Guidelines, and included below:

- An EIR shall discuss cumulative impacts of a project when the project's incremental effect is "cumulatively considerable" (i.e., the incremental effects of an individual project are considerable when viewed in connection with effects of past, current, and probable future projects, including those outside the control of the agency, if necessary).
- An EIR should not discuss impacts that do not result in part from the project evaluated in the EIR.
- The discussion of cumulative impacts shall reflect the severity of the impacts and their likelihood of occurrence, but the discussion need not be as detailed as it is for the effects attributable to the project alone.
- A project's contribution is less than cumulatively considerable, and thus not significant, if the project is required to implement or fund its fair share of a mitigation measure or measures designed to alleviate the cumulative impact.
- The focus of analysis should be on the cumulative impact to which the identified other projects contribute, rather than on attributes of the other projects that do not contribute to the cumulative impact. The cumulative impact analysis for each individual resource topic is described at the end of each resource section in this Chapter, except for the Greenhouse Gas Emissions section, in which the entire analysis is inherently cumulative.

Approach to Analysis

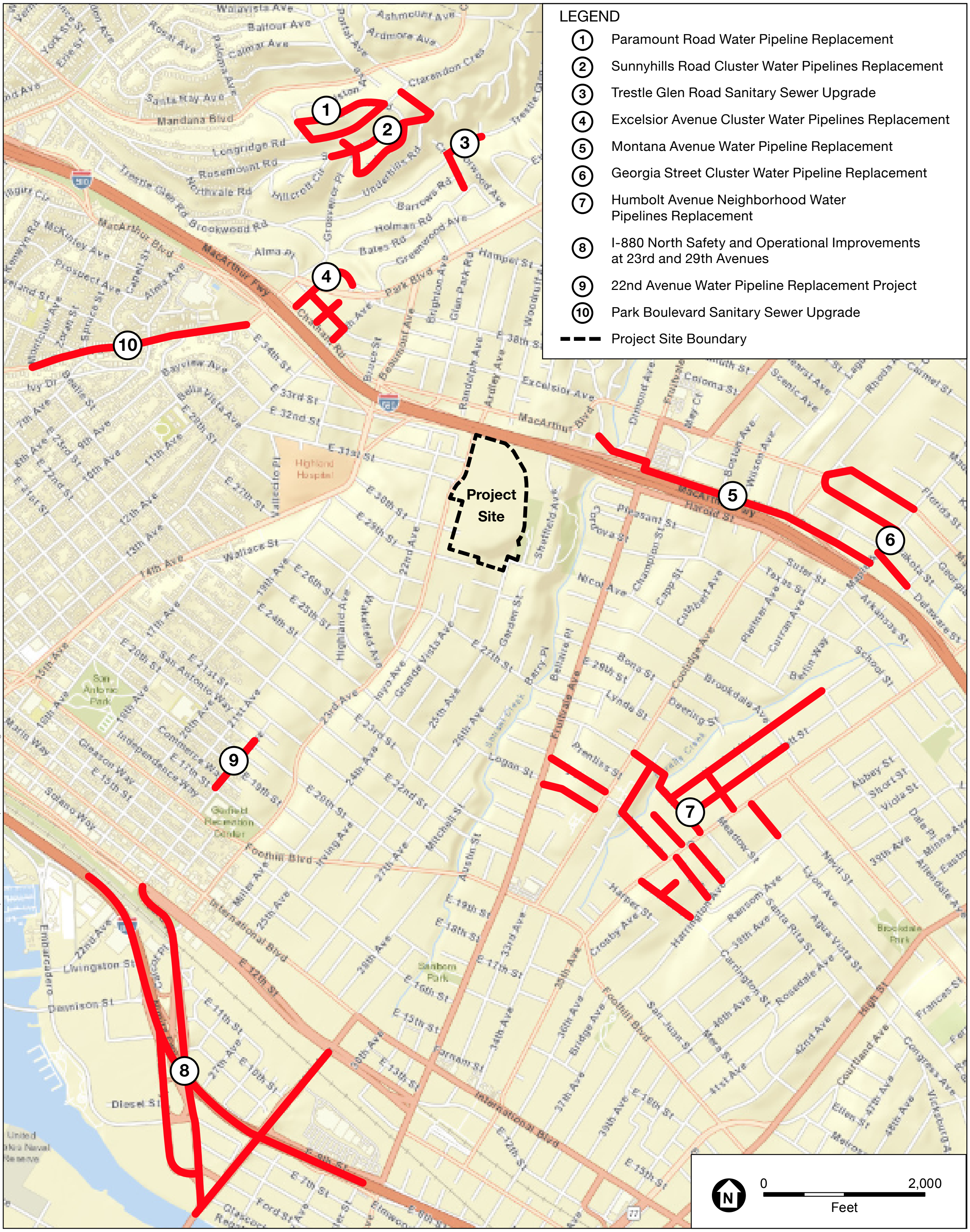
For evaluation of cumulative impacts, this EIR uses a list-based approach, and evaluates the potential for past, present, and probable future projects in the Project area to result in cumulative impacts. Once the Project would be constructed the tanks would remain as a water utility facility; therefore, no operational impacts are expected. Project impacts are entirely associated with construction, so the analysis of cumulative impacts has focused on other projects that could be constructed in the City of Oakland at the same time. Information about pending project applications was obtained from Alameda County Transportation Commission (2018), Amtrak (2018), Bay Area Rapid Transit (2018), Caltrans (2018), the City of Oakland (2018), EBMUD (2018), Pacific Gas & Electric (2018), and Union Pacific (2018). EBMUD has seven proposed water main replacement projects that could occur during construction of the proposed Project and are within one mile of the Project site.

Table 3.0-1 contains a list of potential projects planned for construction within the general vicinity of the Central Reservoir site. Locations of projects are shown in Figure 3.0-1.

TABLE 3.0-1
CUMULATIVE PROJECTS

No.	Project Name/Location	Project Description	Construction Date
1	*Paramount Road Water Pipeline Replacement*	EBMUD is proposing to replace approximately 0.5 miles of pipeline along Paramount Road and Longridge Road, 1-mile north of the Project site.	Could align with the Project.
2	*Sunnyhills Road Cluster Water Pipelines Replacement*	EBMUD is replacing a series of pipelines along Sunnyhills Road and Hubert Road, approximately 1-mile north of the Project site. The length of pipeline replacement is approximately 0.75-miles long.	Summer 2018 – Spring 2019
3	*Trestle Glen Road Sanitary Sewer Upgrade*	The City of Oakland is rehabilitating 0.10-miles of sewer main along Trestle Glen Road between Creed Road and Humphrey Place, approximately 0.8-miles north of the Project site.	Spring 2018 – Spring 2019
4	*Excelsior Avenue Water Pipelines Replacement*	EBMUD is proposing to replace a series of pipelines branching from Excelsior Avenue, approximately 0.4-miles northwest of the Project site. The length of pipeline replacement would range from 0.25-to 0.5-miles long.	Could align with the Project.
5	*Montana Avenue Water Pipeline Replacement*	EBMUD is proposing to replace approximately 0.5-miles of a 30-inch steel pipeline along Montana Street, between Adell Court and Maple Avenue, 0.25-miles northeast of Project site.	Could align with the Project.
6	*Georgia Street Cluster Water Pipeline Replacement*	EBMUD is replacing approximately 0.5-miles of pipeline along Georgia Street and MacArthur Boulevard, 0.75-miles east of the Project site.	Fall 2018 – Spring 2019
7	*Humbolt Avenue Neighborhood Water Pipelines Replacement*	EBMUD is replacing a series of pipelines branching from Humbolt Avenue, 0.8-miles east of the Project site. The length of pipeline replacement is approximately 2-miles long.	Summer 2018 – Summer 2019
8	*I-880 North Safety and Operational Improvements at 23rd and 29th Avenues*	The Alameda County Transportation Commission and Caltrans are reconstructing the I-880 overcrossings and on- and off-ramps to 23rd and 29th Streets, approximately 1.5-miles south of the Project site.	Summer 2014 – Spring 2019
9	*22nd Avenue Water Pipeline Replacement Project*	EBMUD is replacing approximately 0.25-miles of pipeline along 22nd Avenue, 0.75-miles south of the Project site.	Fall 2018 – Spring 2019
10	*Park Boulevard Sanitary Sewer Upgrade*	The City of Oakland is rehabilitating 0.7 miles of sewer main along Park Boulevard, approximately 0.8-miles west of the Project site.	Spring 2018 – Spring 2019

SOURCES:
[a] Alameda County Transportation Commission, 2018
[b] City of Oakland, 2017. Sanitary Sewer Collection System: Annual Report. June 2017.
[c] EBMUD, 2018



SOURCE: ESRI World Imagery; ESA, 2018

Figure 3.0-1
Location of Cumulative Projects

3.0.5 References

Alameda County Transportation Commission. Projects: Capital Project Fact Sheets and Web Pages, 2018. Available at https://www.alamedactc.org/app_pages/view/4681. Accessed December 17, 2018.

Amtrak, 2018. Projects & Stations. Available at https://nec.amtrak.com/nec-projects-stations/. Accessed December 17, 2018.

Bay Area Rapid Transportation, 2018. Projects. Available at https://www.bart.gov/about/projects. Accessed December 17, 2018.

Caltrans, 2018. District 4: Projects by County. Available at http://www.dot.ca.gov/d4/projects_list.htm. Accessed December 17, 2018.

City of Oakland, Public Works Department, 2017. Annual Sanitary Sewer Collection System Report for July 1, 2016 to June 30, 2017. Available at https://www.oaklandca.gov/documents/fy17-sanitary-sewer-collection-system-annual-report. Accessed November 2, 2018.

EBMUD, 2018. Construction projects in my neighborhood. Available at https://www.ebmud.com/about-us/construction-my-neighborhood/construction-projects-my-neighborhood/. Accessed December 18, 2018.

Pacific Gas & Electric, 2018. Current Projects. Available at https://www.pge.com/en_US/safety/electrical-safety/safety-initiatives/transmission-project-overview.page. Accessed December 18, 2018.

Union Pacific, 2018. Grade Separation Bridge Projects. Available at https://www.up.com/real_estate/roadxing/industry/grade_separation/index.htm. Accessed December 18, 2018.

3.1 Aesthetics

This section describes the physical and regulatory setting for aesthetic resources, and identifies and evaluates potential impacts on aesthetic resources (including light and glare effects) that could result from construction and operation of the Project. This section includes photographs to show existing visual conditions in the Project area from various public vantage perspectives and visual simulations of visual conditions with implementation of the Project.

3.1.1 Environmental Setting

Concepts and Terminology

Visual or aesthetic resources are generally defined as both the natural and built features of the landscape that contribute to the public viewer's experience and appreciation of the environment.[1] Depending on the extent to which a project's presence would alter the perceived visual character and quality of the environment, a visual or aesthetic impact may occur. Familiarity with the following terms and concepts will aid the reader in understanding the content of this section.

Visual Character is a general description of the visual attributes of a particular land use setting. The purpose of defining the visual character of an area is to provide the context within which the visual quality of a particular site or locale is most likely to be perceived by the viewing public. For urban areas, visual character is typically described on the neighborhood level or in terms of areas with common land use, intensity of development, socioeconomic conditions, and/or landscaping and urban design features. For natural and open space settings, visual character is most commonly described in terms of areas with common landscape attributes (such as landform, vegetation, water features, etc.).

Visual Quality is defined as the overall visual impression or attractiveness of a site or locale as determined by its aesthetic qualities (such as color, variety, vividness, coherence, uniqueness, harmony, and pattern). For the aesthetic analysis, the visual quality of a site or locale is defined according to three levels:

- **Low.** The location is lacking in natural or cultural visual resource amenities typical of the region. A site with low visual quality will have aesthetic elements that are perceptibly uncharacteristic of the surrounding area.
- **Moderate.** The location is typical or characteristic of the region's natural or cultural visual amenities. A site with moderate visual quality maintains the visual character of the surrounding area, with aesthetic elements that do not stand out as either contributing to or detracting from the visual character of an area.

[1] CEQA Guidelines, Appendix G, Environmental Checklist Form defines public views as those that are experienced from a publicly accessible vantage point.

- **High.** The location has visual resources that are unique or exemplary of the region's natural or cultural scenic amenities. A site with high visual quality is likely to stand out as particularly appealing and makes a notable positive contribution to the visual character of an area.

The identification of public viewer types describes the type of potentially affected viewers within the visual study area (defined below). Land uses that derive value from the quality of their settings are potentially sensitive to changes in visual conditions.

Viewer Exposure addresses the variables that affect the viewing conditions of a site. Viewer exposure considers some or all of the following factors: landscape visibility (the ability to see the landscape); viewing distance (i.e., the proximity of viewers to the Project); viewing angle (whether the Project would be viewed from a superior, inferior, or level line of sight); extent of visibility (whether the line of sight is open and panoramic to the Project area or restricted by terrain, vegetation, and/or structures); and duration of view.

Visual Sensitivity is the overall measure of a site's susceptibility to adverse visual changes. Visual sensitivity is rated as high, moderate, or low and is determined based on the combined factors of visual quality, viewer types, how many viewers, and viewer exposure to the Project. Higher visual sensitivity is associated with sites with a higher visual quality and with a greater potential for changes to degrade or detract from the visual character of a public view.

Regional Setting

Visual resources at the Project site and surrounding area are representative of the East Bay and city of Oakland. The city of Oakland contains an urban and suburban development pattern that includes residential neighborhoods, commercial development, and light industrial. Between the San Francisco Bay and Interstate 580 (I-580), the city of Oakland is predominately flat and densely developed with mainly commercial and light industrial, and pockets of residential neighborhoods. North of I-580, the elevation increases and includes more residential development as the city progresses toward the Oakland-Berkeley Hills. Natural features that are interspersed with the urban setting include hillsides, ridges, redwood groves and oak woodlands, creeks and drainages, and the San Francisco Bay. Within this setting, the ridgelines and hillsides are the prominent landscape features that provide a visual backdrop for the region's urban development pattern of the city of Oakland, surrounded by residential, recreation, educational, and institutional uses. Views of the Oakland-Berkeley Hills are identified as an area of great visual importance in the *City of Oakland General Plan* (City of Oakland, 1996).

Visual Study Area

The Central Reservoir is located at an elevation of approximately 200 feet above sea level; the top elevation along the center of the existing roof is approximately 217 feet. The current Central Reservoir facility is concrete-lined, covered by a corrugated metal roof, and surrounded by a chain link fence with barbed wire on top. The reservoir is currently active with operation and maintenance activities occurring, including vegetation management and cleanup of the site for trash and other debris. The visual study area for the Project is the area from which the proposed tanks, valve structure, rate control station (RCS), and basin would be visible.

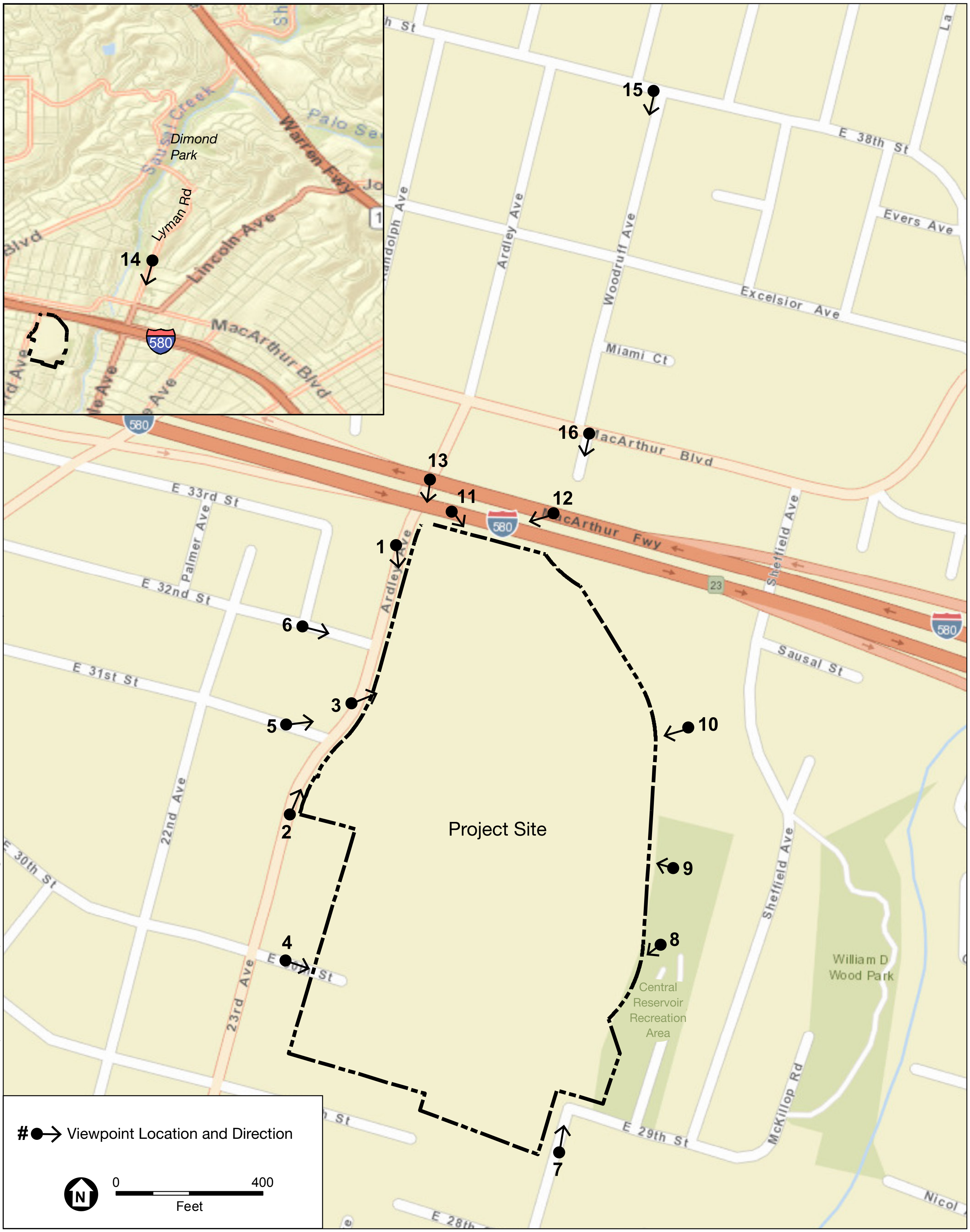
Because the Project area is in an urban setting with relatively heavy landscape vegetation and the public roadways are not directly in-line with and adjacent to the site in most areas, views of the site are generally blocked or restricted by trees, shrubs, and buildings, and views are even further restricted as viewers move away from the Project site. Consequently, the landscaping, buildings, and non-linear configuration of the site limit the visual study area in most places to publicly accessible locations immediately surrounding Project components. In some locations, however, favorable topographic relationships or the lack of intervening features extend the distance from which a viewer could observe features of the Project. While the exact boundaries of the visual study area depend on site conditions (i.e., viewshed, structures, and vegetation) and are highly specific for each viewpoint location, performing an assessment of the visual study area is important in identifying potentially affected viewers and describing the visual quality and character of relevant locations.

Site reconnaissance of the Project area was performed in 2017 and 2018 to identify the visual study area and take representative photographs of existing visual conditions. This section includes a set of photographs to document the existing visual conditions of the Project site and adjacent areas. Figure 3.1-1 provides an overview of photo locations; Figure 3.1-2 through Figure 3.1-6 depict views of Project site and surrounding locations.

Visual Character

The visual study area encompasses neighborhoods and parks, including the city of Oakland's San Antonio Planning Area. I-580 defines the north boundary of the Project site. The general visual character in the vicinity of Project is described below.

The Project site is in the San Antonio district portion of the San Antonio/Fruitvale/Lower Hills Planning Area of the City of Oakland (City of Oakland, 1998). The San Antonio district extends from the east side of Lake Merritt to Sausal Creek and consists of a mix of residential and commercial areas, with Sausal Creek bisecting a portion of the area. Residential developments are mostly closely spaced, one- and two-story, single family-homes that are fronted by small landscaped yards. Small apartment buildings are also scattered throughout the residential areas. Commercial areas consist of single or small row clusters of businesses, primarily near MacArthur Boulevard and Ardley Avenue, and along Fruitvale Avenue. Mature trees are present throughout the neighborhoods, including public sidewalk areas; however, tree density is greater in residential areas than commercial areas. The neighborhoods are interspersed with schools (such as Manzanita Community School) and parks (such as Wood Park) that break up the visual pattern of homes and commercial zones, and open up views for motorists, pedestrians, and other public viewers.



D160330.00 - EBMUD Central Reservoir Replacement EIR\05 Graphics-GIS-Modeling/Illustrator

SOURCE: ESRI, 2018 ; EBMUD, 2018; ESA, 2018

EBMUD Central Reservoir Replacement Project

Figure 3.1-1
Photography Viewpoint Locations

Photo 1: Ardley Avenue looking southeast, towards northwest portion of site

Photo 2: Ardley Avenue at 23rd Avenue looking northeast, towards west portion of site

Photo 3: Ardley Avenue near East 31st Street looking northeast, towards west portion of site

SOURCE: Environmental Vision, 2018

EBMUD Central Reservoir Replacement Project

Figure 3.1-2
Public Views of the Project Site
along Ardley Avenue/23rd Avenue

ESA

Photo 4: East 30th Street near 23rd Avenue looking east, towards southwest portion of site

Photo 5: East 31st Street near 23rd Avenue looking east, towards south portion of site

Photo 6: East 32nd Street near Ardley Avenue looking east, towards northwest portion of site

D160330.00 - EBMUD Central Reservoir Replacement EIR\05 Graphics-GIS-Modeling/Illustrator

SOURCE: Environmental Vision, 2018

EBMUD Central Reservoir Replacement Project

Figure 3.1-3
Public Views of the Project Site
from Neighborhood to the West

ESA

Photo 7: 25th Avenue near East 29th Street looking north, towards south portion of site

Photo 8: Central Reservoir Recreation Area at basketball court looking southwest, towards east portion of site

Photo 9: Central Reservoir Recreation Area at baseball field looking northwest towards east edge of site

Photo 10: Redwood Day School looking west, towards northeast portion of site

SOURCE: Environmental Vision, 2018

EBMUD Central Reservoir Replacement Project

Figure 3.1-4
Public Views of the Project Site from South Entrance, Central Reservoir Recreation Area, and Redwood Day School

ESA

Photo 11: I-580 traveling east looking south, towards north edge of site

Photo 12: I-580 traveling west looking southwest, towards north edge of site

Photo 13: Ardley Avenue at I-580 overcrossing looking south, towards northwest edge of site

SOURCE: Environmental Vision, 2018

EBMUD Central Reservoir Replacement Project

Figure 3.1-5
Public Views of the Project Site from I-580
and Overcrossing at Ardley Avenue

ESA

Photo 14: Lyman Road near Dimond Park looking south, Project site is approximately 0.5 miles to the southwest

Photo 15: Woodruff Avenue and East 38th Street looking south, Project site is approximately 0.2 miles directly south

Photo 16: Woodruff Avenue looking south, Project site is approximately 0.08 miles directly south

SOURCE: Environmental Vision, 2018

EBMUD Central Reservoir Replacement Project

Figure 3.1-6
Public Views of the Project Area from the Neighborhood North of I-580

ESA

The Central Reservoir Recreation Area, which is adjacent to the east boundary of the site, consists of a complex of outdoor recreation facilities, as well as an adjacent education campus (Redwood Day School), providing a sprawling developed character with more open views. The area does not have an untouched natural setting due to the dense presence of structures, utilities, and roads. The relatively flat topography and density of development around the Project site limit views primarily to the immediately surrounding areas.

I-580 is a west-east freeway between Highway 101 in San Rafael and Highway 5 in Vernalis. In the vicinity of the Project site, I-580 is an eight-lane freeway with four lanes in each direction, with a posted speed limit of 65 miles per hour (mph). I-580 from the San Leandro city limits to Highway 24 in Oakland is a designated state scenic highway. The California Department of Transportation (Caltrans)has designated this section a state scenic highway for the following reasons (Caltrans, 2018):

- This landscaped freeway gives the motorist a view of the San Francisco Bay with the San Francisco Peninsula and its cities lying beyond.
- Between the freeway and the San Francisco Bay can be seen many examples of the architecture prevalent around the turn of the century.
- This recessed freeway has received several aesthetic awards for attractive landscaping.

Views of the San Francisco Bay and San Francisco from I-580 are available along the segment of I-580 that is approximately 4-miles from the Project site, near Highway 24. However, the Project site is south of and adjacent to the section of I-580 that Caltrans has designated a state scenic highway. Although designated as a state scenic highway, the segment of I-580 that passes the Project site does not include views of the San Francisco Bay, San Francisco Peninsula, or its cities lying beyond. The architecture that is visible along the portion of I-580 near the Project site is not historic-era resources or related to the turn of the century (ESA, 2018). Along this portion of I-580, mature trees and shrubs are visible.

Visual Sensitivity

The overall visual sensitivity of the Project site from public views is described in terms of its visual quality, potentially affected viewers, and exposure conditions (i.e., landscape visibility, viewing angle, extent of visibility, and duration of view). Table 3.1-1 summarizes these attributes, which are described in more detail in the remainder of this section.

Ardley Avenue/23rd Avenue

Figure 3.1-2 provides photographs of the Project site from Ardley Avenue and 23rd Avenue, which bound the site to the west. The area immediately west of the site is dominated by one- and two-story residential structures. Existing views in this area include the existing roadways, sidewalks, reservoir roof, security fencing, and vegetation between Ardley Avenue and the reservoir. The existing reservoir is surrounded by mature landscaping along these streets; thus, the existing reservoir is minimally visible from these

TABLE 3.1-1
SUMMARY OF VISUAL SENSITIVITY FINDINGS

Viewing Location and Representative Photos	Visual Quality	Affected Viewers and Viewer Exposure Conditions	Visual Sensitivity
Ardley Avenue/23rd Avenue (Figure 3.1-2, Photos1–3)	Low	Views of the Project site are mostly screened or blocked by vegetation. Direct views of the Project site are available for brief periods by pedestrians and motorists when there is a break in the landscaping.	Low
Neighborhood to the West of Project Site (Figure 3.1-3, Photos 4-6)	Low	Views of the existing reservoir facilities and roof are prominent where there are breaks in the existing landscape vegetation The existing site is seen only briefly as viewers pass by.	Low
South Entrance, Central Reservoir Recreation Area, and Redwood Day School (Figure 3.1-4, Photos 7–10)	Low	Views of the Project site from the facilities to the south and east are prominent through breaks in the existing vegetation surrounding much of the site. Affected viewers include motorists and pedestrians in close proximity to the south portion of the site, and users of the recreation facilities and school attendees.	Low
I-580 and Overcrossing at Ardley Avenue (Figure 3.1-5, Photos 11–13)	Low	Views of the Project site are blocked by vegetation and an existing wall.	Low
Neighborhood North of I-580 (Figure 3.1-6, Photos 14–16)	Low to Moderate	Views of the Project site are screened from public views by existing vegetation and development.	Low

viewpoints (Photo 1 and Photo 2). The existing corrugated metal reservoir roof is visible where there are breaks in the landscaping. At certain times of day, the existing metal roof produces glare. Short-duration views of the Project site are available as motorists and pedestrians pass directly along the west boundary of the site. Photo 3 provides a view of the Project site with distant views of the Oakland-Berkeley Hills and the Oakland Temple in the background. As described above, the Oakland-Berkeley Hills are an area of great visual importance in the *City of Oakland General Plan* (City of Oakland, 1996) and therefore may be considered a designated scenic vista. Views of the Oakland-Berkeley Hills from Ardley Avenue are mostly obstructed by existing vegetation and development; however, views of the Oakland-Berkeley Hills are available from some areas of Ardley Avenue looking north/northwest where there are breaks between the mature trees between Ardley Avenue and the reservoir.

Visual Quality. The Central Reservoir site, which is restricted from public use and access, is characterized along Ardley Avenue and 23rd Avenue by the presence of the existing reservoir, security fencing, and vegetation. Views of the site are mostly blocked by the existing mature landscaping; however, views of the existing reservoir facilities and roof are prominent where there are breaks in the existing landscape vegetation. Because the breaks in vegetation reveal views of the existing reservoir roof, which is perceptibly uncharacteristic of the surrounding residential areas and landscaping, the existing visual quality is considered low.

Affected Viewers and Exposure Conditions. Numerous factors limit public views of the site at this location. The viewers at this location primarily include motorists and pedestrians traveling along Ardley Avenue and 23rd Avenue. The site is surrounded by security fencing and mature trees/landscaping. Therefore, views of the Project site are screened or blocked by vegetation for most motorists and pedestrians traveling along Ardley Avenue and 23rd Avenue. However, direct views of the Project site are available for brief periods where there is a break in the landscaping. The site has low viewer exposure and would be seen only briefly as viewers pass by.

Visual Sensitivity Conclusion. Because the site has low visual quality and low exposure, it is considered to have low visual sensitivity.

Neighborhood to the West of Project Site

Figure 3.1-3 provides photographs of the Project site and neighborhood to the west. Photo 4 provides a view of the site from East 30th Street, with the existing fencing, landscaping, and reservoir facilities in the middleground view. Photo 5 provides a view of the Project site from East 31st Street, which is limited by the existing vegetation. The existing roadways, sidewalks, cars, and landscape trees adjacent to the residential structures are in the foreground of Photo 5. Photo 6 provides a view of the Project site from East 32nd Street, which provides a direct view of the Project site due to the break in vegetation and higher elevation, with the roadways, sidewalks, cars, and residential structures in the foreground view; the existing reservoir roof and fencing in the middleground view; and existing trees on the other side of the reservoir in the background view. Views of the reservoir roof in Photo 6 include a wide stretch of the reservoir roof that dominates the middleground view. Photos 5 and 6 provide examples of the residential neighborhood in the immediate vicinity of the Project site.

Visual Quality. The Central Reservoir site, which is restricted from public use and access, is characterized from the neighborhood to the west by the presence of the existing vegetation, the reservoir, and security fencing. In some locations, views of the interior of the site are mostly blocked by the existing fencing and vegetation, as shown in Photo 5. However, views of the existing reservoir facilities and roof are prominent where there are breaks in the existing landscape vegetation, as shown in Photo 4 and Photo 6. Views of the site are prominent in the middleground, while foreground views are dominated by residential development. Because the site reveals views of the existing reservoir roof, which is perceptibly uncharacteristic of the surrounding residential development, the visual quality is considered low.

Affected Viewers and Exposure Conditions. Public views of the Project site from the neighborhood to the west are limited by the existing vegetation and fence surrounding much of the site. Portions of the site are highly visible from public areas where there are breaks in the landscape vegetation, such as at the end of East 30th Street currently used for parking (see Photo 4, foreground), and at the end of East 32nd Street (see Photo 6). The site has low viewer exposure and would be seen only briefly as viewers pass by. The viewers at this location primarily include motorists and pedestrians traveling along Ardley Avenue and the roadways that are perpendicular to the west of the Project site (i.e., East 32nd Street, East 31st Street, and East 30th Street).

Visual Sensitivity Conclusion. Because the site has low visual quality and low exposure, it is considered to have low visual sensitivity.

South Entrance, Central Reservoir Recreation Area, and Redwood Day School

Figure 3.1-4 provides views of the Project site from the south and east boundaries. Photo 7 provides a view of the Project site from the corner of 25th Avenue and East 29th Street, with the existing roadway in the foreground view; the sidewalk, fencing, utilities, vegetation between the street and fence line, and a portion of the existing material storage building in the middleground view; and the existing main embankment, landscaping, and reservoir facilities in the background view. Photo 8 and Photo 9 provide views of the Project site from the Central Reservoir Recreation Area. Photo 10 provides views of the Project site from Redwood Day School. These photos are dominated by views of the recreation (basketball court and baseball field) and school facilities in the foreground views and the existing fence, reservoir roof, and trees in the middleground views. Existing trees on the other side of the reservoir are visible in the background view where there are breaks in the trees adjacent to the recreation area and school. These trees block most of the views of the neighborhood beyond, and there are no scenic resources in the background views from these locations. Views of the existing reservoir facilities from these locations include a wide stretch of the metal reservoir roof between breaks in the existing trees.

Visual Quality. The Central Reservoir site, which is restricted from public use and access, is characterized from the land uses to the south and east by the presence of the existing vegetation, the reservoir facilities, and security fencing. The existing built structures associated with the reservoir are evident in the views from the south portion of the site. Views of the reservoir roof dominate the middleground of views from the recreation and school facilities. While the surrounding open space facilities and mature screening vegetation are representative of the naturalistic amenities in the neighborhood, the views of the existing built structures and reservoir roof are perceptibly uncharacteristic of the surrounding areas, and the visual quality is considered low.

Affected Viewers and Exposure Conditions. Public views of the Project site from the facilities to the south and east are prominent through breaks in the existing vegetation surrounding much of the site. Affected viewers to the south primarily include motorists and pedestrians in close proximity to the site, who would only briefly see the site as they walk or drive by. Affected viewers to the east primarily include the users of the recreation facilities and school attendees. Views of the Project site from the Central Reservoir Recreation Area may be more extensive in terms of exposure length as compared to other public locations (i.e., streets) because users of the facilities are exposed to views of the sites for longer. However, the areas adjacent to the site are designed for active uses (baseball field and basketball courts). Active uses have significantly less visual exposure than other types of park use such as picnic areas and contemplative vantage points, which do not exist at along the east side of the site, because active uses do not provide opportunities for extended display of the Project site.

Visual Sensitivity Conclusion. The visual sensitivity of the site from the south and east is considered low because the site has a low visual quality, most of the site is not visible from public viewpoints, and affected viewers are only briefly exposed.

I-580 and Overcrossing at Ardley Avenue

Figure 3.1-5 provides views of the Project site from I-580, which bounds the north portion of the site. Photo 11 and Photo 12 provide views of motorists traveling along I-580. Photo 11 includes existing landscape vegetation in the foreground and middleground views, with the existing wall along the auxiliary embankment of the reservoir in the background. Photo 12 includes the existing road and cars in the foreground and middleground views, and vegetation and the existing wall along the auxiliary embankment of the reservoir in the background. The background of Photo 12 also provides an example of the height and massing of structures in the vicinity of the Project site, which include one- and two-story buildings. Photo 13 provides a view of the Project site from the I-580 overcrossing at Ardley Avenue, with the existing roadway in the foreground, the bridge and the existing wall along the auxiliary embankment of the reservoir in the middleground, and the land uses in the vicinity of the Project site (one- and two-story residential structures) in the background.

Visual Quality. The Central Reservoir site, which is restricted from public use and access, is characterized from I-580 by the presence of the existing vegetation and the existing wall along the reservoir auxiliary embankment. Views of the existing reservoir are blocked by the wall along the reservoir auxiliary embankment. The vegetation and wall are in the middleground and background of views dominated by the existing roadways, I-580 and Ardley Avenue. From the overcrossing at Ardley Avenue, views of the existing reservoir are blocked by the wall along the reservoir auxiliary embankment, which is not visible unless viewers are looking directly at the site. Because the appearance of the site is within the context of a major roadway, the visual quality is considered low.

Affected Viewers and Exposure Conditions. Public views of the Project site from I-580 and the Ardley Avenue overcrossing are limited by the existing wall along the auxiliary embankment of the reservoir. Affected viewers at this location primarily include motorists in close proximity to the site, who would only briefly see the site as they drive by.

Visual Sensitivity Conclusion. Because the site has low visual quality and low exposure, it is considered to have low visual sensitivity.

Neighborhood North of I-580

Figure 3.1-6 provides views toward the Project area from the neighborhood north of I-580. Photo 14 provides a view toward the Project area from an elevated location in the neighborhood across I-580, with existing land uses and landscaping prominent features in the photo. Photo 15 provides a view from the neighborhood immediately on the north side of I-580, with streets that are parallel and perpendicular with the Project site, with existing land uses and landscaping in the foreground and middleground of the photo. Photo 16 provides a view toward I-580 and the Project site from a street immediately adjacent to I-580. Photo 15 and Photo 16 also provide examples of the residential structures in the vicinity of the Project site. The Project site is not visible from the neighborhood north of I-580. The visual character of the neighborhood north of I-580 consists of closely spaced, one- and two-story, residential structures that are fronted by small landscaped yards. Mature trees are present throughout the neighborhoods, including public sidewalk areas.

Visual Quality. Views of the Project area from the elevated locations are in the background of views dominated by existing vegetation and development in the foreground and middleground. Views of the Project area from the neighborhood immediately north and adjacent to I-580 are blocked by the existing vegetation and development. Mature street trees restrict the viewer exposure, while other areas include few street trees and exhibit more open views of developed areas. The Project site is not visible from these locations. The visual quality of views toward the Projects area are low to moderate because of the presence of existing residential and small-scale commercial development, with mature trees and landscaping that provide a visual buffer between the residential/commercial areas and I-580, the reservoir, and other land uses with lower visual appeal.

Affected Viewers and Exposure Conditions. The Project site is not visible from the neighborhood across I-580 due to the roadway configuration (the roadways are not parallel or perpendicular to the Project site) and due to the existing vegetation and development that blocks views of the Project area.

Visual Sensitivity Conclusion. Because the site has low to moderate visual quality and low exposure, it is considered to have low visual sensitivity.

3.1.2 Regulatory Framework

Federal Regulations

There are no applicable federal regulations related to aesthetics.

State Regulations

Caltrans designates highways as scenic highways based on how much of the landscape can be seen by travelers, the scenic quality of the landscape, and the extent to which views are compromised by development. I-580 from the San Leandro city limits to Highway 24 in Oakland is a designated state scenic highway because: (1) this landscaped freeway gives the motorist a view of the San Francisco Bay, with the San Francisco Peninsula and its cities lying beyond; (2) between the freeway and the San Francisco Bay can be seen many examples of the architecture prevalent around the turn of the century; and (3) this recessed freeway has also received several aesthetic awards for attractive landscaping (Caltrans, 2018).

Local Regulations

Under Section 53091 of the California Government Code, EBMUD, as a local agency and utility district, is not subject to building and land use zoning ordinances (such as tree ordinances) for projects involving facilities for the production, generation, storage, treatment, or transmission of water. However, EBMUD’s practice is to work with local jurisdictions and neighboring communities during project planning and to consider local environmental protection policies as guidance.

City of Oakland General Plan

The *City of Oakland General Plan* includes the following objectives, policies, and actions that guide development design and aesthetic resource impact considerations, with the goal of protecting scenic resources (City of Oakland, 1996).

Open Space, Conservation, and Recreation Element

Policy OS-3.6: Open Space Buffers Along Freeways. Maintain existing open space buffers along Oakland's freeways to absorb noise and emissions and enhance the scenic quality of the roadways. Manage steeply sloping or wooded parcels adjacent to highways owned by Caltrans to conserve natural resources and protect open space. Where compatible with adjacent land uses, support the use of land along, under, or over freeways in urban settings for greenbelts, recreation, public art, or other activities which enhance the usefulness and appearance of such land.

Action OS-3.6.1: Landscape Screening Along Freeways. Require retention of existing landscape screening as a condition of development approval for any property adjacent to Highway 13, Highway 580 (east of Grand), or Highway 24 (above Broadway). Encourage Caltrans to include landscape screening for any sound wall project in these areas.

Objective OS-10: Scenic Resources. To protect scenic views and improve visual quality.

Policy OS-10.1: View Protection. Protect the character of existing scenic views in Oakland, paying particular attention to: (a) views of the Oakland Hills from the flatlands; (b) views of downtown and Lake Merritt; (c) views of the shoreline; and (d) panoramic views from Skyline Boulevard, Grizzly Peak Road, and other hillside locations.

Policy OS-10.2: Minimizing Adverse Visual Impacts. Encourage site planning for new development which minimizes adverse visual impacts and takes advantage of opportunities for new vistas and scenic enhancement.

Action OS-10.2.1: Visual Analysis for New Development. On an ongoing basis, the Office of Planning and Building will require visual analysis for new developments which could significantly impact views and vistas.

Policy OS-10.3: Underutilized Visual Resources. Enhance Oakland's underutilized visual resources, including the waterfront, creeks, San Leandro Bay, architecturally significant buildings or landmarks, and major thoroughfares.

Scenic Highways Element

The *Scenic Highways Element of the Oakland Comprehensive Plan* (City of Oakland, 1974) includes goals and policies to establish guidelines for the preservation of scenic routes.

> **Goal:** To protect and enhance the distinctive character of scenic routes within the City.
>
> **Goal:** To improve Oakland's physical environment and to preserve the natural qualities of Oakland's setting.
>
> > ***General Policy 3:*** Urban development should be related sensitively to the natural setting.
> >
> > ***General Policy 4:*** High standards for preserving and enhancing natural landforms and vegetation should be established and maintained to regulate all activities related to earthwork and the removal of trees, shrubs or ground cover.
> >
> > ***Policy Related to MacArthur Freeway 1:*** The signs within the scenic corridor that are visible from the freeway should be for identification purposes only; no advertising should be permitted.
> >
> > ***Policy Related to MacArthur Freeway 2:*** Visual intrusions within the scenic corridor should be removed, converted, buffered or screened from the motorist's view.
> >
> > ***Policy Related to MacArthur Freeway 3:*** Panoramic vistas and interesting views now available to the motorists should not be obliterated by new structures.
> >
> > ***Policy Related to MacArthur Freeway 4:*** New construction within the scenic corridor should demonstrate architectural merit and a harmonious relationship with the surrounding landscape.
> >
> > ***Policy Related to MacArthur Freeway 5:*** The ban of truck traffic on the MacArthur Freeway should continue indefinitely.

EBMUD Standard Construction Specifications

EBMUD's Standard Construction Specification 01 35 44, Environmental Requirements, Section 3.7 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.
- 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 EBMUD.
- Any tree injured during construction shall be evaluated as soon as possible by a certified arborist provided by the EBMUD, and replaced as deemed necessary by the certified arborist.

EBMUD’s Standard Construction Specification 01 35 44, Section 1.1(B) requires controls on site activities 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 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.

EBMUD’s Standard Construction Specification 01 74 05, Cleaning, requires controls on site activities relative to the cleanliness of construction areas:

- 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 EBMUD property as often as necessary so that at no time shall there be any unsightly or unsafe accumulation of rubbish.

3.1.3 Impact Analysis

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

The visual quality impact analysis is based on field observations conducted by ESA in 2017 and 2018, review of Project maps and drawings, aerial and ground-level photographs, simulations of the Project within photographs, and review of a variety of data in the record, such as local planning documents. The analysis identifies potential temporary (short-term) and permanent (long-term) impacts on scenic vistas or the visual character and quality of a site as seen from urban locales, recreational facilities, and open space areas.

Methodology for Illustrating Existing and Proposed Conditions

As part of the analysis, computer-generated visual simulations were produced to illustrate conceptual “before” and “after” visual conditions as seen of the Project site from the most prominent public locations. Visual simulations and renderings were prepared as part of the Architectural Design Report, which is included in Appendix C. The direction and location of these viewpoints are shown on Figure 3.1-1 and include the following:

- Photo 1: Ardley Avenue looking southeast
- Photo 2: Ardley Avenue at 23rd Avenue looking north
- Photo 6: East 32nd Street near Ardley Avenue looking east
- Photo 7: 25th Avenue near East 29th Street looking north
- Photo 10: Redwood Day School looking west

Visual simulations are not provided separately for the other photo viewpoints shown in Figure 3.1-1 (Photos 3–5, 8–9, 11–16) because the views of the Project are less prominent or would not be visible, or the viewpoint was similar to other viewpoints for which simulations are provided (Photos 1–2, 6–7, and 10).

Significance Criteria

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

1. Have a substantial adverse effect on a scenic vista.
2. Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway.

3. In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings (Public views are those that are experienced from publicly accessible vantage points), or in an urbanized area, conflict with applicable zoning and other regulations governing scenic quality.
4. Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area.

The approach to evaluating the effect of the Project under each CEQA significance criterion is briefly clarified below.

- ***Have a substantial adverse effect on a scenic vista*:** This criterion applies only to projects that would be on or disrupt access to a scenic vista, or result in visual changes within its viewshed. Scenic vistas may be officially recognized or designated (e.g., within local planning documents or the Caltrans Scenic Highway Program), or they may be informal in nature (e.g., mountain peaks or coastal bluffs). The Project's effect would be considered substantial if it would appreciably damage or remove the visual qualities that make the view unique, unobstructed, and/or exemplary.
- ***Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway:*** Damage to a scenic resource is substantial when it is reasonably perceptible to affected viewers, as seen from a scenic highway, and when it appreciably degrades one or more of the aesthetic qualities that contributes to a scenic setting. The presence of and potential damage to scenic resources in this analysis is considered, along with Project-related effects on the existing visual character and quality of a site or surroundings (see the next bullet).
- ***In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings (Public views are those that are experienced from publicly accessible vantage points), or in an urbanized area, conflict with applicable zoning and other regulations governing scenic quality:*** The city of Oakland is considered an urbanized area, as defined in *CEQA Guidelines* Section 15387, and as mapped by the U.S. Census (2010); thus, impacts are considered in the context of the potential to conflict with applicable zoning and other regulations governing scenic quality.

  Given the naturalistic setting of some of the Project area and surrounding areas (including existing mature trees), the Project effects on the visual character and quality of the site and its surroundings are also considered. The Project would "substantially degrade" the visual character or quality of a site if it would have a strong negative influence on the public's experience and appreciation of the visual environment. As such, visual changes are always considered in the context of a site or locale's visual sensitivity (as described above in Section 3.1.1, Environmental Setting). Visual changes caused by the Project are evaluated in terms of their visual contrast with the area's predominant landscape elements and features, their dominance in views relative to other existing features, and the degree to which they could block or obscure views of aesthetically pleasing landscape elements. Visual changes are also evaluated in terms of potential damage to or removal of features of the natural or built environment that contribute to a scenic public setting. The magnitude of visual change that would result in a significant impact (i.e., substantial degradation) is influenced by its degree of permanence, and is inversely related to the visual sensitivity of a site.

- ***Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area:*** This criterion applies to projects that require nighttime lighting (either during construction or operation), or that involve structures or finishes that could create substantial glare.

Impacts and Mitigation Measures

Impact AES-1: Have a substantial adverse effect on a scenic vista. (Criterion 1)

Views of the Oakland-Berkeley Hills are considered a designated scenic vista in this analysis as they are identified as an area of great visual importance in the *City of Oakland General Plan* (City of Oakland, 1996). As discussed in Section 3.1.1, Environmental Setting, the Oakland-Berkeley Hills and the Oakland Temple are the distant background of views of the Project site from some areas of Ardley Avenue looking north/northeast as shown in Photo 3 on Figure 3.1-2, where views of the Oakland-Berkeley Hills are not blocked by mature trees. Portions of Ardley Avenue are the only neighborhood area in the vicinity of the Project site where the Project and Oakland-Berkeley Hills could be seen in the same view, as other neighborhoods are between the site and the Oakland-Berkeley Hills; or are at a lower elevation than the site, which currently blocks views of the Oakland-Berkeley Hills, such as the areas south of the existing reservoir (Figure 3.1-4, Photo 7).

Construction

Demolition and construction are anticipated to take approximately 6 years. Project construction activities would require vegetation removal, earthwork, stockpiling of material, and the use of heavy equipment. The existing fence would remain in place during construction. During the site preparation and demolition, tank and valve structure construction, and site restoration phases, some activities would be visible between the breaks in vegetation, including some of the taller construction equipment (e.g., cranes and Cement Deep Soil Mixing [CDSM] drill rigs). The substructure construction phase would take place at a lower elevation on the site than the existing street, so these construction activities would not be highly visible. In the few areas where views of the Oakland-Berkeley Hills are not obstructed by mature trees, views of the construction activities would be limited in the foreground or middleground. Because most of the construction activities would be not much higher than the existing top of reservoir or structures between the reservoir site and the Oakland-Berkeley Hills, which include one- and two-story commercial/institutional uses and residences, view of the Oakland-Berkeley Hills would not be substantially obstructed. Because the scenic views that are blocked by construction activities would be limited, construction would not appreciably damage or remove the visual qualities that make the view unique, unobstructed, and/or exemplary.

Therefore, the Project construction would not have a substantial adverse effect on a scenic vista, and impacts would be less than significant.

Operation

As described in the Section 2.5 in the Project Description, the Project would include construction of three concrete tanks within the existing reservoir basin, which would be approximately 22-feet higher than the existing reservoir roof at the location closest to Ardley Avenue. As described above, portions of Ardley Avenue are the only neighborhood area in the vicinity of the Project site where the Project and Oakland-Berkeley Hills could be seen in the same view. A visual simulation is presented on Figure 3.1-7, depicting existing site conditions and simulated Project conditions from Ardley Avenue. The simulated Project conditions are based on preliminary Project designs and landscaping approximately 5- and 10-years after planting. As shown in the upper photo, existing views of the Project site are dominated by vegetation and the existing reservoir and security fencing. There are glimpses of views of the Oakland-Berkeley Hills and the Oakland Temple in the background between the mature trees as viewers pass the site. Under the Project (Visual Simulation-5 years and Visual Simulation-10 years), a new fence, berm, and landscaping would be installed along Ardley Avenue adjacent to the sidewalk. The upper portion of the tanks would be visible as public viewers in cars, bicycles, or along the sidewalk pass the site through residential areas. The Oakland-Berkeley Hills would still be visible in the background of views where there are breaks between mature trees, similar to existing conditions (refer to Figure 3.1-7, Visual Simulation-5 years after construction). With the planting after 10 years, the mature vegetation would fill in more of the gaps along Ardley Avenue and limit the views of the Oakland-Berkeley Hills in more areas, relative to existing conditions.

As shown on Figure 3.1-2 and Figure 3.1-7, the views of the Oakland-Berkeley Hills are limited to areas where there are breaks in the existing vegetation along this portion of Ardley Avenue as a viewer moves past the site (refer to Photos 2 and 3 in Figure 3.1-2). The Oakland-Berkeley Hills and the Oakland Temple would still be intermittently visible in the background of views where there are breaks in the vegetation within 5 years of Project completion, similar to existing conditions (refer to Figure 3.1-7, Visual Simulation-5 years after construction). The Project would not would appreciably damage or remove the visual qualities that make the view unique, unobstructed, and/or exemplary; therefore, the Project would not have a substantial adverse effect on a scenic vista, and impacts would be less than significant.

Significance Determination Before Mitigation

Less than significant.

Mitigation Measure

None required.

Existing View - Ardley Avenue at East 23rd Avenue looking north (Photo 2)

Visual Simulation - 5 years after construction

Visual Simulation - 10 years after construction

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D160330.00 - EBMUD Central Reservoir Replacement EIR\05 Graphics-GIS-Modeling/Illustrator

SOURCE: Environmental Vision, 2018

EBMUD Central Reservoir Replacement Project

Figure 3.1-7
Visual Simulation from Ardley Avenue at 23rd Avenue Looking North

ESA

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

As described in Section 3.1.1, the Project site is south of and adjacent to a designated scenic highway portion of I-580. Caltrans has designated this section a state scenic highway because of the views from the highway, examples of the architecture prevalent around the turn of the century, and aesthetic awards for attractive landscaping (Caltrans, 2018). Views of the San Francisco Bay, San Francisco Peninsula, and its cities lying beyond are not available along this segment of I-580. The visible architecture along this portion of I-580 near the Project site is not a historic-era resource or related to the turn of the century (ESA, 2018). This portion of I-580 is landscaped with mature trees and shrubs.

The current reservoir is not visible to motorists along I-580 because it is screened from the highway by vegetation and the existing auxiliary embankment and wall, as shown on Photo 11 and Photo 12 in Figure 3.1-5. As described in the Section 3.1.1, the background of views include the land uses in the vicinity of the Project site, one- and two-story residential and commercial/institutional structures, which are seen consistently along the top of the bank along the freeway.

The Project would include the removal of the wall on the existing auxiliary embankment, but would not remove any of the trees or landscaping below the wall adjacent to I-580. In addition, the Project would include planting trees at the north boundary of the site, which would enhance the view of existing vegetation along I-580.

The Project would also include the construction of three concrete tanks within the existing reservoir basin, which would be approximately 22-feet higher than the existing reservoir roof at the location closest to Ardley Avenue. These new tanks would not affect views from I-580, nor would they block views of the San Francisco Bay, San Francisco Peninsula, or its cities lying beyond because, as described above, the views of these areas are not visible from the segment of I-580 that passes the site and nearby areas. The perceived height and massing of the new tanks would be consistent with structures in the vicinity of the Project site, which include one- and two-story buildings shown in the background of Photo 12 on Figure 3.1-5 (also refer to Section 2.5, Project Characteristics, for a description of the tanks and other Project components).

Because the Project would include the addition of trees along this portion, and would not remove any of the existing mature trees and shrubs adjacent to I-580, with completion of the Project, views of the tanks in the background would not be out of character with the one- and two-story commercial/institutional and other structures that are currently visible as the viewer travels through this section of the freeway. Therefore, the Project would not damage scenic resources within a state scenic highway.

Significance Determination Before Mitigation

Less than significant.

Mitigation Measure

None required.

Impact AES-3: In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings, or in an urbanized area, conflict with applicable zoning and other regulations governing scenic quality. (Criterion 3)

As described above under Section 3.1.2, the *City of Oakland General Plan* includes objectives, policies, and actions that guide development design and aesthetic resource impact considerations, with the goal of protecting scenic resources. Policy OS-3.6 dictates maintaining space buffers along Oakland's freeways, including the retention of existing landscaping. As described above under Impact AES-2, the Project would not remove any of the existing mature trees and shrubs adjacent to I-580. Objective OS-10 includes polices that focus on protecting the character of existing scenic views in Oakland, including views of the Oakland-Berkeley Hills. In particular, Policy OS-10.1: View Protection, calls for protection of "the character of existing scenic views in Oakland, paying particular attention to: (a) views of the Oakland Hills from the flatlands…." As described in Section 3.1.1, Environmental Setting, the Oakland-Berkeley Hills are the distant background of existing views as northbound travelers along Ardley Avenue and the adjacent sidewalks move past the Project site from some areas of Ardley Avenue looking north/northeast (from approximately East 31st Street to East 32nd Street), where views of the Oakland-Berkeley Hills are not blocked by mature trees (see Photos 2 and 3 of Figure 3.1-2). As described above under Impact AES-1, after Project completion, the Oakland-Berkeley Hills would still be visible in the background of views where there are breaks between mature trees, similar to existing conditions; direct views of the Oakland-Berkeley Hills would be slightly reduced along this approximately 500-foot stretch of Ardley Avenue, by the proposed tanks and landscaping at maturity (see Figure 3.1-7). However, because the Project would not remove any vegetation adjacent to I-580, and views of the Oakland-Berkeley Hills would still be intermittently visible after Project completion, the Project would not substantially alter the character of existing scenic views of the Oakland-Berkeley hills from the flatlands. Thus, the Project would not result in a substantial conflict with applicable zoning and other regulations governing scenic quality.

The Project would affect the visual character of the Project area both due to short-term disruption during construction and due to the long-term change associated with demolishing the existing reservoir, constructing the new tanks, regrading the site, and removing existing trees and other vegetation. Views of construction activities would vary, depending on the type and location of those activities. The changes associated with Project implementation would be noticeable to those land uses that surround the site. As described in Section 3.1.1, the Project site is visible to the immediately surrounding uses (i.e., residential neighborhoods across from the site on Ardley Avenue/23rd Avenue and perpendicular streets [East 31st Street, East 32nd Street, East 30th Street], limited visibility from the corner of 25th Avenue and East 29th Street, and limited visibility from users of the Central Reservoir Recreation Area and Redwood Day School). The Project site is not visible from I-580, nor is the site visible from the overcrossing of I-580 and Ardley Avenue because the existing wall and auxiliary embankment block views of the site. Views of the Project area from the neighborhood immediately north and adjacent to I-580 are blocked by the existing vegetation and development.

The potential changes in views and the effect on the visual character and quality during both construction and operation of the Project are described further below.

Construction

The construction schedule and phases are described under Impact AES-1 above. The degree to which construction activities would be noticeable would vary, depending on the views experienced by the public, and on the type and location of those activities. During the site preparation and demolition, tank and valve structure construction, and site restoration phases, some views of the activities would be visible between the breaks in vegetation, including some of the taller construction equipment (e.g., cranes and CDSM drill rigs). Vegetation removal, soil stockpiling, and tank and pipeline construction would be highly visible to viewers directly adjacent to the work area, and although temporary, would occur over an extended time. Soil stockpiling could reach as high as elevation 215-feet, approximately equal to the height of the existing reservoir roof. While the work area would be fenced during construction with the existing fence, construction vehicles, materials, and equipment may be noticeable visual features. As described in Section 3.1.1, the reservoir is currently active with operation and maintenance activities occurring; with construction, the presence of equipment would intensify. However, most of the visible construction activities, excluding construction of the tanks themselves, would be not much higher than the existing top of reservoir or structures around the reservoir.

As described in Section 3.10, Noise, Mitigation Measure NOI-1 includes the installation of a 16-foot temporary noise barrier along EBMUD’s property adjacent to Redwood Day School. The temporary noise barrier would be constructed of fabric panels mounted on K-rails (Figure 3.1-8).

As shown in Figure 3.1-4, Photo 10, the existing trees adjacent to Redwood Day School block most views of the existing reservoir, with some areas of the metal reservoir roof visible between breaks in the trees. Because the sound barrier is not permanent (i.e., it would be in place during construction only), the current views of the Project site and beyond are limited to breaks in the site’s mature vegetation, and the views are considered low quality because of the presence of existing built features and the reservoir roof, the temporary sound barrier would not substantially degrade the existing visual character or quality of the site and its surroundings.

SOURCE: EBMUD, 2019

Figure 3.1-8
Temporary Noise Barrier Panel System

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 the following:[2]

- 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; 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.

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2 The EBMUD Practices and Procedures Monitoring Plan (Appendix E) lists the applicable standard specifications language.

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 05, Cleaning, have been incorporated into the Project and include measures to maintain an orderly construction site and to protect trees, and because the current views of the Project site are limited to breaks in the site's mature vegetation and are considered low quality because of the presence of existing built features and reservoir roof, construction would not substantially degrade the existing visual character or quality of the site and its surroundings.

A portion of the pipeline work for the Project would take place in East 29th Street over a period of approximately 1 week. Once the pipeline work is completed, the pavement will be restored. The visual character of the pipeline alignment along East 29th Street would be consistent with the existing visual character of the area.

Operation

The major changes in the Project site, as well as the changes in views with the Project from each viewpoint noted on Figure 3.1-1 are described below. The Project's effect on the visual character and quality of the Project site and its surroundings would be attributable primarily to the long-term changes associated with the proposed landscape plan, which would change the site topography, remove trees and shrubs, and add new trees and shrubs, and the construction of three concrete tanks. The existing metal reservoir roof, which is currently a source of glare during certain times of the day, would be removed. With the addition of landscaping and removal of the existing metal roof, the overall glare that is currently present would be significantly reduced. Views toward the site would be temporarily altered due to the removal of the many mature trees that currently provide screening. The Project site currently includes approximately 377 trees and of those existing trees, approximately 143 trees would be removed for poor health and because of conflict with construction. Some tree removal would occur along Ardley Avenue and 23rd Avenue, the south boundary of the site, and portions of the east boundary near the corner of 25th Avenue and East 29th Street and at the Central Reservoir Recreation Area (Appendix C, Architectural Design Report, depicts the locations where trees would be removed). As described in the Project Description and depicted on Figure 2-3, EBMUD would plant approximately 337 new trees, as well as shrubs along Ardley Avenue, the north boundary of the site, at the corner of 25th Avenue and East 29th Street, and within the site. The total number of trees on site during the Project's operational phase would be approximately 571, or an increase of approximately 194 trees.

The tanks and other infrastructure on the site would be partially screened from views from the surrounding neighborhood with earthen berms planted with vegetation, which would be located along Ardley Avenue and 23rd Avenue, as well as at the corner of 25th Avenue and East 29th Street (Figures 2-5 and 2-7 in the Project Description show cross-sections of the proposed site plan with the planted berms). Where berms are not feasible, views of the tanks would be screened with vegetation only, including existing trees and supplemental trees and shrubs. The landscaping plants would include primarily drought-tolerant native tree and shrub species, with the inclusion of Gingko (a non-native, deciduous tree) as an accent. Evergreen trees would be planted along the site perimeter; deciduous trees would also be included for seasonal interest and may be used in interior portions of the site. The proposed trees would include a mix of fast- and slow-growing species to promote screening after installation. Because fast-growing trees often have shorter lives, the plant mix would also include longer lived, but slower growing trees.

Visual changes associated with the Project would be most noticeable in the early years after Project construction because new trees and shrubs would not have grown enough to screen the site and provide an aesthetic value that is similar to current site conditions. Visual simulations were prepared (see Figure 3.1-7 through Figure 3.1-12) and illustrate conditions as they would appear 5- and 10-years after planting of replacement trees and shrubs. These are further described below, by location.

Ardley Avenue/23rd Avenue

Figure 3.1-7 and Figure 3.1-9 present views toward the Project site from viewpoints along Ardley Avenue. As described in Section 3.1.1, Environmental Setting, the existing visual quality in this area is considered low because the breaks in vegetation show intermittent views of the existing reservoir roof, which is perceptibly uncharacteristic of the surrounding residential areas. As shown in the existing view photos in Figure 3.1-7 and Figure 3.1-9, views of the interior of the site are mostly blocked by the existing mature landscaping. The existing reservoir roof is visible where there are breaks in landscaping. Short-duration views into the Project site are available to motorists and to pedestrians traveling along the sidewalk who pass the site through the residential areas. Views of the Oakland-Berkeley Hills are limited looking north/northwest where there are breaks in the mature trees, but the views are mostly obstructed by existing vegetation and development. The area immediately west of the site is dominated by one- and two-story residential structures.

The middle and lower photos in Figure 3.1-7 and Figure 3.1-9 present simulations of the Project 5 and 10 years following completion of construction and installation of landscaping. Once completed, the Project would include three green pre-stressed concrete tanks within the existing reservoir basin, which would be approximately 22 feet higher than the existing reservoir roof at the location closest to Ardley Avenue. The Project would include new security fencing; 8-feet high, black vinyl coated, 1-inch mesh, with three-strand barbed wire. A berm would be installed along Ardley Avenue, at a height of approximately 12 feet above the adjacent sidewalk (Figure 2-5 in Chapter 2 shows cross-sections of the tanks and berms adjacent to Ardley Avenue). Under the Project (Figure 3.1-7 and Figure 3.1-9 Visual Simulation-5 years and Visual Simulation-10 years), the new fence and upper portion of the tanks would be visible. However, the difference between the site's existing and proposed visual character as viewed after Project completion would not be substantial; although the proposed tanks would be taller than the existing reservoir, these tanks would remain as a water utility facility and the perceived height and massing of the tanks above the existing reservoir would be consistent with structures in the vicinity of the Project site, which include one- and two-story buildings to the east and west of the site (Figure 2-6 in the Project Description presents a cross-section of the tanks adjacent to Redwood Day School). In addition, the new tanks would blend within the surrounding vegetation and earthen berms planted with

Existing View - Ardley Avenue looking southeast (Photo 1)

Visual Simulation - 5 years after construction

Visual Simulation - 10 years after construction

011818

D160330.00 - EBMUD Central Reservoir Replacement EIR\05 Graphics-GIS-Modeling/Illustrator

SOURCE: Environmental Vision, 2018

EBMUD Central Reservoir Replacement Project

Figure 3.1-9
Visual Simulation from Ardley Avenue Looking Southeast

ESA

new vegetation, and removal of the existing reservoir would eliminate the existing roof glare. The landscape design would result in site conditions that would be a change from the existing conditions initially, with the removal of vegetation, but as shown in the Visual Simulation-5 years and Visual Simulation-10 years on Figure 3.1-7 and Figure 3.1-9, the new landscaping under the Project would screen the Project site more than the existing vegetation. Because the Project would remain as a water utility facility, be consistent with the perceived massing and height of the surrounding structures, and blend within the surrounding vegetation and landscape, the Project, as seen from public vantage points along Ardley Avenue, would not substantially degrade the existing visual character or quality of the site and its surroundings.

Neighborhood to the West of Ardley Avenue and Project Site

Figure 3.1-10 presents a view from a street perpendicular to the Project site. As described in Section 3.1.1, Environmental Setting, the existing visual quality in the area farther west than Ardley Avenue/23rd Avenue is considered low due to views of the existing reservoir roof, which is perceptibly uncharacteristic of the surrounding residential development and landscaping. As shown in the upper photo in Figure 3.1-10, views of the existing reservoir facilities and roof are prominent where there are breaks in the existing landscape vegetation. The existing trees on the other side of the reservoir are also visible in the background view.

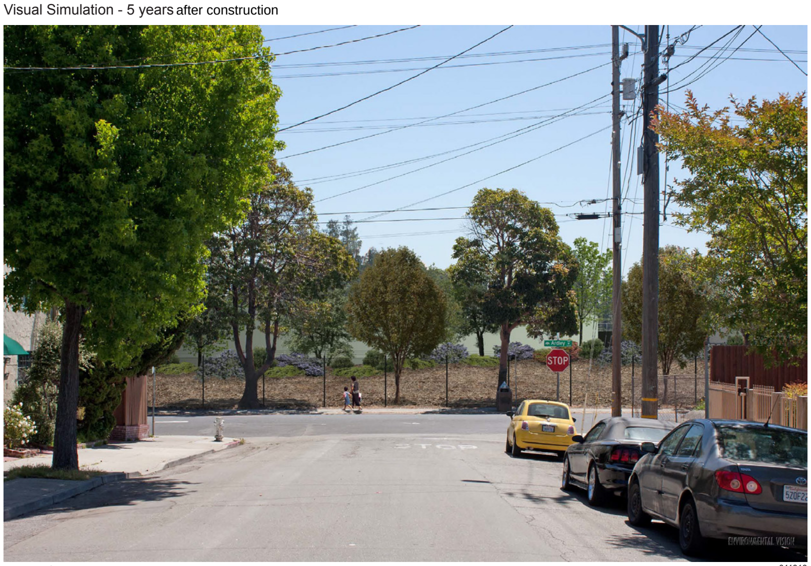
The middle and lower photos in Figure 3.1-10 present visual simulations of the Project 5 and 10 years following completion of construction and installation of landscaping. Under the Project (Visual Simulation-5 years and Visual Simualtion-10 years), fencing and a new tank would be visible.

The new green concrete tanks would be approximately 22 feet higher than the existing reservoir roof at the location closest to Ardley Avenue. However, the tanks would remain as a water utility facility and the perceived height and massing of the tanks above the existing reservoir would be consistent with the structures in the vicinity of the Project site, which include one- and two-story buildings west of the site. In addition, the new tanks would blend within the surrounding vegetation and earthen berms planted with new vegetation, and removal of the existing reservoir would eliminate the existing roof glare. Landscaping along Ardley Avenue would be replaced to include denser shrubs than currently exist, and planted trees that are intended, at maturity, to be denser than those that currently exist, which would partially screen views of the tanks. A berm along Ardley Avenue would also partially block the view of the tanks. The new tanks and fence would blend within the surrounding vegetation and earthen berms planted with new vegetation.

Because the proposed tank design would be consistent with the height of the existing structures to the west of the site and would blend within the surrounding vegetation and landscape, the Project, as seen from public vantage points along streets perpendicular to the site, would not substantially degrade the existing visual character or quality of the site and its surroundings.

Existing View - East 32nd Street near Ardley Avenue looking easth

Visual Simulation - 5 years after construction



Visual Simulation - 10 years after construction

011818

D160330.00 - EBMUD Central Reservoir Replacement EIR\05 Graphics-GIS-Modeling/Illustrator

SOURCE: Environmental Vision, 2018

EBMUD Central Reservoir Replacement Project

Figure 3.1-10
Visual Simulation from East 32nd Street near Ardley Avenue Looking East

ESA

Existing View - 25th Avenue near East 29th Street looking north (Photo 3)

Visual Simulation - 5 years

Visual Simulation - 10 years

020118

SOURCE: Environmental Vision, 2018

EBMUD Central Reservoir Replacement Project

Figure 3.1-11
Visual Simulation from 25th Avenue near East 29th Street Looking North

South Entrance, Central Reservoir Recreation Area, Redwood Day School, and I-580

South Entrance. Figure 3.1-11 presents the view of the south end of the Project site from 25th Avenue near East 29th Street. As described in Section 3.1.1, Environmental Setting, the existing visual quality in this area is considered low because the views of the existing built structures and reservoir roof are perceptibly uncharacteristic of the surrounding areas. As shown in the upper photo in Figure 3.1-11, the existing built structures associated with the reservoir are evident; however, the existing reservoir facilities are partially blocked by the main embankment and landscape vegetation.

The middle and lower photos in Figure 3.1-11 present simulations of the Project 5 and 10 years following completion of construction and installation of landscaping. At this location, the Project would include the construction of new green concrete tanks, new security fencing, landscaping, and removal of the existing material storage building. The existing utility pole at this location would also be relocated approximately 20-feet to the north to accommodate the new driveway. Under the Project (Visual Simulation-5 years and Visual Simualtion-10 years), as shown in in Figure 3.1-11, a portion of the existing main embankment on the south side of the site at the corner of 25th Avenue and East 29th Street would be retained, which would screen most views of the tanks. Landscaping at the south end of the Project site would be replaced to include more planted trees that are intended, at maturity, to be denser than what is currently at this location, which would partially screen the view of the tanks. Although the proposed tanks would be taller than the existing reservoir and more visible compared to the existing reservoir facilities before the vegetation matures, these tanks would remain as a water utility facility, and would blend within the surrounding vegetation and earthen berms planted with new vegetation. The removal of the material storage building would also provide more views of the landscape and natural features.

Because the proposed tank design would blend within the surrounding vegetation and landscape, the Project, as seen from the south end of the Project site, would not substantially degrade the existing visual character or quality of the site and its surroundings.

Redwood Day School. Figure 3.1-12 presents a view from Redwood Day School. As described in Section 3.1.1, Environmental Setting, the existing visual quality in this area is considered low because the views of the existing built structures and reservoir roof are perceptibly uncharacteristic of the surrounding areas. As shown in the upper photo in Figure 3.1-12, views of the existing reservoir facilities from these locations include a wide stretch of a roof with glare through breaks in the existing trees. Existing trees on the other side of the reservoir are slightly visible in the background view where there are breaks in the trees; however, the existing trees block most of the views of the neighborhood beyond, and there are no scenic resources (i.e., Oakland-Berkeley Hills) in the background of views.

The middle and lower photos in Figure 3.1-12 present simulations of the Project 5 and 10 years following completion of construction and installation of landscaping. The Project would include the construction of new green concrete tanks and rehabilitation of the perimeter road at this location. Although the proposed tanks would be taller than the existing reservoir and more visible compared to the existing reservoir facilities, the tanks

Existing View - Redwood Day School looking west (Photo 10)

Visual Simulation - 5 years

Visual Simulation - 10 years

020118

D160330.00 - EBMUD Central Reservoir Replacement EIR\05 Graphics-GIS-Modeling/Illustrator

SOURCE: Environmental Vision, 2018

EBMUD Central Reservoir Replacement Project

Figure 3.1-12
Visual Simulation from Redwood Day School Looking West

would remain as a water utility facility and would blend within the surrounding vegetation. In addition, the new tanks would blend within the surrounding vegetation and earthen berms planted with new vegetation, and removal of the existing reservoir would eliminate the existing roof glare. Under the Project, the trees at this location would be retained and supplemented with additional vegetation and as shown in Figure 3.1-12 (Visual Simulation-5 years and Visual Simualtion-10 years), and the tanks would be mostly screened by the vegetation as viewed from Redwood Day School. Because the existing trees at this location would be retained, the landscape design would result in site conditions that would be very similar to existing conditions.

Because the proposed tank design would blend within the surrounding vegetation and landscape, and the current trees would be retained at this location, the Project, as seen from Redwood Day School, would not substantially degrade the existing visual character or quality of the site and its surroundings.

Central Reservoir Recreation Area. Photo 8 and Photo 9 on Figure 3.1-4 present views toward the Project site from the Central Reservoir Recreation Area. As described in Section 3.1.1, Environmental Setting, the existing visual quality in this area is considered low because the view of the reservoir roof is perceptibly uncharacteristic of the surrounding areas. Views of the site are visible where there are breaks in the vegetation. Existing trees on the other side of the reservoir are visible in the background view, but the trees block most of the views of the neighborhood beyond and there are no scenic resources in the background. Views of the tanks would be available from the baseball field and basketball courts looking north. However, as noted in Section 3.1.1, the baseball field and basketball courts are active use areas where exposure is limited and do not include facilities that would be associated with more contemplative use.

Although the proposed tanks would be taller than the existing reservoir and more visible compared to the existing reservoir facilities, these tanks would remain as a water utility facility and blend within the surrounding vegetation. The removal of the existing reservoir would eliminate the existing roof glare that is produced at the Project site. In addition, as shown in Figure 2-3 of the Project Description, the Project is directly adjacent to the Central Reservoir Recreation Area and would include a basin and bioretention area that would be mulched and landscaped, with sloped sides, which would replace the existing built facilities and would eliminate the existing roof glare. Most of the trees adjacent to the recreation area would be retained with the Project, further screening the site. The portions of the basin that would be visible between the breaks in the trees would consist of sloped and flat landscaping with mulch, ground cover, trees, and shrubs, which would provide more views of the landscape and natural features.

Because the visual conditions of surrounding areas are not a focus of the types of active uses that occur at vantage points at the Central Recreation Area, and the proposed tank design would blend within the surrounding vegetation and landscape, and the new mulched and landscaped basin would replace the existing built reservoir facilities, the Project, as seen from the Central Reservoir Recreation Area, would not substantially degrade the existing visual character or quality of the site and its surroundings.

I-580 and Overcrossing at Ardley Avenue. Photo 11 and Photo 12 on Figure 3.1-5 present views toward the Project site from I-580. As described in Section 3.1.1, Environmental Setting, the existing visual quality in this area is considered low because the site is mostly screened from public view and because the appearance of the site is within the context of a major roadway. The interior of the Project site is not visible from this location; views of the Project area include the existing roadway, vegetation, and the existing wall along the auxiliary embankment of the reservoir. The background views include the land uses in the vicinity of the Project site, which are seen consistently along the top of the bank along the freeway. As described in Section 3.1.1, the Project site is south of and adjacent to a designated scenic highway portion of I-580. As described under Impact AES-2, views of the San Francisco Bay, San Francisco Peninsula, and its cities lying beyond are not available, and the architecture that is visible along this portion of I-580 near the Project site is not historic-era resources or related to the turn of the century (ESA, 2018). This portion of I-580 is landscaped with mature trees and shrubs. The Project would include the removal of the wall on the existing auxiliary embankment, which would give motorists traveling adjacent to the site on I-580 fleeting views of the tanks and security fencing. The perceived height and massing of the proposed tanks above the existing reservoir would be consistent with the one- and two-story structures shown in the background of Photo 12 on Figure 3.1-5. The Project would not remove any of the trees or landscaping below the wall, adjacent to I-580. The Project would include trees along the north boundary of the site, which would contribute to the existing vegetation along I-580 and further screen the tanks. Because the Project would include the addition of trees along this portion of the highway, would not remove any of the mature trees and shrubs, and the tanks would be consistent with the height of the structures in the background of views along I-580, and the views would be similar to those as viewers pass beyond the site (i.e., landscaping adjacent to highway with structures in the background of views), the Project, as seen from I-580, would not substantially degrade the existing visual character or quality of the site and its surroundings.

Photo 13 on Figure 3.1-5 presents views toward the Project site from the overcrossing at I-580 and Ardley Avenue. As described in Section 3.1.1, the existing visual quality in this area is considered low because the appearance of the site is within the context of a major roadway. Views of the existing reservoir are blocked by the wall along the reservoir auxiliary embankment, which is not visible unless viewers are looking directly at the site from this location. The background views include the land uses in the vicinity of the Project site. The Project would include the removal of the wall on the existing auxiliary embankment, which would give motorists traveling along this overcrossing fleeting views of the tanks and security fencing. The height of the proposed tanks above the existing reservoir would be similar to the heights of the structures shown in the background of Photo 13 on Figure 3.1-5, and would blend within the surrounding vegetation. The Project would also include trees along the north boundary of the site, which would contribute to the existing vegetation along I-580. At the corner of Ardley Avenue and the I-580 overcrossing, the Project would include a berm, at a height of approximately 12 feet above the adjacent sidewalk, which would further screen the site. Because the Project would include the addition of trees and a berm at this location, the top of the tanks would be consistent with the height of the one- and two-story structures in the background of views, and the proposed tank design would blend within the surrounding vegetation and landscape, the Project, as seen from the I-580 overcrossing at Ardley Avenue, would not substantially degrade the existing visual character or quality of the site and its surroundings.

Neighborhood north of I-580

Photos 14 through 16 on Figure 3.1-6 present views toward the Project area from the neighborhood north of I-580. As described in Section 3.1.1, the existing visual quality in this area is considered low to moderate because of the presence of existing residential and small-scale commercial development with mature trees and landscaping that provide a visual buffer between the residential/commercial areas and I-580, the reservoir, and other land uses with lower visual appeal. The Project site is not visible from this neighborhood. Views of the Project area are screened from public view at the elevated locations in the neighborhood across I-580 and from the neighborhood immediately on the north side of I-580. It may be possible to see a small portion of the edge of the top of one of the tanks through the lower vegetation at the end of Woodruff Avenue (Photo 16 on Figure 3.1-6), but most of the tank would be behind the taller trees to the left, and the trees and structures to the right. In addition, the height of the proposed tank would be similar to the heights of the structures shown on the right of the photo. Given that the type and height of Project facilities would not be prominent or inconsistent with the visual character of the area, the Project, when viewed from the neighbor across from I-580, would not substantially degrade the existing visual character or quality of the site and its surroundings.

Significance Determination Before Mitigation

Less than significant.

Mitigation Measure

None required.

Impact AES-4: Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area. (Criterion 4)

Construction

As described in the Project Description, Section 2.6.3, Construction Schedule and Hours*,* construction would typically 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 and emergencies. Installation of the CDSM columns would take place over one 12-hour shift from approximately 7:00 a.m. to 7:00 p.m. Nighttime lighting would be required during CDSM construction during portions of the year when days are short and daylight is not adequate. For the CDSM work, nighttime lighting would be located around the tank pad area, on the north end of the site, next to the CDSM drilled piers. Nighttime lighting for a maximum of 2 nights may also be required when the new pipelines are connected to the existing distribution system. For the pipeline connections, nighttime lighting would be located at the corner of 25th Avenue and East 29th Street. The Central Reservoir Recreation Area and Redwood Day School are operated during daytime hours, but closed in the evenings/nighttime; however, the construction lighting may be visible to adjacent residences and along public roadways. Although the use of construction lighting at night would be temporary, the impact from night lighting on nighttime views could be potentially significant. **Mitigation Measure AES-1: Nighttime Lighting Controls** requires the shielding of night lighting to be directed downward or oriented such that the light source is not directed toward residential areas or onto streets. By directing the light source away from residential areas and streets, the nighttime lighting would be contained on the Project site, reducing the potential to create a new source of light or glare that would adversely affect nighttime views in the area.

With implementation of Mitigation Measure AES-1, which requires the shielding of night lighting, the Project would not create a new source of substantial light that would adversely affect views, and impacts would be less than significant.

Operation

The current Central Reservoir facility includes an existing concrete structure covered by a corrugated metal roof and surrounded by a chain link fence with barbed wire on top. At certain times of the day, the existing metal roof produces glare. The new pre-stressed concrete tanks would be green, approximately 22-feet taller than the existing Central Reservoir roof at the location closest to Ardley Avenue. All property fencing would be replaced with EBMUD's standard security fencing (8-feet high, black vinyl coated, 1-inch mesh, with double v-arm three-strand barbed wire, and a maximum post spacing of 10-feet). The Project would include earthen berms planted with vegetation, and approximately 337 new trees would be planted to supplement existing trees. The fence, tank and building materials, and finishes would consist of dull, non-reflective surfaces, and would not have large glass windows or other reflective materials facing affected viewers. Such finishes are not substantial sources of glare, such as mirrors, polished metallic surfaces, or windows. In addition, removal of the existing reservoir and replacement with the new tanks would eliminate the existing glare produced at the Project site.

The only permanent light source used during Project operation would be the motion-detected outdoor security lighting on the valve structure between the tanks. As shown in Figure 2-3 in the Project Description, the valve structure would be located between the three tanks and mostly shielded from the surrounding land uses by the tanks. However, the lighting may be visible to some of the residences and travelers along Ardley Avenue, approximately 400 feet from the valve structure. Periodically, this lighting may be on consistently, in non-motion detect mode, if evening maintenance is required. Because the lighting is on the structure between the tanks, and the area requiring lighting would not be close to residences or other land uses that would be sensitive to light and glare, the Project would not result in a substantial new source of light in the area. Further, the use of this lighting would be infrequent and short duration.

With the shielding of night lighting, and the use dull, non-reflective surfaces, the Project would not create a new source of substantial light or glare that would adversely affect views.

Significance Determination Before Mitigation

Potentially significant (construction).

Mitigation Measure

Mitigation Measure AES-1: Nighttime Lighting Controls.

To the extent possible, EBMUD shall 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.

Cumulative Impact Analysis

The scope and analysis for cumulative impacts on aesthetic resources encompasses the locations from which a viewer could see the Project construction or operations elements, along with views of other projects in the cumulative scenario. The cumulative impacts analysis also considers consecutive views where cumulative projects may be seen in close succession as a viewer moves through an area. A significant cumulative effect on aesthetic resources would result if the effects of the Project combined in space and time with those of cumulative projects to cause substantial degradation of the same scenic resources. A significant cumulative effect related to light and glare would result if the effects of the Project combined in space and time with those of other cumulative projects to cause substantial nuisance or hazard conditions on the same light-sensitive receptor.

The cumulative projects listed in the Section 3.0, Table 3.0-1 and shown on Figure 3.0-1 are all located between approximately 1,320 feet and 1 mile away from the Project site. The Montana Avenue Water Pipeline Replacement project and the Excelsior Street Cluster Water Pipelines Replacement project could have construction impacts that could combine with those of the Project to affect the aesthetics of the Project area. Construction activities at nearby project sites could be noticeable and visually unappealing, as seen by users of nearby public spaces, as well as a viewer moves through the area. However, construction-phase impacts of the pipeline replacement projects would generally be confined in extent to the immediate work areas. In addition, the impacts would be limited to periods of a few days to weeks along these cumulative project pipeline alignments. The existing buildings, vegetation, and topography would obstruct views of the proposed pipeline project areas. Similarly, views from the Project site toward the cumulative project site locations would be obstructed by the same existing physical features. Once the cumulative projects are complete, they would be buried and not visible above ground. Therefore, these projects would not contribute to short-term or long-term impacts on aesthetics. The change in visual context of the Project site would not have a substantial negative effect on the visual quality or character of the site, because the tanks would remain as a water utility facility, and the perceived height and massing of the tanks above the existing reservoir would be consistent with the structures in the vicinity of the Project site. In addition, the new tanks would blend within the surrounding vegetation and earthen berms planted with new vegetation. Therefore, the Project would not contribute to any cumulative impact on visual resources.

None of the cumulative projects listed in Table 3.0-1 would include permanent outdoor lighting. As described in Impact AES-4, the Project would not utilize building materials or building finishes that would be substantial sources of glare. Permanent motion-detected outdoor security lighting would be installed at the valve structure between the tanks. Because the lighting would be on the structure between the tanks, and the area requiring lighting would not be close to residences or other land uses that would be sensitive to light and glare, the Project would not result in a substantial new source of light in the area. Therefore, the Project would not contribute to any cumulative impacts related to a new source of substantial light or glare that would adversely affect views of the Project area.

3.1.4 References

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3.2 Air Quality

This section describes the physical and regulatory setting for air quality, and identifies and evaluates potential air quality impacts that could result from the construction and operation of the Project. It provides an introduction to criteria air pollutants and toxic air contaminants (TACs); describes the physical and regulatory setting, including pertinent regulations at the federal, state, and local levels; lists the criteria used for determining the significance of the Project's potential environmental impacts; and describes potential impacts and mitigation measures. Refer to Appendix F for supporting information, including air quality and greenhouse gases modeling outputs.

3.2.1 Environmental Setting

Climate and Meteorology

Atmospheric conditions such as wind speed, wind direction, and air temperature gradients interact with the physical features of the landscape to determine the movement and dispersal of air pollutants. The Project site is in the city of Oakland and is within the boundaries of the San Francisco Bay Area Air Basin (SFBAAB). The SFBAAB encompasses the nine-county region including all of Alameda, Contra Costa, Santa Clara, San Francisco, San Mateo, Marin, and Napa Counties, and the southern portions of Solano and Sonoma Counties. The climate of the SFBAAB is determined largely by a high-pressure system that is almost always present over the eastern Pacific Ocean off the West Coast of North America. During winter, the Pacific high-pressure system shifts to the south, allowing more storms to pass through the region. During summer and early fall, when few storms pass through the region, emissions generated within the SFBAAB can combine with abundant sunshine under the restraining influences of topography and atmospheric inversions[1] to create conditions that are conducive to the formation of photochemical pollutants, such as ozone (O_3), and secondary particulates, such as nitrates and sulfates.

More specifically, the Project site is approximately 6-miles east of San Francisco Bay in the Northern Alameda and Western Contra Costa Counties climatological subregion. This subregion extends from Richmond to San Leandro, with San Francisco Bay as its western boundary and its eastern boundary defined by the Oakland-Berkeley Hills. In this subregion, marine air traveling through the Golden Gate, as well as across San Francisco and the San Bruno Gap (a gap in the Coastal Range between the ocean and the San Francisco Airport), is a dominant weather factor. The Oakland-Berkeley Hills cause the westerly flow of air to split off to the north and south of Oakland, which causes diminished wind speeds. The air pollution potential in this subregion is relatively low for portions close to the San Francisco Bay, due to the largely good ventilation and less

1 In meteorology, an inversion refers to an increase in temperature with height, a departure from the usual trend of decrease in temperature with increasing altitude. Temperature inversions occur when the air above a certain level is warmer than the air below.

influx of pollutants from upwind sources (Bay Area Air Quality Management District [BAAQMD], 2017a).

Wind measurements taken at Oakland International Airport indicate that the predominant wind flow is out of the west-northwest, with northwest winds occurring approximately 46 percent of the time. Average wind speeds vary from season to season with the strongest average winds during summer and the lightest average winds during winter. Average wind speeds are 9.7 miles per hour (mph) during summer and 7.4 mph during winter. Temperatures in Oakland average 58 degrees F annually, ranging from an average of 40 degrees F on winter mornings to an average of mid-70 degrees F in the late summer afternoons. Daily and seasonal fluctuations of temperature are small because of the moderating effects of the nearby ocean. In contrast to the steady temperature regime, rainfall is highly variable and confined almost exclusively to the “rainy” period from early November to mid-April. Oakland averages 18 inches of precipitation annually, but because much of the area’s rainfall is derived from the fringes of mid-latitude storms, a shift in the annual storm track of a few hundred miles can mean the difference between a very wet year and near-drought conditions.

Criteria Air Pollutants

As required by the 1970 federal Clean Air Act (CAA), the United States Environmental Protection Agency (U.S. EPA) 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 U.S. EPA 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 U.S. EPA are O_3, carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter (PM), and lead (Pb).

Ozone (O_3)

Short-term exposure to O_3 can irritate the eyes and constrict the airways. Besides causing shortness of breath, O_3 can aggravate existing respiratory diseases such as asthma, bronchitis, and emphysema. O_3 is not emitted directly into the atmosphere, but is a secondary air pollutant produced in the atmosphere through a complex series of photochemical reactions involving reactive organic gases (ROG) and nitrogen oxides (NO_X). ROG and NO_X are known as precursor compounds for O_3. Significant O_3 production generally requires O_3 precursors to be present in a stable atmosphere with strong sunlight for approximately 3 hours. O_3 is a regional air pollutant because it is not emitted directly by sources, but is formed downwind of sources of ROG and NO_X under the influence of wind and sunlight. O_3 concentrations tend to be higher in the late spring, summer, and fall, when the long sunny days combine with regional subsidence inversions to create conditions conducive to the formation and accumulation of secondary photochemical compounds, like O_3.

Carbon Monoxide (CO)

CO is a non-reactive pollutant that is a product of incomplete combustion and is mostly associated with motor vehicle traffic. High CO concentrations develop primarily during winter when light winds combine with the formation of ground-level temperature inversions (typically from the evening through early morning). These conditions result in reduced dispersion of vehicle emissions. Motor vehicles also exhibit increased CO emission rates at low air temperatures. When inhaled at high concentrations, CO combines with hemoglobin in the blood and reduces the oxygen-carrying capacity of the blood, which reduces the oxygen reaching the brain, heart, and other body tissues. This condition (i.e., reduced oxygen carrying capacity in the blood) is especially critical for people with cardiovascular diseases, chronic lung disease, or anemia, as well as for fetuses.

CO concentrations have declined dramatically in California due to existing controls and programs, and most areas of the state, including the Project area, have no problem meeting the CO state and federal standards. CO measurements and modeling were important in the early 1980s when CO levels were regularly exceeded throughout California. In more recent years, CO measurements and modeling have not been a priority in most California air districts due to the retirement of older polluting vehicles, fewer emissions from new vehicles, and improvements in fuels.

Nitrogen Dioxide (NO_2)

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. NO_2 may be visible as a coloring component of a brown cloud on high pollution days, especially in conjunction with high O_3 levels.

NO_2 is an air quality concern because it is a respiratory irritant and a precursor of O_3. NO_2 is a major component of the group of gaseous nitrogen compounds commonly referred to as NO_X, which are produced by fuel combustion in motor vehicles, industrial stationary sources (such as industrial activities), ships, aircraft, and rail transit. Typically, nitrogen oxides emitted from fuel combustion are in the form of nitric oxide (NO) and NO_2. NO is often converted to NO_2 when it reacts with O_3 or undergoes photochemical reactions in the atmosphere. Therefore, emissions of NO_2 from combustion sources are typically evaluated based on the amount of NO_X emitted from the source.

Sulfur Dioxide (SO_2)

SO_2 is a colorless, acidic gas with a strong odor. SO_2 is a combustion product of sulfur or sulfur-containing fuels such as coal and diesel. SO_2 is also a precursor to the formation of atmospheric sulfate and particulate matter, and contributes to the potential formation of atmospheric sulfuric acid that could precipitate downwind as acid rain. SO_2 can irritate lung tissue and increase the risk of acute and chronic respiratory disease.

Particulate Matter (PM)

PM_{10} and $PM_{2.5}$ consist of PM that is 10 microns or less in diameter and 2.5 microns or less in diameter, respectively (a micron is one-millionth of a meter). PM_{10} and $PM_{2.5}$

represent fractions of particulate matter that can be inhaled into the air passages and the lungs and can cause adverse health effects. Some sources of PM (such as wood burning in fireplaces, and demolition and construction activities) are more local in nature, while others (such as vehicular traffic) have a more regional effect. Very small particles of certain substances (e.g., sulfates and nitrates) can cause lung damage directly, or can contain adsorbed gases (e.g., chlorides or ammonium) that may be injurious to health. Particulates also can damage materials and reduce visibility. Large dust particles (diameter greater than 10 microns) settle out rapidly and are easily filtered by human breathing passages. The large dust particles are of more concern as a soiling nuisance rather than a health hazard. The remaining fraction, PM_{10} and $PM_{2.5}$, are a health concern, particularly at levels above the federal and state ambient air quality standards. $PM_{2.5}$ (including diesel exhaust particles) is thought to have greater effects on health, because these particles are so small and thus are able to penetrate to the deepest parts of the lungs. Scientific studies have suggested links between fine PM and numerous health problems including asthma, bronchitis, and acute and chronic respiratory symptoms such as shortness of breath and painful breathing. Recent studies have shown an association between morbidity and mortality and daily concentrations of PM in the air. Children are more susceptible to the health risks of PM_{10} and $PM_{2.5}$ because their immune and respiratory systems are still developing.

Mortality studies since the 1990s have shown a statistically significant direct association between mortality (premature deaths) and daily concentrations of PM in the air. Despite important gaps in scientific knowledge and continued reasons for some skepticism, a comprehensive evaluation of the research findings provides persuasive evidence that exposure to fine particulate air pollution has adverse effects on cardiopulmonary health (Pope and Dockery, 2006).

Lead (Pb)

Leaded gasoline, 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. Pb has a range of adverse neurotoxin health effects, and was formerly released into the atmosphere primarily via leaded gasoline products. The phase-out of leaded gasoline in California has decreased the levels of atmospheric Pb.

Toxic Air Contaminants

TACs are airborne substances that are capable of causing short-term (acute) and/or long-term (chronic or carcinogenic, i.e., cancer-causing) adverse human health effects (i.e., injury or illness), even when present in relatively low concentrations. Potential human health effects of TACs include birth defects, neurological damage, cancer, and death. TACs include both organic and inorganic chemical substances. They may be emitted from a variety of common sources including gasoline stations, automobiles, dry cleaners, industrial operations, and painting operations. The current California list of TACs includes approximately 200 compounds, including diesel particulate matter (DPM) emissions from diesel-fueled engines, which was identified as a TAC by the California Air Resources Board (CARB) in 1998 (CARB, 2011).

TACs do not have ambient air quality standards but are regulated by the BAAQMD using a risk-based approach. This approach uses a health risk assessment to determine what sources and pollutants to control as well as the degree of control. A health risk assessment is an analysis of the exposure to toxic substances and human health risks from exposure to toxic substances, based on the potency of the toxic substances.[2]

Existing Air Quality

The Project site is within the jurisdiction of the BAAQMD. The BAAQMD operates a regional monitoring network that measures the ambient concentrations of the six criteria air pollutants. Existing and probable future levels of air quality in Oakland can generally be inferred from ambient air quality measurements conducted by the BAAQMD at its nearby monitoring stations. The West Oakland monitoring station is 3.7 miles northwest of the Project site and the International Boulevard station is 4.5 miles southeast of the site. Both stations monitor all criteria pollutants except PM_{10} and CO. PM_{10} and CO concentrations are not available for any of the monitoring stations in Oakland. No monitoring stations monitor these two pollutants that can be considered representative of concentrations in the Project area. The Laney College monitoring station monitors $PM_{2.5}$ and is approximately 1.8 miles west of the Project site.

Since the major pollutants of concern in the San Francisco Bay Area are O_3 and PM (as detailed under the discussion of *Attainment Status,* below), Table 3.2-1 shows a 5-year summary of monitoring data (2013 through 2017) for these pollutants from the West Oakland station. $PM_{2.5}$ data are from the Laney College station. Table 3.2-1 also compares measured pollutant concentrations with state and national ambient air quality standards (see *Regulatory Framework* below).

Odors

Although offensive odors from stationary sources rarely cause any physical harm, they are unpleasant and can lead to public distress, generating complaints to local governments. The occurrence and severity of odor impacts depend on the nature, frequency, and intensity of the source; wind speed and direction; and the sensitivity of receptors. The *CEQA Guidelines* recommend that odor impacts be considered for any proposed new odor sources near existing receptors, as well as any new sensitive receptors near existing odor sources. Generally, increasing the distance between the receptor and the source would mitigate odor impacts.

The BAAQMD provides examples of odor sources, which include wastewater treatment plants, landfills, confined animal facilities, composting stations, food manufacturing plants, refineries, and chemical plants. None of these odor sources currently exist in the Project vicinity.

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[2] A health risk assessment is required for permitting approval if the BAAQMD concludes that projected emissions of a specific toxic air contaminant from a proposed new or modified source suggests a potential public health risk. Such an assessment generally evaluates chronic, long-term effects, calculating the increased risk of cancer as a result of exposure to one or more TACs.

TABLE 3.2-1
AIR QUALITY DATA SUMMARY (2013–2017) FOR THE PROJECT AREA[a]

Pollutant	State Standard[b]	National Standard[b]	Monitoring Data by Year				
			2013	2014	2015	2016	2017
Ozone (O_3) hourly							
Highest 1-hour average, ppm[c]	0.09	NA	0.071	0.072	0.091[e]	0.065	0.087
Days over state standard			0	0	0	0	0
Ozone (O_3) 8-hour							
Highest 8-hour average, ppm[c]	0.07	0.07	0.059	0.059	0.064	0.052	0.068
Days over national standard			0	0	0	0	0
Days over state standard			0	0	0	0	0
$PM_{2.5}$							
Highest 24-hour average, μg/m^3[c]	NA	35	42.7	38.8	37.2	20.2	70.8
Estimated days over national standard[d]			2	1	1	0	8
Annual average, μg/m^3[c]	12	12	12.7	9.5	10.0	8.7	11.6

NOTES:
a O_3 data are from the BAAQMD's West Oakland station, approximately 3.7 miles northwest of the Project site; $PM_{2.5}$ data for 2015, 2016, and 2017 are from the BAAQMD's Laney College station; $PM_{2.5}$ data for 2013 and 214 are from the West Oakland station.
b Generally, state standards and national standards are not to be exceeded more than once per year.
c ppm = parts per million; µg/m^3 = micrograms per cubic meter.
d The CARB states that an exceedance is not necessarily a violation.
e A violation occurs only if the standard is exceeded. Because 0.091 rounds to 0.09, it is not considered a violation. A recorded concentration of 0.095 or greater would constitute a violation of the state standard.

NA = Not Available or Not Applicable.

SOURCE: CARB, 2018.

Sensitive Land Uses

Some receptors are more sensitive than others to air pollutants. The reasons for greater sensitivity include pre-existing health problems, proximity to emissions source, or the duration of exposure to air pollutants. Land uses such as schools, children's day care centers, hospitals, and convalescent homes are more sensitive than the general public to poor air quality because the population groups associated with these uses have increased susceptibility to respiratory distress and other air quality-related health problems. People engaged in strenuous work or exercise also have increased sensitivity to poor air quality. Residential areas are 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.

The BAAQMD defines sensitive receptors as facilities or land uses that include members of the population that are particularly sensitive to the effects of air pollutants, such as children, the elderly, and people with illnesses. Examples include schools, hospitals, and residential areas. The Project site is surrounded to the west, south, and east by single- and multi-family residential homes. The Central Reservoir Recreation Area and Redwood Day School are adjacent to the eastern boundary of the Project site. Oakland Heights Nursing and Rehabilitation is south of the site. The nearest sensitive receptors to the Project site would be the occupants of Redwood Day School and the residences along Ardley Avenue, 23rd Avenue, and Sheffield Avenue surrounding the Project site.

3.2.2 Regulatory Framework

Established federal, state, and regional regulations provide the framework for analyzing and controlling air pollutant emissions and general air quality.

Federal Regulations

U.S. EPA is responsible for implementing the programs established under the federal CAA, such as establishing and reviewing the National Ambient Air Quality Standards (NAAQS) and judging the adequacy of State Implementation Plans (SIPs), but has delegated the authority to implement many of the federal programs to the states while retaining an oversight role to ensure that the programs continue to be implemented.

Clean Air Act and Air Quality Standards

Air pollution is regulated through both national and state ambient air quality standards, and emission limits for individual sources of air pollutants. As required by the federal CAA, the U.S. EPA has identified criteria pollutants and has established NAAQS to protect public health and welfare. NAAQS have been established for O_3, CO, NO_2, SO_2, PM_{10}, $PM_{2.5}$, and lead. To protect human health and the environment, the U.S. EPA has set "primary" and "secondary" maximum ambient thresholds for each of the criteria pollutants. Primary thresholds were set to protect human health, particularly sensitive receptors such as children, the elderly, and individuals suffering from chronic lung conditions such as asthma and emphysema. Secondary standards were set to protect the natural environment and prevent the deterioration of animals, crops, vegetation, and buildings.

The NAAQS are defined as the maximum acceptable concentration that may be reached, but not exceeded more than once per year. California has adopted more stringent State Ambient Air Quality Standards (SAAQS) for most of the criteria air pollutants. California has also established ambient standards for sulfates, hydrogen sulfide, and vinyl chloride.

Attainment Status

Under amendments to the federal CAA, U.S. EPA has classified air basins or portions thereof as either "attainment" or "non-attainment" for each criteria air pollutant, based on whether or not the national standards have been achieved. The California CAA, which is patterned after the federal CAA, also requires areas to be designated as "attainment" or "non-attainment" for the state standards. Thus, areas in California have two sets of attainment/non-attainment designations: one set for the national standards and one set for the state standards. Table 3.2-2 presents both sets of ambient air quality standards and the SFBAAB-designated attainment status for each standard.

TABLE 3.2-2
AMBIENT AIR QUALITY STANDARDS AND SAN FRANCISCO BAY AREA AIR BASIN ATTAINMENT STATUS

Pollutant	Averaging Time	State Standard[a]		National Standard[b]	
		Concentration	Attainment Status	Concentration	Attainment Status
Ozone (O_3)	1-Hour 8-Hour	0.09 ppm 0.070 ppm	Non-attainment Non-attainment	– 0.07 ppm	– Non-Attainment
Carbon Monoxide (CO)	1-Hour 8-Hour	20 ppm 9.0 ppm	Attainment Attainment	35 ppm 9 ppm	Attainment Attainment
Nitrogen Dioxide (NO_2)	1-Hour Annual	0.18 ppm 0.030 ppm	Attainment –	0.1 ppm 0.053 ppm	Unclassified Attainment
Sulfur Dioxide (SO_2)	1-Hour 24-Hour Annual	0.25 ppm 0.04 ppm –	Attainment Attainment	0.075 ppm 0.14 ppm 0.03 ppm	Attainment Attainment Attainment
Respirable Particulate Matter (PM_{10})	24-Hour Annual	50 μg/m^3 20 μg/m^3	Non-Attainment Non-Attainment	150 μg/m^3 –	Unclassified –
Fine Particulate Matter ($PM_{2.5}$)	24-Hour Annual	– 12 μg/m^3	 Non-Attainment	35 μg/m^3 12 μg/m^3	Non-Attainment Attainment*
Lead (Pb)	Monthly Quarterly	1.5 μg/m^3 –	Attainment	– 1.5 μg/m^3	 Attainment

NOTES: ppm = parts per million; μg/m^3 = micrograms per cubic meter.

[a] State standards for O_3, CO (except Lake Tahoe), SO_2 (1-hour and 24-hour), NO_2, PM, 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] National standards, other than O_3 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 O_3 standard is attained when the 3-year average of the 4th highest daily concentration is 0.08 ppm or less. The 24-hour PM_{10} standard is attained when the 3-year average of the 99th percentile of monitored concentrations is less than the standard. The 24-hour $PM_{2.5}$ standard is attained when the 3-year average of the 98th percentile is less than the standard.

SOURCE: BAAQMD, 2018.

Health Risk Assessments

The Air Toxics "Hot Spots" Information and Assessment Act of 1987 (Assembly Bill [AB] 2588) seeks to identify and evaluate risk from air toxics sources, but does not directly regulate air toxics emissions. Under the Act, TAC emissions from individual facilities are quantified and prioritized. "High-priority" facilities are required to perform a health risk assessment and, if specific thresholds are violated, are required to communicate the results to the public in the form of notices and public meetings. Depending on the risk levels, emitting facilities are required to implement varying levels of risk reduction measures. The BAAQMD implements AB 2588 and is responsible for prioritizing facilities that emit air toxics, reviewing health risk assessments, and implementing risk reduction procedures. Pursuant to the requirements of AB 2588, the BAAQMD publishes an air toxics emissions inventory that details the TAC emissions of facilities throughout the BAAQMD area.

State Regulations

California Air Resources Board

CARB is responsible for establishing and reviewing the state standards, compiling the California SIP and securing approval of that plan from U.S. EPA, conducting research and planning, and identifying TACs. CARB also regulates mobile sources of emissions in California, such as construction equipment, trucks, and automobiles, and oversees the activities of California's air quality management districts, which are organized at the county or regional level. County or regional air quality management districts are primarily responsible for regulating stationary sources at industrial and commercial facilities within their geographic areas and for preparing the air quality plans that are required under the federal CAA and California CAA.

Regional Regulations

Bay Area Air Quality Management District

BAAQMD is the regional agency with jurisdiction over the nine-county region located in the SFBAAB. The Association of Bay Area Governments (ABAG) and the Metropolitan Transportation Commission (MTC), county transportation agencies, cities and counties, and various non-governmental organizations also join in the efforts to improve air quality through a variety of programs. These programs include the adoption of regulations and policies, as well as the implementation of educational and public outreach programs. BAAQMD is also responsible for attaining and/or maintaining air quality in the SFBAAB within federal and state air quality standards. Specifically, BAAQMD has the responsibility to monitor ambient air pollutant levels throughout the Bay Area and to develop and implement strategies to attain the applicable federal and state standards.

Any person or facility that puts in place, builds, erects, installs, modifies, modernizes, alters, or replaces any article, machine, equipment, or other contrivance, the use of which may cause, reduce, or control the emission of air contaminants, shall first secure written authorization from the BAAQMD in the form of an Authority to Construct, unless the source is specifically excluded or exempt from permit requirements. The BAAQMD permit process is a pre-construction review and approval process. Review by the BAAQMD is conducted after the equipment is designed, but before it is installed.

BAAQMD CEQA Air Quality Guidelines

The BAAQMD *CEQA Air Quality Guidelines* (Guidelines) advise lead agencies on how to evaluate potential air quality impacts, including establishing quantitative and qualitative thresholds of significance. In June 2010, the BAAQMD adopted updated Guidelines, including new thresholds of significance, and revised them in May 2011 (BAAQMD, 2011a). These thresholds were challenged in court, and in view of the Supreme Court's opinion, the BAAQMD 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. 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 issued an interim update to the Guidelines (dated May 2017), which includes thresholds of significance consistent with those adopted in 2010, but does not update outdated references, links, analytical methodologies, or other technical information. The BAAQMD has advised local agencies that the thresholds are not mandatory and should be applied only after determining that they reflect an appropriate measure of a project's impacts. The 2017 update also specifies that under CEQA, the receptor thresholds (the analysis of exposing new receptors to existing sources of toxic air pollution and odors) should not be applied to "routinely assess the effect of existing environmental conditions on future users or occupants of a project."

Air Quality Plans

The federal CAA and the California CAA require plans to be developed for areas designated as nonattainment (with the exception of areas designated as nonattainment for the state PM_{10} standard). In April 2017, the BAAQMD adopted the *2017 Clean Air Plan* (BAAQMD, 2017b). The primary goals of the plan are to protect public health and the climate. The plan includes a range of proposed control measures, which consist of actions to reduce combustion-related activities, decrease fossil fuel combustion, improve energy efficiency, and decrease emissions of potent greenhouse gases (GHGs). The *2017 Clean Air Plan* updates the *Bay Area 2010 Clean Air Plan* and complies with state air quality planning requirements as codified in the California Health and Safety Code. The SFBAAB is designated non-attainment for both the 1- and 8-hour state O_3 standards. In addition, emissions of O_3 precursors in the SFBAAB contribute to air quality problems in neighboring air basins. Under these circumstances, state law requires a Clean Air Plan to include all feasible measures to reduce emissions of O_3 precursors and to reduce the transport of O_3 precursors to neighboring air basins.

The *2017 Clean Air Plan* contains 85 measures to reduce several pollutants: O_3 precursors, PM, air toxics, and/or GHGs. Other measures focus on a single type of pollutant, potent GHGs such as methane and black carbon, or harmful fine particles that affect public health.[3] These control strategies can be grouped into the following categories:

- Stationary source measures
- Transportation control measures
- Energy control measures
- Building control measures
- Agricultural control measures
- Natural and working lands control measures
- Waste management control measures
- Water control measures
- Super GHG control measures

[3] Refer to Section 3.7, Greenhouse Gas Emissions, for more information about the 2017 Clean Air Plan.

Air Toxics Program

The BAAQMD's Air Toxics Program integrates federal and state air toxics mandates with local goals that have been established by the BAAQMD's Board of Directors. The program consists of several elements that are designed to identify and reduce public exposure TACs. Under the preconstruction review of new and modified sources program, proposed projects are reviewed for potential health impacts, with the requirement that significant new/modified sources use the Best Available Control Technology (BACT) to minimize TAC emissions. All applications for new or modified permits are reviewed for air toxics impacts, in accordance with the BAAQMD's Risk Management Policy and BAAQMD Regulation 2, Rule 5: New Source Review of Toxic Air Contaminants.

Local Regulations

City of Oakland General Plan

The City of Oakland General Plan, Open Space, Conservation, and Recreation Element (City of Oakland, 1996) includes the following policy relevant to the potential Project emissions:

> ***Policy CO-12.6*****:** Control of Dust Emissions. Require construction, demolition, and grading practices which minimize dust emissions.

City of Oakland Standard Conditions of Approval and Uniformly Applied Development Standards Imposed as Standard Conditions of Approval

The City of Oakland has adopted thresholds from BAAQMD's Guidelines for the analysis of projects proposed within the city. The Standard Conditions of Approval (SCAs) adopted by the City and relevant to a project's air quality impacts are also consistent with BAAQMD recommendations. These SCAs apply to all projects under the purview of the City and that generate air pollutant emissions. Under Section 53091 of the California Government Code, EBMUD, as a local agency and utility district, is not subject to building and land use zoning ordinances (such as tree ordinances) for projects involving facilities for the production, generation, storage, treatment, or transmission of water. However, EBMUD's practice is to work with local jurisdictions and neighboring communities during project planning and to consider local environmental protection policies for guidance. As such, a summary of the City of Oakland SCAs relevant to air quality is included below.

- **SCA 21: Dust Controls – Construction Related.** The project applicant shall implement all of the following basic dust control measures during construction of the project:
  a) Water all exposed surfaces of active construction areas at least twice daily. Watering should be sufficient to prevent airborne dust from leaving the site. Increased watering frequency may be necessary whenever wind speeds exceed 15 miles per hour. Reclaimed water should be used whenever feasible.

b) Cover all trucks hauling soil, sand, and other loose materials or require all trucks to maintain at least 2 feet of freeboard (i.e., the minimum required space between the top of the load and the top of the trailer).

c) All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.

d) Limit vehicle speeds on unpaved roads to 15 miles per hour.

e) All demolition activities (if any) shall be suspended when average wind speeds exceed 20 mph.

f) All trucks and equipment, including tires, shall be washed off prior to leaving the site.

g) Site accesses to a distance of 100 feet from the paved road shall be treated with a 6- to 12-inch compacted layer of wood chips, mulch, or gravel.

The following “Enhanced” control measures shall be implemented in addition to all "Basic" controls listed above if the project involves:

- Extensive site preparation (i.e., the construction site is 4 acres or more in size); or
- Extensive soil transport (i.e., 10,000 or more cubic yards of soil import/export).

a) Apply and maintain vegetative ground cover (e.g., hydroseed) or nontoxic soil stabilizers to disturbed areas of soil that will be inactive for more than 1 month. Enclose, cover, water twice daily, or apply (nontoxic) soil stabilizers to exposed stockpiles (dirt, sand, etc.).

b) Designate a person or persons to monitor the dust control program and to order increased watering, as necessary, to prevent transport of dust off-site. Their duties shall include holidays and weekend periods when work may not be in progress.

c) When working at a site, install appropriate wind breaks (e.g., trees, fences) on the windward side(s) of the site, to minimize wind-blown dust. Windbreaks must have a maximum 50 percent air porosity.

d) Post a publicly visible large on-site sign that includes the contact name and phone number for the project complaint manager responsible for responding to dust complaints and the telephone numbers of the City’s Code Enforcement unit and the Bay Area Air Quality Management District. When contacted, the project complaint manager shall respond and take corrective action within 48 hours.

e) All exposed surfaces shall be watered at a frequency adequate to maintain minimum soil moisture of 12 percent. Moisture content can be verified by lab samples or moisture probe.

- **SCA 22: Criteria Air Pollutant Controls – Construction Related.** The project applicant shall implement all of the following applicable basic control measures for criteria air pollutants during construction of the project as applicable:

  a) Idling times on all diesel-fueled commercial vehicles over 10,000 lbs. shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 2 minutes (as required by the California airborne toxics control measure Title 13, Section 2485, of the California Code of Regulations). Clear signage to this effect shall be provided for construction workers at all access points.

  b) Idling times on all diesel-fueled off-road vehicles over 25 horsepower shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 2 minutes and fleet operators must develop a written policy as required by Title 23, Section 2449, of the California Code of Regulations ("California Air Resources Board Off-Road Diesel Regulations").

  c) All construction equipment shall be maintained and properly tuned in accordance with the manufacturer's specifications. All equipment shall be checked by a certified mechanic and determined to be running in proper condition prior to operation. Equipment check documentation should be kept at the construction site and be available for review by the City and the Bay Area Air Quality District as needed.

  d) Portable equipment shall be powered by grid electricity if available. If electricity is not available, propane or natural gas generators shall be used if feasible. Diesel engines shall only be used if grid electricity is not available and propane or natural gas generators cannot meet the electrical demand.

  e) Low Volatile Organic Compound (VOC) (i.e., ROG) coatings shall be used that comply with BAAQMD Regulation 8, Rule 3: Architectural Coatings.

  f) All equipment to be used on the construction site shall comply with the requirements of Title 13, Section 2449, of the California Code of Regulations ("California Air Resources Board Off-Road Diesel Regulations") and upon request by the City (and the Air District if specifically requested), the project applicant shall provide written documentation that fleet requirements have been met.

The following "Enhanced" control measures shall be implemented in addition to all "Basic" controls listed above if the project involves construction activities with average daily emissions exceeding the CEQA thresholds for construction activity, currently 54 pounds per day of ROG, NO_X, or $PM_{2.5}$ or 82 pounds per day of PM_{10}.

a) Criteria Air Pollutant Reduction Measures. The project applicant shall retain a qualified air quality consultant to identify criteria air pollutant reduction measures to reduce the project's average daily emissions below 54 pounds per day of ROG, NO_x, or $PM_{2.5}$ or 82 pounds per day of PM_{10}. Quantified emissions and identified reduction measures shall be submitted to the City (and the Air District if specifically requested) for review and approval prior to the issuance of building permits and the approved criteria air pollutant reduction measures shall be implemented during construction.

b) Construction Emissions Minimization Plan. The project applicant shall prepare a Construction Emissions Minimization Plan (Emissions Plan) for all identified criteria air pollutant reduction measures. The Emissions Plan shall be submitted to the City (and the Air District if specifically requested) for review and approval prior to the issuance of building permits. The Emissions Plan shall include the following:

   i. An equipment inventory summarizing the type of off-road equipment required for each phase of construction, including the equipment manufacturer, equipment identification number, engine model year, engine certification (tier rating), horsepower, and engine serial number. For all Verified Diesel Emissions Control Strategies (VDECS), the equipment inventory shall also include the technology type, serial number, make, model, manufacturer, CARB verification number level, and installation date.

   ii. A Certification Statement that the Contractor agrees to comply fully with the Emissions Plan and acknowledges that a significant violation of the Emissions Plan shall constitute a material breach of contract.

- **SCA 23: Diesel Particulate Matter Controls – Construction Related.**

a) Diesel Particulate Matter Reduction Measures. The project applicant shall implement appropriate measures during construction to reduce potential health risks to sensitive receptors due to exposure to diesel particulate matter (DPM) from construction emissions. The project applicant shall choose one of the following methods:

   i. The project applicant shall retain a qualified air quality consultant to prepare a Health Risk Assessment (HRA) in accordance with current guidance from the California Air Resources Board (CARB) and Office of Environmental Health and Hazard Assessment to determine the health risk to sensitive receptors exposed to DPM from project construction emissions. The HRA shall be submitted to the City (and the Air District if specifically requested) for review and approval. If the HRA concludes that the health risk is at or below acceptable levels, then DPM reduction measures are not required. If the HRA concludes that the health risk exceeds acceptable levels, DPM reduction measures shall be identified to reduce the health risk to acceptable levels as set forth under subsection b below. Identified DPM reduction measures shall be submitted to the City for review and approval prior to the issuance of building permits and the approved DPM reduction measures shall be implemented during construction.

   OR

   ii. All off-road diesel equipment shall be equipped with the most effective Verified Diesel Emission Control Strategies (VDECS) available for the engine type (Tier 4 engines automatically meet this requirement) as certified by CARB. The equipment shall be properly maintained and tuned in accordance with manufacturer specifications. This shall be verified through an equipment inventory submittal and Certification Statement that the Contractor agrees to compliance and acknowledges that a significant violation of this requirement shall constitute a material breach of contract.

b) Construction Emissions Minimization Plan (if required by a) above). The project applicant shall prepare a Construction Emissions Minimization Plan (Emissions Plan) for all identified DPM reduction measures (if any). The Emissions Plan shall be submitted to the City (and the Bay Area Air Quality Management District if specifically requested) for review and approval prior to the issuance of building permits. The Emissions Plan shall include the following:

    i. An equipment inventory summarizing the type of off-road equipment required for each phase of construction, including the equipment manufacturer, equipment identification number, engine model year, engine certification (tier rating), horsepower, and engine serial number. For all VDECS, the equipment inventory shall also include the technology type, serial number, make, model, manufacturer, CARB verification number level, and installation date.

    ii. A Certification Statement that the Contractor agrees to comply fully with the Emissions Plan and acknowledges that a significant violation of the Emissions Plan shall constitute a material breach of contract.

- **SCA 27: Asbestos in Structures.** The project applicant shall comply with all applicable laws and regulations regarding demolition and renovation of Asbestos Containing Materials (ACM), including but not limited to California Code of Regulations, Title 8; California Business and Professions Code, Division 3; California Health and Safety Code sections 25915-25919.7; and Bay Area Air Quality Management District, Regulation 11, Rule 2, as may be amended. Evidence of compliance shall be submitted to the City upon request.

EBMUD Standard Construction Specifications

EBMUD’s Standard Construction Specification 01 35 44, Environmental Requirements, (EBMUD, 2018) includes practices and procedures for minimizing air quality impacts such as dust control and monitoring, emissions control, and use of BAAQMD-compliant architectural coatings, as described below.

Submittal of Dust Control and Monitoring Plan. EBMUD Standard Construction Specification 01 35 44, Section 1.3(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[4] and Public Nuisance Rule.[5]
- Include items such as 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 Standard Construction Specification 01 35 44, Section 3.3(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 the 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 nontoxic soil stabilizers on all unpaved access roads, parking areas, and staging areas at construction sites.

[4] 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.

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

- 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 run-off to public roadways from sites with a slope greater than 1 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.
- 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 15 mph or less on the construction site and any adjacent unpaved roads.

Dust Monitoring During Demolition and Construction. EBMUD Standard Construction Specification 01 35 44, Section 3.3(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 3 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 3 minutes in an hour an emission equal to or greater than 20 percent 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 Standard Construction Specification 01 35 44, Section 3.3(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 Standard Construction Specification 01 35 44, Section 3.4(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 5 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 Oxide of Nitrogen (NOx) and Particulate Matter (PM).
  - Demolition debris shall be recycled for reuse to the extent feasible. See the Construction and Demolition Waste Disposal Plan (EBMUD Standard Construction Specification 01 35 44 Section 1.3(C)) in Section 3.8, Hazards and Hazardous Materials, for requirements on wood treated with preservatives.

Architectural Coatings. EBMUD Standard Construction Specification 01 35 44, Section 3.4(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.

Asbestos Control Activities. EBMUD Standard Construction Specification 02 82 13, Section 1.1(A) requires implementation of the following control measures:

- Furnish all labor, materials, facilities, equipment, services, employee training and testing, permits, and agreements necessary to perform the asbestos removal in accordance with these specifications and with the latest regulations from the U.S. Environmental Protection Agency (U.S. EPA), the Occupational Safety and Health Administration (OSHA), the Bay Area Air Quality Management District (BAAQMD), the Cal/EPA Department of Toxic Substance Control, the California Department of Occupational Safety and Health (DOSH), 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.

Section 1.1(B) requires the BAAQMD to be notified at least 10 work days prior to the beginning of demolition of any asbestos containing structures. Section 1.5(B) 1A requires that a detailed plan of the procedures proposed for use in complying with the regulations included in this specification and requires that asbestos abatement be included in the Construction and Demolition Waste Disposal Plan (required in EBMUD Standard Construction Specification 01 35 44, Section 1.3(C)), as discussed in Section 3.8, Hazards and Hazardous Materials.

3.2.3 Impact Analysis

Methodology for Analysis

The analysis of potential air quality impacts uses the project-level analysis methodology identified by the BAAQMD Guidelines. Based on the BAAQMD Guidelines*,* construction emissions from the Project are quantified and compared to significance thresholds recommended by the BAAQMD and adopted by the City of Oakland. The California Emissions Estimator Model (CalEEMod version 2016.3.2) was used to quantify emissions. The model quantifies direct emissions from construction equipment as well as vehicle trips associated with worker commute and material delivery and hauling. Emissions from construction equipment were modeled using data provided by EBMUD on construction phase durations, equipment mix and activity, and vehicle trips associated with worker commute, material delivery, and haul trips.

Operational emissions are discussed qualitatively as the Project would not introduce any new sources of emissions.

Consistent with the BAAQMD Guidelines, the analysis assesses potential health risk and hazard impacts when sensitive receptors are located within 1,000 feet of emission sources. A Health Risk Assessment (HRA) was conducted to assess potential TAC impacts from DPM and local $PM_{2.5}$ concentrations from Project construction using methodologies published by the Office of Environmental Health Hazard Assessment (OEHHA). OEHHA is responsible for developing and revising guidelines for performing health risk assessments under the state's the Air Toxics Hot Spots Program Risk Assessment (AB 2588) regulation. In March 2015, OEHHA adopted revised guidelines, *Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments* ("OEHHA Guidance"), which updates the previous guidance by incorporating advances in risk assessment with consideration of infants and children using Age Sensitivity Factors (OEHHA, 2015). These changes also take into account the sensitivity of children to TAC emissions, different breathing rates, and time spent at home.

The HRA is a quantitative analysis of Project construction emissions, given the proximity of construction activity on the Project site to sensitive receptors. The analysis evaluates whether the Project would cause health risks at nearby receptors that exceed the BAAQMD thresholds. Acute risks were not evaluated as DPM does not represent an acute health risk. The Project would not include any operational sources of TAC emissions nor would it include any land uses considered sensitive to TACs emitted by surrounding land uses. Therefore, no further discussion of operational TAC impacts is included.

Regarding the assessment of cumulative impacts, the BAAQMD Guidelines consider a project's contribution to cumulative impacts on regional air quality to be significant if the Project's impact individually would be significant (i.e., exceeds the BAAQMD's quantitative thresholds). For a project that would not result in a significant impact individually, the project's contribution to any cumulative impact would be considered less than significant if the project is consistent with the local general plan and the local general plan is consistent with the applicable regional air quality plan. In this case, the applicable regional air quality plan is the *2017 Clean Air Plan*.

Significance Criteria

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

1. Conflict with or obstruct implementation of the applicable air quality plan.
2. 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.
3. Expose sensitive receptors to substantial pollutant concentrations.
4. Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people.

BAAQMD Significance Thresholds

Impacts from Project construction are evaluated by comparing estimated construction emissions to the BAAQMD significance thresholds for construction, which are average daily emissions of 54 pounds per day for ROG, NO_X, and $PM_{2.5}$; and 82 pounds per day for PM_{10}. Only the exhaust portion of $PM_{2.5}$ and PM_{10} emissions are compared against the construction thresholds. The BAAQMD recommends that analyses focus on implementation of dust control measures rather than comparing estimated levels of fugitive dust to a quantitative significance threshold. The BAAQMD considers implementation of the BAAQMD-recommended mitigation measures for fugitive dust sufficient to ensure that the impact from construction-related fugitive dust is reduced to a less-than-significant level. The BAAQMD Guidelines provide feasible control measures for construction emission of PM_{10}. If the appropriate construction controls are implemented, air pollutant emissions for construction activities would be considered mitigated to a less-than-significant level.

For long-term operations, BAAQMD has two sets of significance thresholds, including average daily thresholds that are the same as the construction thresholds, and maximum annual thresholds that are 10 tons per year for ROG, NO_X, and $PM_{2.5}$; and 15 tons per year for PM_{10}. However, as the Project would not include any operational sources of emissions, no further evaluation of operational emissions is conducted.

For health risk impacts from exposure to TACs, BAAQMD recommends a cancer risk threshold of 10 in a million, an acute and chronic hazard index threshold of 1.0, and a $PM_{2.5}$ threshold of 0.3 $\mu g/m^3$ for a project-level analysis.

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 is discussed as part of the cumulative analysis.

- ***Criterion 4 Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people***: During construction, diesel exhaust from construction equipment would generate some odors. However, construction-related odors would be temporary, localized, and would not persist upon Project completion. As a result, a substantial number of receptors would not be affected at any given time during construction. Odors would not be emitted during operation of the Project and associated facilities. Therefore, there would be no odor impacts associated with the Project and are not discussed further in the analysis presented below.

Impacts and Mitigation Measures

Impact AIR-1: Conflict with or obstruct implementation of the applicable air quality plan. (Criterion 1)

The BAAQMD Guidelines recommend that a project's consistency with the current air quality plan be evaluated using the following three criteria:

a. The project supports the goals of the applicable air quality plan.

b. The project includes applicable control measures from the air quality plan.

c. The project does not disrupt or hinder implementation of any control measures from the air quality plan.

If it can be concluded with substantial evidence that a project would be consistent with the above three criteria, then the BAAQMD considers it to be consistent with air quality plans prepared for the Bay Area (BAAQMD, 2017a).

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 the climate. The primary goals of the *2017 Clean Air Plan* are to attain air quality standards, reduce population exposure, protect public health in the Bay Area, reduce GHG emissions, and protect the climate. The *2017 Clean Air Plan* includes a 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 the reduction of several pollutants: O_3 precursors, PM, 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.

The BAAQMD-recommended guidance for determining if a project supports the goals in the current clean air plan is to compare project-estimated emissions with BAAQMD thresholds of significance. If project emissions would not exceed the thresholds of significance after the application of all feasible mitigation measures, the project would be consistent with the goals of the *2017 Clean Air Plan*. Construction and operational impacts of the Project are discussed below, which are then used to evaluate consistency with the *2017 Clean Air Plan*.

Construction

Construction activities are typically short term and result in emissions of O_3 precursors and PM in the form of dust (fugitive dust) and exhaust (e.g., vehicle tailpipe) emissions. The Project includes demolition of the existing reservoir and construction of the replacement tanks and associated facilities (valve structure, rate control station, and pipelines). Pollutant emissions associated with Project construction would be generated from the following general construction activities: (1) grading, excavation, and construction; (2) vehicle trips from workers traveling to and from the construction areas; (3) trips associated with delivery and hauling of construction supplies to, and debris from, the construction areas; (4) fuel combustion by on-site construction equipment; and (5) paving and architectural coatings (paints, varnishes, lacquers, and other coatings used in interior and exterior finishing of buildings). These construction activities would temporarily create emissions of dust, fumes, equipment exhaust, and other air pollutants. Emissions of O_3 precursors and exhaust PM are primarily a result of the combustion of fuel from on-road and off-road vehicles. However, ROGs are also emitted from activities that involve painting, other types of architectural coatings, or asphalt paving. The amount of emissions generated on a daily basis would vary, depending on the intensity and types of construction activities occurring simultaneously at the time. Overall, the Project's construction activities would occur over a period of approximately 6 years. Construction of various Project phases would generally take place sequentially, except in the phases of construction where construction activities would overlap, as shown in Table 2-2 in Chapter 2, Project Description.

Although construction emissions are considered short term and temporary, they have the potential to be a significant impact with respect to air quality, particularly when construction extends over a long period of time and/or when sensitive receptors are located close by. Particulate matter (i.e., PM_{10} and $PM_{2.5}$) are among the pollutants of greatest localized concern with respect to construction activities. Particulate emissions from construction activities can lead to adverse health effects and nuisance concerns, such as reduced visibility and soiling of exposed surfaces. Particulate emissions can result from a variety of construction activities, including excavation, grading, vehicle travel on paved and unpaved surfaces, and vehicle and equipment exhaust. Construction emissions of PM can vary greatly depending on the level of activity, the specific operations taking place, the number and types of equipment operated, local soil conditions, weather conditions, and the amount of earth disturbance.

Emissions of O_3 precursors ROG and NO_X are primarily generated from construction equipment exhaust and mobile sources, and vary as a function of the number of daily vehicle trips, and the types and number of heavy-duty, off-road equipment used, and the intensity and frequency of their operation. Additionally, construction-related ROG emissions would also result from the application of asphalt and architectural coating; the amount of these emissions would vary depending on the amount of paving or coating that would occur each day.

Table 3.2-3 below shows a summary of the construction emissions as estimated using CalEEMod (version 2016.3.2). The table shows daily emissions of criteria air pollutants as averaged over the entire duration of construction (approximately 1,352 workdays accounting for overlapping construction), compared to the BAAQMD significance thresholds. As shown in the table, emissions of all evaluated pollutants would be well below BAAQMD significance thresholds.

TABLE 3.2-3
UNMITIGATED AVERAGE DAILY CONSTRUCTION EMISSIONS

	Construction Emissions (pounds/day)			
	ROG	NO_X	Exhaust PM_{10}	Exhaust $PM_{2.5}$
Project Construction Emissions	2.2	16	0.6	0.5
BAAQMD Threshold	54	54	82	54
Exceed Threshold?	No	No	No	No

NOTE: See Appendix F for CalEEMod model outputs.

SOURCE: Calculations by ESA, CalEEMod Modeling, October 2018.

Whether or not a project's emissions exceed the BAAQMD significance thresholds, the BAAQMD recommends that all projects implement the Basic Construction Mitigation Measures that primarily address dust control. The BAAQMD considers implementation of the BAAQMD-recommended mitigation measures for fugitive dust sufficient to ensure that construction-related fugitive dust is reduced to a less-than-significant level. 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, Environmental Requirements, and Standard Construction Specification 02 82 13, Asbestos Control Activities (as discussed in Section 3.8, Hazards and Hazardous Materials). Standard Construction Specification 01 35 44 Section 1.3(E), Submittal of Dust Control and Monitoring Plan, Section 3.3(D), Dust Control System Compliance, Section 3.3(C), Dust Monitoring During Demolition and Construction, Section 3.3(B), Dust Control, and Section 3.4(A), Air Quality and Emissions Control, include BAAQMD-recommended measures addressing dust and emissions controls, while Section 3.4(B), Architectural Coatings, requires EBMUD to use architectural coatings compliant with appropriate VOC limits as established in the BAAQMD regulations to reduce ROG emissions during construction and maintenance. All demolition activities of asbestos containing structures would be conducted in accordance with the requirements of EBMUD Standard Construction Specification 02 82 13, Asbestos Control Activities, which would ensure compliance with the procedures required by the BAAQMD for the safe removal and disposal of asbestos containing material. The EBMUD Practices and Procedures Monitoring and Reporting Plan (Appendix E) lists the applicable standard specifications language.

Further, as indicated in Impact AIR-2 (Table 3.2-4), and Impact GHG-1 (Table 3.7-1) in Section 3.7, Greenhouse Gas Emissions, the Project's TAC, and GHG emissions would also not exceed threshold levels (consistent with the BAAQMD 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.

The *2017 Clean Air Plan* contains 85 control measures to reduce air pollution in the Bay Area. Projects that incorporate all feasible control measures are considered consistent with the clean air plan. However, no emission control strategies are specifically applicable to the operation of water storage and distribution facilities such as the Project. Heavy-duty vehicles used for Project construction would comply with applicable diesel emission standards for heavy-duty on road and off-road engines, consistent with the *2017 Clean Air Plan's* measures requiring the use of cleaner diesel-fueled engines. For these reasons, the Project would not be inconsistent with nor hinder implementation of the *2017 Clean Air Plan* control measures.

The estimated construction emissions from the Project would be less than the recommended BAAQMD significance thresholds for construction with Section 1.3(E), Dust Control and Monitoring Plan, Section 3.3(B), Dust Control, and Section 3.4(A), Air Quality and Emissions Control, of EBMUD's Standard Construction Specification 01 35 44, Environmental Requirements incorporated into the Project which include specified dust control BMPs to minimize short-term construction-related emissions. Therefore, the Project would be consistent with all applicable control strategies in the *2017 Clean Air Plan*. Because Project construction would be consistent with all three criteria identified by the BAAQMD to evaluate consistency with the *2017 Clean Air Plan*, the Project would lead to a less-than-significant impact with respect to conflicting with or obstructing implementation of the *2017 Clean Air Plan*.

Operation

Once operational, the Project would not include any new sources of emissions. The tanks and associated facilities (valve structure, rate control station, and pipelines) would operate in the same way as the existing facilities and would be operated and monitored remotely. EBMUD worker vehicle trips for operation and maintenance would remain the same or less than existing, with approximately 4-trips per month. For these reasons, the Project would not hinder the *2017 Clean Air Plan*'s ability to meet its primary goals to reduce emissions and harmful pollutants, safeguard public health, and reduce GHG emissions. Because the Project would not generate operational emissions that would hinder regional air quality planning in the area, the impact would be less than significant with respect to implementation of the *2017 Clean Air Plan.*

Significance Determination Before Mitigation

Less than significant.

Mitigation Measure

None required.

Impact AIR-2: Expose sensitive receptors to substantial pollutant concentrations. (Criterion 3)

Construction

Toxic Air Contaminants and Localized $PM_{2.5}$ Concentrations

Project construction activities over the 6-year construction period would produce TACs primarily as DPM and $PM_{2.5}$ emissions from the exhaust of diesel-fueled construction equipment such as loaders, backhoes, cranes, etc., as well as heavy-duty truck trips. These emissions could result in elevated concentrations of DPM and $PM_{2.5}$ at nearby receptors. Exposure of receptors in the vicinity of the Project site to these elevated concentrations could lead to an increase in the risk of cancer or other health impacts.

As discussed earlier, the Project site is surrounded by residential uses to the west, south, and east. The Central Reservoir Recreation Area and Redwood Day School are adjacent to the east boundary of the site and Oakland Heights Nursing and Rehabilitation is south of the site. Given the Project's construction duration and proximity to 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 hazard index (HI) of 1 for chronic and acute non-cancer risks, and an annual $PM_{2.5}$ concentration of 0.3 micrograms per cubic meter ($\mu g/m^3$). Consequently, an HRA was conducted to determine the level of risk generated by construction-related TACs and $PM_{2.5}$ at nearby receptors.

PM emissions over the duration of Project construction were used to estimate an emission rate in terms of grams per second based on the number of workdays and hours of construction per day. This was then used to model the highest annual concentrations in the Project vicinity using the American Meteorological Society/Environmental Protection Agency Regulatory Model (AERMOD). In accordance with OEHHA's 2015 *Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments,* the HRA applied the highest estimated Project-generated annual concentrations of TACs at the receptors to established cancer potency factors and acceptable reference concentrations for non-cancer health effects. The maximum off-site DPM and $PM_{2.5}$ annual concentrations as modeled using AERMOD occurred at Redwood Day School and were 0.045 $\mu g/m^3$ and 0.042 $\mu g/m^3$, respectively. This would be considered the Maximum Exposed Individual Receptor (MEIR) for the Project. The highest DPM and $PM_{2.5}$ annual concentrations at a residential receptor were 0.039 $\mu g/m^3$ and 0.037 $\mu g/m^3$, respectively, and occurred at the residences immediately downwind of the Project site along Sheffield Avenue. Increased cancer risks were calculated using the modeled maximum DPM concentrations and OEHHA-recommended methodologies for infant (3rd trimester through 2 years of age), child, and adult exposure at the residences. At Redwood Day School, risks were calculated only for child and adult exposure because Redwood Day School does not house any infants.

As shown in the Table 3.2-4, uncontrolled health risks (cancer risk, chronic HI, and $PM_{2.5}$ concentration) to children and adult receptors at Redwood Day School resulting from Project construction would be less than the BAAQMD Guidelines significance thresholds. Health risks to child and adult receptors at the maximum affected residential receptors would also be less than the significance thresholds, while cancer risk to infants at the maximum affected residences is estimated at 14.2 in a million and would exceed the threshold of 10 in a million. However, these are the resultant risks from uncontrolled emissions from construction equipment. As detailed in the Project Description, a number of EBMUD standard practices and procedures listed earlier in this section, applicable to all EBMUD projects, have been incorporated into the Project, including Standard Construction Specification 01 35 44, Section 3.4(A), Air Quality and Emissions Control, which requires that all construction equipment, diesel trucks, and generators be equipped with BACT for emission reductions of NO_X and PM. The EBMUD Practices and Procedures Monitoring and Reporting Plan (Appendix E) lists the applicable standard specifications language.

TABLE 3.2-4
MAXIMUM HEALTH RISKS FROM PROJECT CONSTRUCTION

Health Risk at Maximally Exposed Receptors	Maximum Cancer Risk (in a million)	Chronic Risk (Hazard Index)	Maximum $PM_{2.5}$ concentration
Uncontrolled Emissions			
Residential Receptor - Infant	**14.2**	0.008	0.037
Residential Receptor - Child	4.8	0.008	0.037
Residential Receptor - Adult	0.7	0.008	0.037
Project-level Threshold	10	1.0	0.3
Significant?	**Yes**	**No**	**No**
(MEIR) Redwood Day School Receptor - Child	5.5	0.009	0.042
MEIR - Adult	0.8	0.009	0.042
Project-level Threshold	10	1.0	0.3
Significant?	**No**	**No**	**No**
Emissions with Implementation of Best Available Control Technology with all Tier 4 Construction Equipment			
Residential Receptor - Infant	2.2	0.001	0.006
Residential Receptor - Child	0.7	0.001	0.006
Residential Receptor - Adult	0.1	0.001	0.006
Project-level Threshold	10	1.0	0.3
Significant?	**No**	**No**	**No**
Redwood Day School Receptor - Child	0.8	0.001	0.007
Redwood Day School Receptor - Adult	0.1	0.001	0.007
Project-level Threshold	10	1.0	0.3
Significant?	**No**	**No**	**No**

NOTE: See Appendix F for AERMOD model outputs and health risk calculations.
SOURCE: ESA AERMOD Modeling, October 2018.

Implementation of Specification 01 35 44, Section 3.4(A) in this analysis assumes the use of engines that meet the Tier 4 Final Standards, EPA's most stringent standards for off-highway diesel engines, as the BACT for all construction equipment. Currently, Tier 4 engines or installation of Level 3 verified diesel emission control strategies (VDECS) represent BACT for the control of diesel PM, and are expected to reduce emissions by 85 percent compared to uncontrolled emissions.[6] Table 3.2-4 shows that with the use of Tier 4 controls, health risks at both Redwood Day School and the residential receptors would be less than the BAAQMD significance thresholds for all age groups. Use of construction equipment that meets the Tier 4 standard would reduce the cancer risk to infants at the maximum exposed residential receptor to 2.2 in a million (as shown in the Table 3.2-4), which is less than the respective threshold of 10 in a million.

Section 3.4(A), Air Quality and Emissions Control, of EBMUD's Standard Construction Specification 01 35 44, Environmental Requirements, has been incorporated into the Project and includes the use of engines that meet the Tier 4 Final Standards as the BACT for all construction equipment to minimize short-term construction-related health risk to nearby receptors. In addition, the estimated health risk from exposure to Project construction emissions would be less than the recommended BAAQMD significance thresholds with their incorporation. Therefore, the Project's construction-related health risk from exposure to TACs and $PM_{2.5}$ would be less than significant.

Criteria Air Pollutants

The Project would generate criteria pollutant emissions of ROG, NO_X, and particulate matter, as discussed under Impact AIR-1; however, the impacts of these emissions on sensitive receptors are more difficult to quantify. Given that O_3 formation occurs through a complex photo-chemical reaction between its precursors NO_X and ROG in the atmosphere with the presence of sunlight, the impacts of O_3 are typically considered on a basin-wide or regional basis instead of a localized basis. The health-based ambient air quality standards for O_3 therefore are as concentrations of O_3 and not as tonnages of their precursor pollutants (i.e., NO_X and ROG). It is not necessarily the tonnage of precursor pollutants emitted that causes human health effects, but the concentration of resulting O_3 or particulate matter. Because of the complexity of O_3 formation and the non-linear relationship of O_3 concentration with its precursor gases, and given the state of environmental science modeling in use at this time, it is not feasible to convert specific project-level emissions of NO_X or ROG emitted in a particular area to concentrations of O_3 in that area. Meteorology, the presence of sunlight, seasonal impacts, and other complex chemical factors all combine to determine the ultimate concentration and location of O_3 (SCAQMD, 2014; SJVAPCD, 2014). Because the Project would not exceed the numeric indicator for ROG and NO_X emissions during either construction or operation, it is unlikely that Project ROG and NO_X emissions could result in an increase in ground-level O_3 concentrations in proximity to the Project site or elsewhere in the air basin, and impacts would be less than significant.

6 http://www.arb.ca.gov/diesel/verdev/vt/cvt.htm.

As expressed in the *amicus curiae* briefs submitted for the *Sierra Club v. County of Fresno* case (also known as the *Friant Ranch Case* [SCAQMD, 2014; SJVAPCD, 2014]), the CEQA significance thresholds for criteria pollutants from the air district were set at emission levels tied to the region's attainment status, and are emission levels at which stationary pollution sources permitted by the air district must offset their emissions. A CEQA project must use feasible mitigations for the region to attain the health-based ambient air quality standards. Therefore, given that the Project would not exceed the mass emissions thresholds established by the BAAQMD, it is unlikely that emissions from Project-related activities will cause or contribute to the exposure of sensitive receptors to ground-level concentrations in excess of health-protective levels.

The primary health concern with exposure to NOX emissions is the secondary formation of O3. As discussed earlier, due to the complexity of ozone formation from NOx and ROG, and the state of environmental modeling in use at the current time focusing on regional, population-wide health impacts, a clear connect between Project-level NOX emissions and O3-related health impact cannot be determined at this time.

Operation

The Project would not introduce any new sources of TAC emissions. Therefore, there would be no Project-related operational health risk impacts on nearby receptors. Operational emissions of criteria air pollutants from the Project would be minimal and less than significant.

Significance Determination Before Mitigation

Less than significant.

Mitigation Measure

None required.

Cumulative Impact Analysis

Impact AIR-3: 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. (Criterion 2)

Construction

Criteria Air Pollutant Emissions

By definition, regional air pollution is largely a cumulative impact. Emissions from present and future projects contribute to the region's adverse air quality on a cumulative basis. No single project is sufficient in size, by itself, to result in non-attainment of air quality standards. Instead, a project's individual emissions contribute to existing cumulative air quality impacts (BAAQMD, 2017a). 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 3.2-3, the Project's construction-related emissions would not exceed the BAAQMD construction-related criteria air pollutant significance thresholds (see Impact AIR-1 above). Therefore, because the Project's emissions would not exceed the Project-level thresholds for criteria air pollutants, the Project would not result in a cumulatively considerable contribution to regional air quality impacts, resulting in a cumulative impact that is less than significant.

Health Risks

BAAQMD Guidelines recommend an assessment of cumulative health risk impacts. Therefore, in addition to Project construction, possible local stationary or vehicular source emissions should 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 be considered. Any potential cumulative health risk would, therefore, derive from Project activities plus any existing identified risk sources within the Project vicinity. As the Project site does not include sensitive receptors, the analysis below estimates cumulative health risks to off-site receptors maximally affected by Project construction or the MEIR at Redwood Day School.

The BAAQMD 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. BAAQMD has also developed a geo-referenced database of highways and roadways throughout the San Francisco Bay Area to be used in conjunction with the Highway Screening Analysis Tool and the Roadway Screening Analysis Calculator for estimating risks from highways and major roadways (BAAQMD, 2011b). One mobile source (freeway I-580, immediately north of the Project site) was included in the cumulative analysis. No other roadways carry a volume over 10,000 average daily traffic (ADT) within 1,000 feet of the Project site. Ten cumulative projects were identified in the general vicinity of the Project area, three of which whose construction could coincide with Project construction. However, none of these projects would be within 1,000 feet of the Project site and were therefore not included in the cumulative analysis. The cumulative health risks (cancer risk, annual $PM_{2.5}$ concentration, and chronic non-cancer hazards) from Project construction, along with risks from freeway I-580, are presented in Table 3.2-5. Estimated cumulative health risks would be below BAAQMD-recommended thresholds for cumulative impacts. Therefore, cumulative health risks to receptors in the Project vicinity would be less than significant, and the Project's contribution to cumulative health risks would be less than cumulatively considerable.

TABLE 3.2-5
CUMULATIVE HEALTH IMPACTS ON PROJECT MEIR

Source	Source Type	Distance to MEIR (feet)	Cancer Risk (persons per million)	Chronic Hazard Impact	$PM_{2.5}$ Concentration (µg/m^3)
Project	Construction	50	2.2	0.001	0.006
Freeways and Major Roadways within 1,000 feet					
I-580	Freeway	500	8.14	0.007	0.057
		Cumulative Impacts	10.34	0.008	0.063
		Cumulative Significance Thresholds	100	10	0.8
		Potentially Significant Impact?	No	No	No

SOURCE: BAAQMD, 2011, 2012; calculations by ESA, 2018.

Operation

As discussed under Impact AIR-1, once operational, Project facilities would not increase emissions of criteria air pollutants over existing conditions and would therefore not contribute to a cumulative impact. The Project would also 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.

3.2.4 References

BAAQMD (Bay Area Air Quality Management District). 2011a. California Environmental Quality Act Air Quality Guidelines, May 2011. Available: http://www.baaqmd.gov/~/media/Files/Planning%20and%20Research/CEQA/BAAQMD%20CEQA%20Guidelines%20May%202011.ashx?la=en. Accessed October 7, 2018.

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BAAQMD. 2017a. California Environmental Quality Act Air Quality Guidelines, 2017. Available: http://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en. Accessed October 7, 2018.

BAAQMD. 2017b. Final 2017 Clean Air Plan, adopted April 19, 2017. Available: http://www.baaqmd.gov/~/media/files/planning-and-research/plans/2017-clean-air-plan/attachment-a_-proposed-final-cap-vol-1-pdf.pdf?la=en. Accessed October 7, 2018.

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San Joaquin Valley Air Pollution Control District (SJVAPCD), 2014. Application for Leave to File Brief of Amicus Curiae Brief of San Joaquin Valley Unified Air Pollution Control District in Support of Defendant and Respondent, County of Fresno and Real Party In Interest and Respondent, Friant Ranch, L.P. In the Supreme Court of California. Sierra Club, Revive the San Joaquin, and League of Women Voters of Fresno v. County of Fresno.

South Coast Air Quality Management District (SCAQMD), 2014, Application of the South Coast Air Quality Management District for Leave to File Brief of Amicus Curiae in Support of Neither Party and Brief of Amicus Curiae. In the Supreme Court of California. Sierra Club, Revive the San Joaquin, and League of Women Voters of Fresno v. County of Fresno.

3.3 Biological Resources

This section describes the physical and regulatory setting within the study area[1] for biological resources (Figure 3.3-1) and identifies and evaluates potential biological impacts that could result from the construction and operation of Project. Biological resources include plant and wildlife species, especially those considered special-status species (including rare, threatened, or endangered species), sensitive biological communities, and sensitive habitats (e.g., streams and wetlands). The impact analysis includes consideration of the Final Arborist Report for EBMUD Central Reservoir Replacement Project (Orion Environmental Associates, 2017), and the Central Reservoir Replacement Project Hydrology Report (ESA, 2018), which were prepared for the Project and are included as Appendices D and I, respectively.

3.3.1 Definitions

The definitions below are those used by federal, state, and local regulatory agencies; and the language of applicable federal, state, and local regulations.

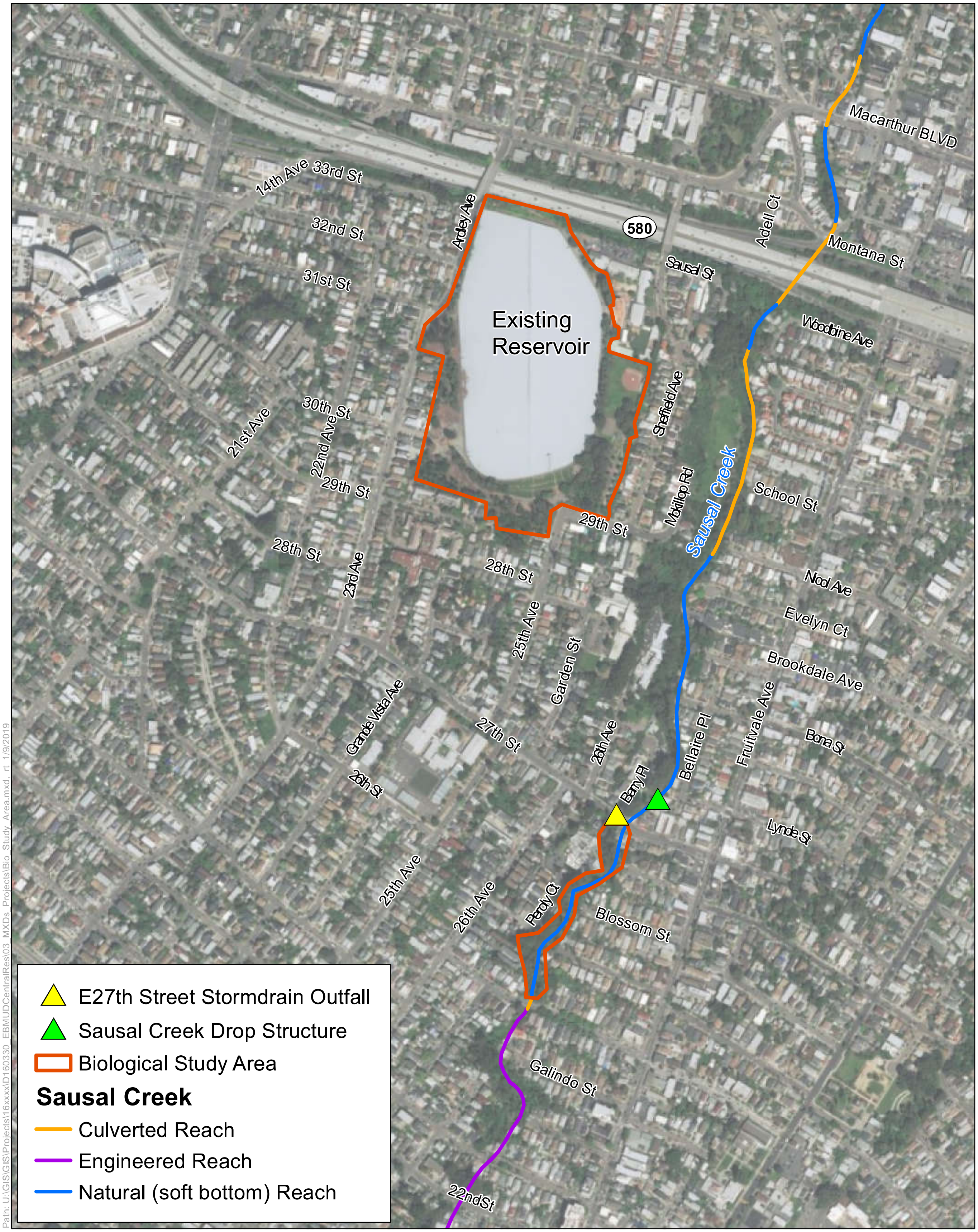
Diameter at Breast Height* (*dbh*)*: The diameter of a tree trunk measured 4.5 feet above the ground. For multi-stemmed trees, dbh is calculated as two-thirds the sum of aggregated stem diameters.

***Special-Status Species*:** For the purpose of this document, special-status species include:

- Plant, fish, and wildlife species listed as Threatened or Endangered under the Federal Endangered Species Act (FESA; 50 Code of Federal Regulations [CFR] 17), and species that are candidates for listing under the statutes.
- Species protected by California Fish and Game Code (CFGC), including nesting birds and Fully Protected species[2].
- Plant, fish, and wildlife species listed as Threatened or Endangered under the California Endangered Species Act (CESA); and the laws and regulations for implementing CESA as defined in CFGC Section 2050 et seq. and the California Code of Regulations (CCR) 14 CCR Section 670.1 et seq., and candidates for listing under the statute (CFGC Section 2068).
- Species meeting the definition of "Rare" or "Endangered" under *CEQA Guidelines* 14 CCR Section 15125 (c) and/or 14 CCR Section 15380, including plants listed on California Native Plant Society (CNPS) Lists 1A, 1B, 2A, 2B, 3 and 4.

[1] In this section, the study area includes the Project site, adjacent Central Reservoir Recreation Area, trees along the border of the Project site and Redwood Day School, and a reach of the Sausal Creek riparian corridor from the East 27th Street outfall to Logan Street, as displayed in Figure 3.3-1. The Project site encompasses the existing reservoir site and includes the areas where active construction would occur, as shown on Figure 2-2 in the Project Description.

[2] Fully Protected species may not be taken or possessed at any time and no licenses or permits may be issued for their take, except for necessary scientific research and relocation of the bird species for the protection of livestock. Fully Protected species are identified in CFGC Sections 3511, 4700, 5050 and 5515.



SOURCE: ESRI World Imagery; EBMUD, 2018; ESA, 2018

EBMUD Central Reservoir Replacement Project

Figure 3.3-1
EBMUD Central Reservoir Project
Biological Study Area

0 400
Feet

ESA

- U.S. Fish and Wildlife Service (USFWS) Birds of Conservation Concern.
- Species of special concern, as designated by the California Department of Fish and Wildlife (CDFW) and required by 14 CCR Section 15380.
- Avian species protected under the Migratory Bird Treaty Act (MBTA) of 1918, as revised December 2017.
- Other species considered to be sensitive or important by resource agencies and/or the scientific community.

Sensitive Biological Community: These communities are of limited distribution within the state, county, or region and are typically vulnerable to the environmental effects of projects (CDFW, 2018a). Wetlands, lakes, streams, and riparian areas typically qualify as sensitive biological communities because of their rarity and importance to a variety of common and special-status plants and wildlife. 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, CEQA, and local ordinances or policies (City or County Tree Ordinances, Special Habitat Management Areas, and General Plan Elements).

The list of high-priority vegetation types is maintained by the California Vegetation Classification and Mapping (VegCAMP) program. Natural communities with state ranks S1–S3 are considered sensitive natural communities under CEQA.

Protected Tree: Oakland Municipal Code provides protection for certain trees and requires a permit for the removal of any "protected tree." A "protected tree" is defined in Oakland City Ordinance Chapter 12.36 as being:

1. On any property, coast live oak (*Quercus agrifolia*) measuring 4 inches dbh or larger, and any other tree measuring 9 inches dbh or larger, except eucalyptus (*Eucalyptus* sp.) and Monterey pine (*Pinus radiata*).
2. Monterey pine trees shall be protected only on City property and in development-related situations where more than five Monterey pine trees per acre are proposed to be removed. Although Monterey pine trees are not protected in non-development-related situations, nor in development-related situations involving five or fewer trees per acre, public posting of such trees and written notice of proposed tree removal to the Office of Parks and Recreation is required per Section 12.36.070A and Section 12.36.080A.

Jurisdictional Waters: Jurisdictional waters are classified as either "Waters of the United States" or "Waters of the State:"

> ***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

water bodies, including wetlands), and their tributaries (33 CFR 328.3). Potential wetland areas 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 the growth of hydrophytic vegetation are subject to Section 404 jurisdiction as "other waters" and are often characterized by an ordinary high water mark (generally naturally occurring 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, and a water quality certification from the State Water Resources Control Board (SWRCB) under Section 401 of the CWA.

Waters of the State. The term "Waters of the State" is defined by the Porter-Cologne Water Quality Control 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 Porter-Cologne Water Quality Control Act. If a 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.

Wildlife Movement Corridor: 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 (e.g., riparian corridors, areas that are contiguous with adjacent open space areas) 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.

3.3.2 Data Collection

Literature and Database Review

The information on natural communities, plant and animal species, and sensitive biological resources used in the preparation of this section was obtained from the following: the California Natural Diversity Database (CNDDB) (CDFW, 2019), the California Native Plant Society (CNPS) Electronic Inventory (CNPS, 2018), the

U.S. Fish and Wildlife Service (USFWS, 2019), on-line resources published by Friends of Sausal Creek, standard biological literature, and eBird.org (eBird, 2019). The following documents were prepared for the analysis or reviewed and referenced to assess habitat quality, as well as assess the potential presence of special-status species and sensitive natural communities:

- CNDDB records within the study area (CDFW, 2019), and the following U.S. Geological Survey (USGS) 7.5-minute topographic quadrangles: Oakland East, San Leandro, Hayward, Las Trampas Ridge, Oakland West, and Briones Valley.
- CNPS Inventory of Rare Plants within the study area (CNPS, 2019).
- USFWS Information for Planning and Consultation (IPaC) Trust Resource Report (USFWS, 2019), which provides results for
  - Federal Threatened and Endangered Species.
  - USFWS Critical Habitats.
  - USFWS Birds of Conservation Concern.
- Friends of Sausal Creek (FOSC, 2018). Natural Resources of the Friends of Sausal Creek Watershed. Available at: http://www.sausalcreek.org/natural-resources.
- Laurel Marcus and Associates, NewFields River Basin Services, Hydrologic Systems Inc. Final Sausal Creek Watershed Enhancement Plan. For Friends of Sausal Creek (LMA et al., 2010).

Study Area Surveys

Summary reports from the following surveys of the study area were prepared for the analysis or reviewed and referenced to assess habitat quality, and to assess the potential presence of special-status species and sensitive natural communities:

- Final Arborist Report for EBMUD Central Reservoir Replacement Project. Oakland, CA. Tree surveys conducted on March 29–31, 2017 (Orion Environmental Associates and ESA, 2017).
- Final Central Reservoir Replacement Project Hydrology Report. Including visual assessment on October 18, 2017 of the hydrological and biological conditions in Sausal Creek upstream and downstream of the East 27th Street outfall (ESA, 2018).
- Central Reservoir Replacement Project Reconnaissance Survey of Sausal Creek for western leatherwood (*Dirca occidentalis*) in the study area between the East 27th Street Outfall and Logan Street in Oakland on January 11, 2019 (ESA, 2019).

3.3.3 Environmental Setting

Regional Setting

The study area is in the Bay Area-Delta Bioregion, as defined by the state's Natural Communities Conservation Program. This bioregion extends from the Sacramento and San Joaquin Valley Bioregions to the Pacific Coast (California Environmental Resources Evaluation System [CERES], 2007). The climate is Mediterranean with relatively mild, wet winters and warm, dry summers. This bioregion is drained by rivers including the Russian, Gualala, Napa, Petaluma Rivers, and the Alameda and Putah Creeks. These watersheds support a variety of habitats such as open water, salt and brackish marshes, chaparral, and oak woodlands, which are host to a variety of threatened or endangered wildlife and sensitive plants, including California red-legged frog (*Rana draytonii*), California Ridgway's [clapper] rail (*Rallus obsoletus obsoletus*), California black rail (*Laterallus jamaicensis coturniculus*), salt-marsh harvest mouse (*Reithrodontomys raviventris)*, and Alameda whipsnake (*Masticophis lateralis euryxanthus*).

Project Study Area Setting

The study area includes the Project site, adjacent Central Reservoir Recreation Area, trees along the border of the Project site and Redwood Day School, and reach of the Sausal Creek riparian corridor from East 27th Street to Logan Street. The Sausal Creek riparian corridor is included in the study area because stormwater and water from the existing reservoir underdrain at the Project site discharges into Sausal Creek via the 25th Avenue and East 27th Street storm drains approximately 1,600-feet south of the Project site. Water that leaks through the reservoir lining is captured by the underdrain system, providing a constant source of flow to the creek.[3] Because of these hydrologic connections, the study area includes the natural (soft bottom) habitats of Sausal Creek and associated wetland vegetation in the reach between East 27th Street and Logan Street (where it enters a culvert). The culverted and engineered portion of the creek downstream, which begins at Logan Street, does not provide flora or faunal habitat that could be affected by changes in water flows and is therefore not included in the study area.

The entire Project site (the existing reservoir site) has been exposed to human influence and is in the urbanized context of Oakland. As described in Chapter 2, the Project site is bordered to the north by Interstate 580 (I-580), to the west and south by single-family residential homes, and to the east by the Central Reservoir Recreation Area and Redwood Day School. As with the region, past and ongoing development and other human activities have altered natural vegetative patterns or otherwise limited large expanses of most natural communities in this portion of the East Bay. Plant communities at the Project site include ornamental landscaping and ruderal (disturbed).

Communities and habitat types within the study area are described in the sections below, along with common wildlife species typically associated with each community.

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[3] Refer to Section 3.9, Hydrology and Water Quality, for more information on site drainage.

Vegetation Communities and Wildlife Habitats

Vegetation communities are assemblages of plant and wildlife species that occur together in the same area, which are defined by species composition and relative abundance. The study area contains developed and ruderal, landscaped, and riparian communities that were identified during the Project's Arborist Report survey (Appendix D), Hydrology Report survey (Appendix I), review of the Final Sausal Creek Watershed Enhancement Plan (LMA et al., 2010), and review of on-line aerial imagery. Vegetation communities and habitat types within the study area are described below.

Developed and Ruderal

This community type includes the reservoir, impervious roads, residences, impervious stormwater pipelines and ditches, and other developed facilities. Vegetation in developed and ruderal areas is subject to repeated or otherwise profound disturbance, and includes opportunistic plant species that can easily colonize and thrive with limited resources. Developed and ruderal areas may include some native species but are typically dominated by non-native and often highly invasive species. Ruderal areas provide low-quality foraging or nesting habitat for birds and small mammals. Wildlife species occurring in ruderal areas are generally those that tolerate proximity to human activity and disturbance. Within the study area, wildlife using adjacent higher quality habitats may forage and occasionally nest within ruderal areas.

Landscaped

This community type includes the Central Reservoir Recreation Area, trees along the border of the Project site and Redwood Day School, vegetated slopes of the reservoir, and tree plantings within the Project site (see Photos 7 and 9 on Figure 3.1-4, in Section 3.1, Aesthetics). This community is dominated by trees generally larger than 15 feet tall, mostly evergreen, and includes dense shrubs in addition to natural turf found in the Central Reservoir Recreation Area. The Project site contains approximately 380 trees, representing 20 different species that were documented in this community (Orion Environmental Associates, 2017). Landscaped areas typically provide cover, foraging, and nesting habitat for a variety of bird species, especially those that are tolerant of disturbance and human presence. Raptors such as red-tailed hawk (*Buteo jamaicensis*) and red-shouldered hawk (*Buteo lineatus*) can be found nesting in the upper branches of mature trees in this community. Passerine birds commonly found in such areas include the non-native English sparrow (*Passer domesticus*), house finch (*Carpodacus mexicanus*), dark-eyed junco (*Junco hyemalis*), western scrub jay (*Aphelocoma californica*), and Anna's hummingbird (*Calypte anna*).

Riparian

No riparian community is present on the Project site. The riparian corridor surrounding the reach of Sausal Creek in the study area is approximately 1,600-feet south of the Project site, near the East 27th Street outfall (see Figure 3.3-1). No Project-related construction or operational impacts would affect the riparian community upstream from the East 27th Street outfall. The Sausal Creek watershed, unlike most urban areas, has many open, unculverted creek channels (Figure 3.3-1). Compared to engineered and culverted reaches, the open creek portion of Sausal Creek in the study area demonstrates an un-engineered earthen channel that has the ability to support aquatic and riparian habitats for fish and wildlife. Please refer to Figure 3.3-2 and Figure 3.3-3 for photographs displaying the existing conditions of the riparian corridor in Sausal Creek near East 27th Street and Logan Street. This community consists of vegetation bordering the low-flow channel and covering the adjacent floodplain. Western pond turtle (*Emys marmorata*) and foothill yellow-legged frog (*Rana boylii*) could be found in the aquatic portions of this community. The following plant species were documented in the Sausal Creek study area during a reconnaissance-level survey: English ivy (*Hedera helix*), common knotweed (*Persicaria* sp.), tall cyperus (*Cyperus eragrostis*), watercress (*Nasturtium officinale*), Bermuda buttercup (*Oxalis pes-caprae*), upright veldt grass (*Ehrharta erecta*), common horsetail (*Equisetum arvense*), Himalayan blackberry (*Rubus armeniacus*), arroyo willow (*Salix lasiolepis*), boxelder (*Acer negundo*), gum (*Eucalyptus* sp.), southern catalpa (*Catalpa bignonioides*), wax-leaf privet (*Ligustrum japonicum*), bigleaf maple (*Acer macrophyllum*), blackwood acacia (*Acacia melanoxylon*), and brown dogwood (*Cornus glabrata*). This community has the potential to support rare plant species.

Sensitive Natural Communities

A sensitive natural community is a biological community that is regionally rare, provides important habitat opportunities for wildlife, is structurally complex, or is in other ways of special concern to local, state, or federal agencies. Most sensitive natural communities are given special consideration because they perform important ecological functions, such as maintaining water quality and providing essential habitat for plants and wildlife. Some plant communities support a unique or diverse assemblage of plant species and therefore are considered sensitive from a botanical standpoint. The most current version of the CDFW's List of California Terrestrial Natural Communities (CDFW, 2018b) indicates which natural communities are of special-status given the current state of the California classification. The CNDDB reports no sensitive natural community occurrences occurring within the study area (CDFW, 2019).

Wetlands and Other Jurisdictional Waters

Within the study area, Sausal Creek is an open channel perennial creek characterized by a stream channel bottom and bank in the south portion of the study area. The creek characteristics in the study area and nearby consist of gravel deposits and stream morphology that create pools, riffles, and glides (LMA et al., 2010). The creek is also culverted in various reaches outside of the study area. The urbanization of Sausal Creek began along the lower creek where the land is flat and eventually extended into the headwaters and onto steep slopes. Over time, large-scale grading, road building, and land disturbance for residential development in the upper Sausal Creek watershed likely increased soil erosion, including landslides in wet years, delivering large volumes of sediment to Sausal Creek (LMA et al., 2010). The reach of the creek in the study area has been subject to high-flow velocities that have contributed to a more incised channel, limiting its area and diversity; however, small portions of the creek display native wetland vegetation such as carex (*Carex pendula*) and common ladyfern (*Athyrium filix-femina*).

SOURCE: ESA, 2018

EBMUD Central Reservoir Replacement Project

Figure 3.3-2
Sausal Creek Entering the Culvert at
Logan Street, 1200 Feet Downstream of E27th Street

ESA

Pool upstream of E27th Street (near Hickory Street) at 0.05 cfs

Pool downstream of E27th Street (near Davis Street) at 0.09 cfs. Note riffle in foreground controlling pool depth.

SOURCE: ESA, 2018

Figure 3.3-3
Pool Habitat in Sausal Creek
Upstream (top) and Downstream (bottom) of E27th Street

While no aquatic habitat exists within the construction footprint, run-off from the Project site and leakage from the existing reservoir discharges into Sausal Creek through the East 27th Street storm drain outfall. An assessment of how the Project relates to the hydrology of Sausal Creek is presented in the Central Reservoir Replacement Project Hydrology Report (ESA, 2018), included as Appendix I. The results of this report as they relate to wetlands and waters are summarized below.

While seemingly negligible, during the dry season when creek flow subsides, supplemental flow from the underdrain contributes approximately 50 percent of the base flow immediately downstream of the East 27th Street storm drain. As described in Section 3.9, Hydrology and Water Quality, the Project may reduce dry season base flows below East 27th Street by up to 50 percent of existing values.

A reconnaissance of Sausal Creek was conducted prior to the first rainfall event of Water Year 2017–18, from East 27th Street downstream to Logan Street where the creek enters a culvert, and for 1,600-feet upstream from East 27th Street to Hickory Street (ESA, 2018). Figure 3.3-2 and Figure 3.3-3 show the creek habitat at the time of the creek reconnaissance. The goal of the reconnaissance was to assess conditions when background watershed flows were lowest and flows from the reservoir underdrain were proportionately at their highest.

The visual assessment during the reconnaissance revealed similar quality aquatic and riparian habitat downstream of the East 27th Street storm drain outfall and in the upstream reach. For example, the number and residual depth of pools (which play an important role as summer refugia for aquatic species) were similar in both reaches, and there were no dry sections of creek upstream of the outfall. Although the upper reach had only half as much flow as the lower reach during the reconnaissance, pool depth was controlled by the elevation of the pool tail, and there was sufficient flow to fill all pools to that controlling depth. Similarly, the wetted area of riffles appeared to be similar in both reaches. The conclusion of the visual assessment is that similar habitat quality is present above and below the point where the underdrain discharges into the creek under existing conditions.

Wildlife Corridors and Nursery Sites

Within the study area, the open channel portion of Sausal Creek has the ability to support aquatic and riparian habitats for fish and wildlife species. The open channel portion of the creek in the study area has been exposed to a relatively high degree of human disturbance over the long term. Furthermore, the length of the creek within the study area is small relative to the larger more open-channel contiguous reaches in the upper watershed. As such, this portion of the study area would not be considered a wildlife corridor. The remaining portions of the study area (the Project site, its shared border with Redwood Day School, and the Central Reservoir Recreation Area) include developed, paved, or landscaped habitats. The Project site is surrounded by residential development to the west and south sides, I-580 on the north side, and a recreation area and school on the east side.

Special-Status Species

A list of special-status species with the potential to occur on or in the vicinity of the study area was compiled from a CNDDB search for the following 7.5-minute USGS topographic quadrangles: Oakland East, San Leandro, Hayward, Las Trampas Ridge, Oakland West, and Briones Valley (CDFW, 2019); a six-quad search on the California CNPS Rare Plant Inventory (CNPS, 2019); a search of the study area from the USFWS species database (USFWS, 2019); and a review of biological literature of the region. Appendix G (Special-Status Species Lists: CDFW, USFWS, and CNPS) presents a comprehensive list of special-status plant and wildlife species that were included in the database searches.

Most of these species are unlikely to occur in the study area or be affected by the Project, due to the Project's location being outside of special-status species' geographic range; habitats are of poor quality; or unsuitable conditions occurring in the study area (CDFW, 2019; CNPS, 2019; USFWS, 2019). From the full list of species in Appendix G, each special-status species was then individually assessed based on habitat requirements, its range, life history, potential barriers to dispersal from occupied habitat, and distribution relative to vegetation communities that occur in and around the study area. Table 3.3-2 list the special-status species that have the potential to occur within the study area.

Field reconnaissance of the study area, which informed the analysis, was conducted in 2017 in preparation for the Project's Hydrology Report (ESA, 2018) and Arborist Report (Orion Environmental Associates, 2017). Initial data collection efforts described above, identified western leatherwood (a California Rare Plant Rank (CRPR) 1B.2 species), as having a moderate potential to occur. Based on a focused survey of the Sausal Creek study area conducted for western leatherwood, during its flowering period, on January 11, 2019 (ESA, 2019) it was determined that western leatherwood is not present in the study area because no individuals were observed.

Except for nesting birds and roosting bats, no special-status species have the potential to be present at the Project site (where active construction will occur). However, within the Sausal Creek study area (outside the construction footprint) several special status species have the potential to occur as shown in Table 3.3-1 and Table 3.3-2.

Rare and Special-Status Plants

The study area is not within any USFWS critical habitat for plant species (USFWS, 2019). The habitats present within the Project site are characteristic of disturbed and urban habitats and are dominated by planted landscaping and other non-native species; therefore, the Project site does not contain habitat for special-status plants. No construction is proposed within the Sausal Creek riparian community of the study area.

TABLE 3.3-1
SPECIAL-STATUS PLANTS WITH POTENTIAL TO OCCUR IN THE STUDY AREA

Scientific and Common Names	Status Federal/State/ CRPR or Other	Habitat Requirements	Potential Occurrence in Study Area
FEDERAL OR STATE LISTED PLANT SPECIES			
Arctostaphylos pallida Pallid manzanita	FT/SE/1B.1	Siliceous shale, sandy, or gravelly substrate; broadleafed upland forest, closed-cone coniferous forest, chaparral, cismontane woodland, and coastal scrub. Known from fewer than 10 occurrences in the Contra Costa Hills and Diablo Range. 185-465 meters. December – March	**Absent.** Suitable habitat not present.
Chorizanthe robusta var. robusta Robust spineflower	FE/–/1B.1	Sandy or gravelly habitat in coastal scrub and coastal dunes. 3-300 meters. April - September	**Absent**. Suitable habitat not present.
Clarkia franciscana Presidio clarkia	FE/SE/1B.1	Chaparral, valley and foothill grassland in serpentine soils. 25-335 meters. May – July	**Absent**. Suitable habitat not present.
Holocarpha macradenia Santa Cruz tarplant	FT/SE/1B.1	Light, sandy soil or sandy clay; often with non-natives in coastal prairie, scrub, or valley and foothill grassland. 10-220 meters. June - October	**Absent**. Suitable habitat not present.
Lasthienia conjugens Contra Costa goldfields	FE/--/1B.1	Valley and foothill grassland, vernal pools, cismontane woodland; vernal pools and swales and low depressions in open grassy areas. 0 - 470 meters. March – June	**Absent**. Suitable habitat not present.
Plagiobothrys diffuses San Francisco popcorn flower	--/SE/1B.1	Historically on grassy slopes with marine influence. 60-485 meters. March – June	**Absent**. Suitable habitat not present.
Sanicula maritima Adobe sanicle	--/SR/1B.1	Moist clay or ultramafic/serpentine soil in chaparral, coastal prairie, meadows, seeps, and valley and foothill grassland. Affinity to serpentine soils: weak indicator. February – May	**Absent**. Suitable habitat not present.
OTHER SPECIAL STATUS PLANT SPECIES			
Amsinckia lunaris Bent-flowered fiddleneck	--/--/1B.2	Occurs in coastal bluff scrub, cismontane woodland, and valley and foothill grassland. 50-500 meters. March - June	**Absent**. Suitable habitat not present.
Astragalus tener var. *tener* Alkali milk-vetch	--/--/1B.2	Grows in playas, valley and foothill grasslands in adobe clay, and vernal pools in alkaline soils. 1-60 meters March – June	**Absent**. Suitable habitat not present.
Balsamorhiza macrolepis Big scale balsamroot	--/--/1B.2	Chaparral, cismontane woodland, and valley and foothill grassland, sometimes on serpentine soils. 90-1400 meters. March – June.	**Absent**. Suitable habitat not present.
Calochortus pulchellus Mt. Diablo fairy lantern	--/--/1B.2	Chaparral, valley grassland, foothill woodland. 30 – 840 meters. April – June.	**Absent**. Suitable habitat not present.
Carex comosa Bristly sedge	--/--/2B.1	Freshwater wetlands, wetland-riparian. Coastal prairie, marshes and swamps (lake margins), valley and foothill grasslands. 270 – 1030 meters. May – September	**Low**. Low quality suitable habitat present and historical occurrence is only documented occurrence in region. Not recorded in CNNDB search.

TABLE 3.3-1 (CONTINUED)
SPECIAL-STATUS PLANTS WITH POTENTIAL TO OCCUR IN THE STUDY AREA

Scientific and Common Names	Status Federal/State/ CRPR or Other	Habitat Requirements	Potential Occurrence in Study Area
OTHER SPECIAL STATUS PLANT SPECIES (cont.)			
Centromadia parryi ssp. *Congdonii* Congdon's tarplant	--/--/1B.1	Alkaline soils in annual grassland, on lower slopes, flats, and swales, sometimes on saline soils. 0 - 230 meters May - October	**Absent**. Suitable habitat not present.
Cicuta maculate var. *bolanderi* Bolander's water-hemlock	--/--/2B.1	Marshes and swamps, coastal, fresh or brackish water. 4 – 120m. July – September.	**Absent**. Suitable habitat not present and historical occurrence is only documented occurrence in region
Cirsium andrewsii Franciscan thistle	--/--/1B.2	Broadleaved upland forest, coastal bluff scrub, coastal prairie, and coastal scrub. Mesic habitats, sometimes serpentinite soils (Affinity: weak indicator). 0-150 meters. March - July	**Absent**. Suitable habitat not present.
Dirca occidentalis Western leatherwood	--/--/1B.2	Mesic habitats. Broadleafed upland and closed-cone coniferous forest, chaparral, cismontane woodland, North coast coniferous forest, riparian forest and woodland. 25-425 meters. January – March	**Absent**. Several occurrences in region and reflect similar habitat conditions to the Sausal Creek portion of the study area; however, ESA 1/11/19 focused survey, after reference site was visited, confirmed not present in study area.
Eriogonum luteolum var. caninum Tiburon buckwheat	--/--/1B.2	Chaparral, coastal prairie, valley and foothill grasslands, sandy to gravelly sites, usually on sandy to gravelly soils, strict serpentine endemic. 0-700 meters. May – September	**Absent**. Suitable habitat not present.
Extriplex joaquinana San Joaquin spearscale	--/--/1B.2	Alkaline soils in chenopod scrub, meadows and seeps, playas, valley and foothill grassland. 1-835 meters. April – October	**Absent**. Suitable habitat not present and historical occurrence is only documented occurrence in region.
Fissidens pauperculus Minute pocket moss	--/--/1B.2	Moss growing on damp soil along coast. In dry streambeds and on stream banks. 10-1024 meters.	**Absent**. Suitable habitat not present and historical occurrence is only documented occurrence in region.
Fritillaria liliacea Fragrant fritillary	--/--1B.2	Often on serpentine; although can be found in various soils, including clay in grasslands. 3-400 meters. February – October	**Absent**. Suitable habitat not present.
Helianthella castanea Diablo helianthella	--/--1B.2	Broadleafed upland forest, chaparral, cismontane woodland, coastal scrub, riparian woodland, valley and foothill grassland. Usually rock, axonal soils; often in partial shade. 60-1300 meters. March – June	**Low**. Although suitable habitat is present in the Sausal Creek riparian habitat portion of the study area, species regional occurrences are in more exposed and chaparral sites in hills several miles east of the study area.
Hemizonia congesta ssp. Congesta Congested-headed hayfield tarplant	--/--1B.2	Valley and foothill grassland; sometimes roadsides. Affinity for serpentine soil: weak indicator / indifferent. April – November	**Absent**. Suitable habitat not present and historical occurrence is only documented occurrence in region.
Heteranthera dubia Water star-grass	--/--/2B.2	Requires a pH of 7 or higher, usually in slightly eutrophic waters. Marshes and swamps (alkaline, still or slow-moving water). July – August	**Low**. Although suitable habitat is present in the Sausal Creek riparian corridor portion of the study area, historical occurrence is only documented occurrence in region.
Hoita stobilina Loma Prieta hoita	--/--/1B.1	Chaparral, cismontane woodland, riparian woodland, usually on serpentine soil and mesic sites. 30-860 meters. May – July	**Low**. Although suitable habitat is present in the Sausal Creek riparian corridor portion of the study area, historical occurrence is only documented occurrence in region.

TABLE 3.3-1 (CONTINUED)
SPECIAL-STATUS PLANTS WITH POTENTIAL TO OCCUR IN THE STUDY AREA

Scientific and Common Names	Status Federal/State/ CRPR or Other	Habitat Requirements	Potential Occurrence in Study Area
OTHER SPECIAL STATUS PLANT SPECIES (cont.)			
Horkelia cuneate var. *sericea* Kellogg's horkelia	--/--/1B.1	Openings in closed-cone coniferous forest, maritime chaparral, coastal scrub, sandy or gravelly soil. 10-200 meters. April - September	**Absent**. Suitable habitat not present.
Monolopia gracilens Woodland woollythreads	--/--/1B.2	Mixed evergreen forest, broadleaved upland forest, redwood forest, and chaparral, and valley and foothill grasslands. Affinity to serpentine soil. 100-1200 meters. March – July	**Absent**. Suitable habitat not present and historical occurrence is only documented occurrence in region.
Plagiobothrys chorisianus var. *Chorisianus* Choris' popcorn-flower	--/--/1B.2	Mesic sites in chaparral, coastal scrub, and coastal prairie. March – June	**Absent.** Historical occurrence in vicinity of Oakland, however, presumed extirpated.
Senecio aphanactis Chaparral ragwort	--/--/2B.2	Chaparral, cismontane woodland, coastal scrub. 130 – 660 meters. January - April	**Absent**. Suitable habitat not present.
Spergularia macrotheca var. *longistyla* Long-styled sand-spurrey	--/--/1B.2	Alkaline soils, meadows and seeps, marshes and swamps. 0-225 meters. February – May	**Absent**. Suitable habitat not present.
Streptanthus albidus ssp. *permoenus* Most beautiful jewelflower	--/--/1B.2	Serpentine outcrops on ridges and slopes in chaparral, grassland, and cismontane woodland. 95-1000 meters. April - September	**Absent**. Suitable habitat not present.
Trifolium hydrophilum Saline clover	--/--/1B.2	Marshes and swamps, vernal pools, and alkaline, mesic habitats in valley and foothill grassland. 0-300 meters. April – June	**Absent**. Suitable habitat not present.
Viburnum ellipticum Oval-leaved viburnum	--/--/2B.3	Chaparral, cismontane woodland, lower montane coniferous forest. 215-1400 meters. May - June	**Absent**. Suitable habitat not present.

NOTES:

Potential occurrence in the study area:
High = Species is expected to occur in the Project study area or occurs locally to the area.
Moderate = Suitable habitat exists in the study area.
Low = The study area is outside of the species' described range or suitable habitat is absent.

California Rare Plant Rank (CRPR):
Rank 1A = Plants presumed extirpated in California and either rare or extinct elsewhere.
Rank 1B = Plants rare, threatened, or endangered in California and elsewhere.
Rank 2A = Plants presumed extirpated in California, but more common elsewhere.
Rank 2B = Plants rare, threatened, or endangered in California, but more common elsewhere.

An extension reflecting the level of threat to each species is appended to each rarity category as follows:
.1 – Seriously endangered in California.
.2 – Fairly endangered in California.
.3 – Not very endangered in California.

Status Codes:
Federal
FE = listed as endangered under the ESA
FT = listed as threatened under the ESA
-– = no listing
State
SE = listed as endangered under CESA
SR = listed as Rare by the State of California (plants only)
SSC = California Department of Fish and Wildlife designated "species of special concern"
Asterisk = listed on CDFW Special Animals List
-– = no listing

Northern California black walnut (*Juglans hindsii*), a CRPR: 1B.1 species currently has a widespread distribution in northern California and southern Oregon of trees that match *J. hindsii* morphologically, previously thought to be hybrids. Recent findings show that most of these occurrences are genetically pure *J. hindsii* (Potter et al., 2018). There are only three or four sites (Contra Costa, Sacramento, and Napa Counties) where the species is known to have occurred prior to extensive settlement of California by Europeans in the mid-19th century, which has served as the exclusive justification for the CNPS designating a rare plant rank of 1B.1 (rare, threatened, or endangered in California and elsewhere; seriously threatened in California). This now known widespread distribution of genetically pure *J. hindsii* suggests that the CNPS rare plant rank of 1B.1 is not appropriate.

SOURCE: USFWS, 2019; CDFW, 2019; and CNPS, 2019.

TABLE 3.3-2
SPECIAL-STATUS ANIMALS WITH POTENTIAL TO OCCUR IN THE STUDY AREA

Scientific and Common Names	Status Federal/State/ Other	Habitat Requirements	Potential Occurrence in Study Area
Invertebrates			
Euphydryas editha bayensis Bay checkerspot butterfly	FT/--/Xerces CI	Native grasslands on serpentine soils in San Francisco Bay area. Host plants: foothill plantain (*Plantago erecta)* (primary); denseflower Indian paintbrush (*Castilleja densiflora*) and owl's clover (*C. exserta*). Host plants typically grow on serpentine soils. Period of identification: March - May	**Absent.** Suitable habitat not present.
Speyeria callipppe callippe Callippe silverspot butterfly	FE/--/Xerces CI	Grasslands, especially hilltops and ridges. Requires large patches of host plant, johnny jump-up (*Viola pedunculata*). Populations limited to San Bruno Mountain in San Mateo County and Alameda County. Period of identification: late April - July	**Absent.** Suitable habitat not present.
Fish			
Oncorhynchus mykiss irideus Central California Coast steelhead DPS	FT/--/--	Spawns and rears in coastal streams between the Russian River in Sonoma County and Soquel Creek in Santa Cruz County, as well as drainages tributary to San Francisco Bay, where gravelly substrate and shaded riparian habitat occurs.	**Absent**. Suitable habitat not present.
Amphibians			
Rana boylii Foothill yellow-legged frog	--/SCT	Partly-shaded, shallow streams and riffles with rocky substrate in a variety of habitats. Need at least some cobble-sized substrate for egg-laying. Needs at least 15 weeks to attain metamorphosis.	**Moderate.** Suitable habitat present, although species only documented in the upper Sausal Creek watershed.
Rana draytonii California red-legged frog	FT/SSC	Permanent and semipermanent aquatic habitats, such as creeks and cold-water ponds, with emergent and submergent vegetation; may aestivate in rodent burrows or cracks during dry periods.	**Low.** Suitable habitat present, although limited aestivation habitat due to isolated dynamic habitat.
Reptiles			
Masticophis lateralis euryxanthus Alameda whipsnake	FT/ST	Primarily associated with scrub and chaparral habitat. Uses adjacent grassland, oak woodland and riparian habitats adjacent to core scrub habitat. Require open areas to maintain optimal body temperature.	**Low.** High quality suitable habitat not present due to lack of core scrub habitat in proximity to study area's riparian habitat.
OTHER SPECIAL STATUS ANIMAL SPECIES			
Invertebrates			
Bombus caliginosus Obscure bumble bee	--/*/--	Species occurs along the Pacific Coast, from southern California to southern British Columbia, with scattered records from the east side of California's Central Valley. Food plant genera include Baccharis, Cirsium, Lupinus, Lotus, Grindelia and Phacelia.	**Low**. Low abundance of plant species providing food source in study area.
Bombus cotchii Crotch bumble bee	--/*/--	This species occurs primarily in California, including the Mediterranean region, Pacific Coast, Western Desert, Great Valley, and adjacent foothills through most of southwestern California. It has also been documented in southwest Nevada, near the California border. Food plant genera include Antirrhinum, Phacelia, Clarkia, Dendromecon, Eschscholzia, and Eriogonum.	**Low**. Low abundance of plant species providing food source in study area.

TABLE 3.3-2 (CONTINUED)
SPECIAL-STATUS ANIMALS WITH POTENTIAL TO OCCUR IN THE STUDY AREA

Scientific and Common Names	Status Federal/State/ Other	Habitat Requirements	Potential Occurrence in Study Area
OTHER SPECIAL STATUS ANIMAL SPECIES (cont.)			
Invertebrates (cont.)			
Danaus plexippus Monarch butterfly (overwintering population)	--/*/--	Eucalyptus groves (winter sites). Period of identification: Winter	**Absent**. Suitable habitat not present.
Helminthoglypta nickliniana bridgesi Bridges' coast range shoulderband	--/*/--	Open hillsides of Alameda and Contra Costa, colonizing under tall grasses and weeds, especially rock piles.	**Absent**. Lack of rock piles and open grasslands in study area.
Reptiles			
Emys marmorata Western pond turtle	--/SSC/--	The western pond turtle is uncommon to common in suitable aquatic habitat throughout California, west of the Sierra-Cascade crest and absent from desert regions, except in the Mojave Desert along the Mojave River and its tributaries. Occupies ponds, marshes, rivers, streams, and irrigation canals with muddy or rocky bottoms and with watercress, cattails, water lilies, or other aquatic vegetation in woodlands, grasslands, and open forests. Nests are typically constructed in upland habitat within 0.25 mile of aquatic habitat.	**High.** Suitable habitat present and has been observed in the Sausal Creek watershed (FOSC, 2018).
Birds			
Accipiter cooperii Cooper's hawk (nesting)	--/WL/--	Nests in riparian areas and oak woodlands, and hunts songbirds at woodland edges. Increasingly found nesting in residential neighborhoods, feeding on backyard songbirds.	High. Listed as uncommon in the Sausal Creek watershed (FOSC, 2018); however, suitable nesting habitat is present in the riparian watershed and residential neighborhoods surrounding the project site.
Accipiter striatus Sharp-shinned hawk (nesting)	--/WL/--	Nests in dense groves of usually midsized conifers, in the tops of live oaks, and sometimes deciduous trees. Usually on hilltops or hillsides, near grasslands or chaparral, but typically not water. Hunts songbirds along edge habitat.	**Moderate.** Listed as common in Sausal Creek watershed (FOSC, 2018), but riparian and urban habitat are not typical nesting habitats for this species; however, conifer trees at the Project site could provide habitat.
Ardea herodias Great blue heron (nesting colony)	--/*/--	Colonial nester in tall trees near wetland foraging areas. Prefers to nest in vegetation on islands or in swamps, probably to avoid ground predators. Nests (*Herodias* group) are found mostly in trees, up to 30 m or more above ground.	**Low**. Could migrate through the study area. Study area provides low quality nesting colony habitat.
Athene cunicularia Burrowing owl (burrow sites and some wintering sites)	--/SSC/--	Present in open annual grasslands with abundance of small mammal burrows for nesting.	**Absent**. Some open grassland in W.D. Wood Park, 0.07 miles from the project site, but no suitable habitat in the study area.
Branta hutchinsii leaucopareia Cackling (=Aleutian Canada) goose (wintering)	--/*/--	Nests individually or semi-colonially in remote areas, preferring sites that command a clear view in all directions with permanent water not far away, including lakes, ponds, larger streams, marshes, muskegs, and wet hummocky areas.	**Low**. Common along the creek corridor west of the study area closer to more open water.
Contopus cooperi Olive-sided flycatcher (nesting)	--/SSC/--	Breeds in montane and northern coniferous forests, at forest edges and openings, such as meadows and ponds.	**Moderate.** Detected in breeding season in Sausal Creek watershed in 2015 (Ebird, 2018) and could nest the Project site or Sausal Creek riparian community of the study area. Listed as uncommon visitor to Sausal Creek watershed between April – October (FOSC, 2018).

**TABLE 3.3-2 (CONTINUED)
SPECIAL-STATUS ANIMALS WITH POTENTIAL TO OCCUR IN THE STUDY AREA**

Scientific and Common Names	Status Federal/State/ Other	Habitat Requirements	Potential Occurrence in Study Area
OTHER SPECIAL STATUS ANIMAL SPECIES (cont.)			
Birds (cont.)			
Falco peregrinus anatum Peregrine falcon (nesting)	--/FP/--	Breeds near water with nearby vertical structure such as niches in steep banks, ledges and cliffs serving as nesting sites. Nests on skyscrapers and bridges in urban areas.	**Absent.** Peregrine falcon pair has nested annually on the Fruitvale Bridge and has been observed on territory in 2018 (FOSC, 2018), approximately 1.9 miles from Central Reservoir; however, no suitable nesting habitat is present within 1 mile of Central Reservoir or within the Sausal Creek watershed.
Setophaga petechia Yellow warbler (nesting)	--/SSC/--	Breeds in wet, deciduous thickets, especially willows.	**Moderate**. Listed as uncommon in the Sausal Creek watershed (FOSC, 2018), however, could migrate through the study area.
Mammals			
Antrozous pallidus Pallid bat	--/SSC/ WBWG High	Deserts, grasslands, shrublands, woodlands & forests. Most common in open, dry habitats with rocky areas for roosting. Roosts must protect bats from high temperatures. Very sensitive to disturbance of roosting sites.	**Moderate.** No recorded observations in Sausal Creek watershed; however suitable habitat may exist in underutilized structures of the Project site and in the Sausal Creek riparian community of the study area.
Corynorhinus townsendii Townsend's big-eared bat	--/SSC/ WBWG High	Throughout California in a wide variety of habitats. Most common in mesic sites, habitat edges. Roosts in the open, hanging from walls and ceilings. Roosting sites limited and extremely sensitive to human disturbance.	**Moderate.** No recorded observations in Sausal Creek watershed; however suitable habitat exists in underutilized structures of the Project site and in the Sausal Creek riparian community of the study area.
Dipodomys heermanni berkeleyensis Berkeley kangaroo rat	--/*/--	Open grassy hilltops and open spaces in chaparral and blue oak/digger pine woodlands. Needs fine, deep, well-drained soil for burrowing.	**Absent**. Not suitable habitat in the study area.
Eumops perotis californicus Western mastiff bat	--/--/WBWG High	Many open, semi-arid to arid habitats, including conifer & deciduous woodlands, coastal scrub, grasslands, chaparral, etc.	**Low.** No recorded observations in Sausal Creek watershed; low quality suitable habitat in conifer trees in the Project site and Sausal Creek riparian community of the study area.
Lasionycteris noctivagans Silver-haired bat	--/--/WBWG Medium	Primarily a coastal and montane forest dweller. Roosts in dense foliage of trees, in hollow trees, beneath exfoliating bark, abandoned woodpecker holes and rarely under rocks. Forages over or near standing water. Uncommon in Bay Area.	**Low.** No recorded observations in Sausal Creek watershed; however suitable habitat exists in tree foliage found in the Project site and Sausal Creek riparian community of the study area.
Lasiurus cinereus Hoary bat	--/--/WBWG Medium	Habitats include woodlands, forests, and riparian habitats with dense foliage. Often found near open grassy areas in coniferous or deciduous forests or near lakes. Solitary rooster in tree foliage.	**Moderate.** No recorded observations in Sausal Creek watershed; however suitable habitat exists in the Sausal Creek riparian community of the study area.
Neotoma fuscipes annectens San Francisco dusky-footed woodrat	--/SSC/--	It is found in both the Coast Ranges and interior of CA. Prefers moderate canopy in a variety of habitats. Houses are built of sticks and leaves at the base of, or in a tree, around a shrub, or at the base of a hill.	**High.** Suitable habitat present, although not documented in the Sausal Creek watershed.
Nyctinomops macrotis Big free-tailed bat	--/--/WBWG Medium-High	Prefer habitats with rugged, rocky terrain up to 8,000 feet elevation. Clustering information unknown. Roost in rock crevices.	**Absent**. Suitable habitat not present.

TABLE 3.3-2 (CONTINUED)
SPECIAL-STATUS ANIMALS WITH POTENTIAL TO OCCUR IN THE STUDY AREA

Scientific and Common Names	Status Federal/State/ Other	Habitat Requirements	Potential Occurrence in Study Area
OTHER SPECIAL STATUS ANIMAL SPECIES (cont.)			
Mammals (cont.)			
Taxidea taxus American badger	--/SSC/--	Occupies a diversity of habitats throughout the state; principal habitat requirements include sufficient prey base, friable soils, and relatively open, uncultivated ground.	**Absent**. Suitable habitat not present.

NOTES:

Potential occurrence in the study area:
High = Species is expected to occur in the Project study area or occurs locally to the area.
Moderate = Suitable habitat exists in the study area.
Low = The study area is outside of the species' described range or suitable habitat is absent.

Xerces Society for Invertebrate Conservation (Xerces)
CI = Critically imperiled
IM = Imperiled
VU = Vulnerable
DD = Data Deficit

Status Codes:

Federal
FE = listed as endangered under the ESA
FT = listed as threatened under the ESA
BCC = United States Fish and Wildlife designated "birds of conservation concern"
DL = delisted
–– = no listing

State
SCT = candidate for listing as threatened under CESA
SE = listed as endangered under CESA
ST = listed as threatened under CESA
SSC = California Department of Fish and Wildlife designated "species of special concern"
DL = delisted
WL = watch list
CFP = California Department of Fish and Wildlife designated "fully protected"
Asterisk = listed on CDFW Special Animals List
–– = no listing

WBWG = Western Bat Working Group:
Low = Stable population
Medium = Need more information about the species, possible threats, and protective actions to implement.
High= Imperiled or at high risk of imperilment.

SOURCE: USFWS, 2019; CDFW, 2019

A total of 54 rare and special-status-plant species were identified during a desktop review of CNPS, CNDDB, and IPaC databases, included in Appendix G. Rare plants considered in the analysis are species that are native to California and are rare; species that demonstrate a declining presence; or species facing an imminent threat. Special-status plants include taxon with official status under the CESA, FESA, and/or the Native Plant Protection Act (NPPA) (CNPS, 2018). Plant species categorized as CRPR 1 and 2 (32 individual species) were evaluated for their potential to occur within the study area based on habitat requirements and elevation range (Table 3.3-1). The remaining 22 species were categorized as CRPR 3 (Plants About Which More Information is Needed) and CRPR 4 (Plants of Limited Distribution) species, which are not considered under CEQA and therefore withdrawn from further analysis.[4]

Twenty-seven of the remaining 32 CRPR 1 and 2 rare plant species were determined absent from the Sausal Creek study area based on either occurring within specific habitat types that are not present in the Sausal Creek riparian study area (such as chaparral, scrub, vernal pools, alkaline soils, sandy soils, and serpentine soils); or being considered outside the species present range). Four rare plants were identified as having a low potential to occur within the Sausal Creek study area: Diablo helianthella (*Helianthella castanea* [CRPR 1B.2]), bristly sedge (*Carex comosa* [CRPR 2B.1]), water star-grass (*Heteranthera dubia* [CRPR 2B.2]), and Loma Prieta hoita (*Hoita strobilina* [CRPR 1B.1]). Only western leatherwood (*Dirca occidentalis*)[5], a CRPR 1B.2 species, was determined to have a moderate potential to occur in the Sausal Creek study area. A January 2019 ESA reconnaissance-level site survey for western leatherwood in the Sausal Creek study area during the blooming period (January through March) determined the species was absent (ESA, 2019). The survey that was completed for western leatherwood was conducted outside of the blooming period for the four rare plant species with low potential for occurrence (Diablo helianthella, bristly sedge, water star-grass, and Loma Prieta hoita), and therefore cannot be used to confirm their absence.

Special-Status Fish

Landlocked rainbow trout (*Oncorhynchus mykiss*) are found throughout the Sausal Creek watershed where suitable habitat exists. Rainbow trout and steelhead are the same species; the anadromous form is called steelhead, and the resident, or non-anadromous form, is commonly referred to as rainbow trout. Unlike many steelhead runs, rainbow trout are afforded no special protection under the state or federal law. The rainbow trout of Sausal Creek are likely descended from a historical steelhead run whose anadromy was blocked through the channelization and culverting of a large portion of the watershed (Leidy et al., 2005). Rainbow trout are found in Sausal Creek upstream of the study area.

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4 CRPR 3: Plants About Which More Information is Needed - A Review List species; and CRPR 4: Plants of Limited Distribution - A Watch List species. All CRPR Rank 1 and 2 and some Rank 3 and 4 plants may fall under Section 15380 of CEQA. Those CRPR Rank 3 and 4 species that fall under Section 15380 generally occur in undisturbed habitat, not found within the study area.

5 CRPR 1B: Plants Rare, Threatened, or Endangered in California and Elsewhere with a Threat Rank of 0.2- Moderately threatened in California (20–80 percent occurrences threatened / moderate degree and immediacy of threat). See http://www.rareplants.cnps.org/glossary.html#lists for additional details.

No aquatic habitat exists within the construction footprint, and what limited aquatic habitat exists in Sausal Creek does not support special-status fish species.

Special-Status Terrestrial Wildlife

Nesting Birds. Special-status passerine and raptor species identified in the CNDDB (CDFW, 2019) and local scientific literature (Lowe, 2000) with a moderate to high potential to nest in the Sausal Creek study area include olive-sided flycatcher (*Contopus cooperi*), yellow warbler (*Setophaga petechia*), and Cooper's hawk (*Accipiter cooperii*). The Sausal Creek study area also provides suitable nesting habitat for common passerine and raptor species protected by the MBTA and CFGC Section 3503.

Suitable nesting habitat is found in the mature conifer trees of the Project site for the olive-sided flycatcher and common nesting passerine birds, in addition to sharp-shinned hawk (*A. striatus*), Cooper's hawk (*Accipiter cooperii*), and common nesting raptors.

Mammal Species. Four special-status mammal species (pallid bat [*Antrozous pallidus*], Townsend's big-eared bat [*Corynorhinus townsendii*], hoary bat [*Lasiurus cinereus*], and San Francisco dusky-footed woodrat [*Neotoma fuscipes annectens*]) have a moderate to high potential to occur within the Sausal Creek study area due to suitable habitat; although, none of these species or signs of their presence have been documented in the study area (CDFW, 2019; Lowe, 2000).

Pallid bat and Townsend's big-eared bat, both state species of special concern, and hoary bat, a CFDW-watched species, typically use buildings, trees, bridges, and rock crevices for roost habitat and are very sensitive to human disturbance. The urbanized context of Sausal Creek riparian corridor in the study area and ongoing operations of the reservoir site would preclude high-quality suitable roosting habitat for these three special-status bat species in the study area; however, dense foliage and crevices in mature trees remain potential roosting habitat for these species, in addition to common roosting bat species protected by Section 4150 of the CFGC.

The study area contains suitable habitat for the San Francisco dusky-footed woodrat in the Sausal Creek riparian corridor. No construction is proposed within habitat for this species.

Foothill Yellow-Legged Frog. The current range of the foothill yellow-legged frog (*Rana boylii*), a state Threatened candidate and species of special concern, excludes coastal areas south of northern San Luis Obispo County and foothill areas south of Fresno County, where the species is apparently extirpated (Jennings and Hayes, 1994). The foothill yellow-legged frog is still common along the north coast of California (G. Fellers cited by Stebbins and Cohen, 1995). Fellers (1994) reported healthy, reproducing populations throughout suitable habitat in the Diablo Range in Alameda, western Stanislaus, Santa Clara, San Benito, and western Fresno Counties. Foothill yellow-legged frogs require shallow, flowing water in small to moderate-sized streams with at least some cobble-sized substrate (Hayes and Jennings, 1988; Jennings, 1988; Bourque, 2008).

The species also needs at least some rock or cobble-sized substrate for egg-laying and needs at least 15 weeks to attain metamorphosis.

Although foothill yellow-legged frog was not observed during the reconnaissance site survey of the hydrological conditions of Sausal Creek (ESA, 2018), Sausal Creek's riparian corridor may be capable of supporting foothill yellow-legged frog. No construction is proposed within habitat for this species.

Western Pond Turtle. The western pond turtle (*Actinemys marmorata*), a state species of special concern, is a thoroughly aquatic turtle found in permanent ponds, rivers, streams, channels, and irrigation ditches with rocky or muddy bottoms, and emergent vegetation. It is common in suitable aquatic habitat throughout California, west of the Sierra-Cascade crest and absent from desert regions, except in the Mojave Desert along the Mojave River and its tributaries. Basking areas used by this species include partially submerged logs, rocks, vegetation mats, and open mud banks. Female western pond turtles have been recorded moving up to 100-meters overland to find suitable sites for egg-laying (Morey, 2000).

Western pond turtle has been recorded within the Sausal Creek watershed (FOSC, 2018); however, this species was not detected during the reconnaissance site survey of the hydrological conditions of Sausal Creek (ESA, 2018). Larger pools within Sausal Creek in the study area are capable of supporting this species. No construction is proposed within habitat for this species.

3.3.4 Regulatory Framework

Federal Regulations

Endangered Species Act and Migratory Bird Treaty Act

The USFWS implements the FESA (16 U.S. Code [U.S.C.] Section 1531 et seq.) and MBTA (16 U.S.C. Section 703-712). Under these acts, the USFWS has jurisdiction over migratory birds, candidate species, and species proposed or listed as threatened or endangered. All birds native to North America are protected under the MBTA, which prohibits the purposeful killing, possessing, or trading of migratory birds, nests, and eggs except as otherwise provided in 16 U.S.C. Section 703–712 (e.g., regulated take of game species). Enacted in 1973, the FESA prohibits the take, possession, sale, or transport of proposed, candidate, or listed species. "Take" is broadly defined as "…the action of harassing, harming, pursuing, hunting, shooting, wounding, killing, trapping, capturing, or collecting, or attempting to engage in any such conduct." Projects that would result in take of any species federally listed as threatened or endangered are required to obtain authorization from the National Marine Fisheries Service and/or USFWS through Section 7 (interagency consultation) or Section 10(a) (Incidental Take Permit) of the FESA, depending on whether the federal government is involved in permitting or funding the project. The Section 7 authorization process does not apply to the Project as it has no federal nexus; but if the Project would involve take of listed species, the Section 10(a) process, which allows take of endangered species or their habitat in nonfederal activities, would apply because it is a nonfederal action.

Clean Water Act, Section 404

Under Section 404 of the CWA, the Corps and the U.S. Environmental Protection Agency (U.S. EPA) regulate the discharge of dredge or fill material into waters of the United States, including wetlands and lakes, rivers, streams, and their tributaries. For regulatory purposes, "wetlands" are defined as areas "…inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions" (33 CFR 328.3, 40 CFR 230.3). Applicants must obtain a permit from the Corps under Section 404 of the CWA for all discharges of dredge or fill material into wetlands or jurisdictional other waters of the United States before proceeding with a proposed action. There are no waters of the United States in or immediately adjacent to the Project site that would be potentially impacted by discharge of dredge or fill material and, therefore, the Project would not require a CWA Section 404 permit.

Clean Water Act, Section 401

Under Section 401 of the CWA, every applicant seeking a Section 404 permit is required to obtain water quality certification, which is issued by the SWRCB and is intended to verify that the proposed activity will comply with state water quality standards. Sausal Creek and associated wetland vegetation in the study area are subject to Section 401 of the CWA.

State Regulations

State CEQA Guidelines Section 15380

State *CEQA Guidelines* Section 15380(b) provides that a species not listed on the federal or state list of protected species may be considered rare or endangered if the species can be shown to meet certain criteria. Section 15380(b) addresses projects that may significantly affect a species that is not yet listed by the USFWS or the CDFW but is under consideration for listing (e.g., a candidate species). CEQA enables an agency to protect a species from significant project impacts until the respective government agencies have an opportunity to list the species as protected, if warranted. In general, plants appearing on the CRPR List 1 (plants believed to be extant and rare, threatened, or endangered plants in California) and List 2 (rare, threatened, or endangered plants in California but more numerous elsewhere) are considered to meet CEQA's Section 15380 criteria.

California Endangered Species Act

The CDFW administers CESA. Section 2080 of the CFGC prohibits take of any species that the Fish and Wildlife Commission determines to be an endangered species or a threatened species. However, CESA does allow for take that is incidental to otherwise lawful development projects.

Sections 2081(b) and (c) of CESA allow the CDFW to issue an Incidental Take Permit for a state-listed threatened or endangered species only if specific criteria are met. These criteria are reiterated in Title 14 of CCR, Sections 783.4(a) and (b):

- The authorized take is incidental to an otherwise lawful activity.
- The effects of the authorized take are minimized and fully mitigated. The measures required to minimize and fully mitigate the effects of the authorized take:
  - Are roughly proportional in extent to the effect of the taking on the species.
  - Maintain the applicant's objectives to the greatest extent possible.
  - Are capable of successful implementation.
- Adequate funding is provided to implement the required minimization and mitigation measures and to monitor compliance with and the effectiveness of the measures.
- Issuance of the permit will not jeopardize the continued existence of a state-listed species.

Under Section 2081, Incidental Take Permits cannot be issued for species that are "fully protected" under state law. Several state-listed species also are listed as threatened or endangered under the FESA. Section 2080.1 allows the CDFW to make a determination that a federal incidental take authorization for a species also listed by the state is consistent with CESA. Section 2080.1 consistency cannot be issued for federally listed species that are fully protected under state law. The CESA applies to the Project due to the potential presence of state-listed species, such as foothill yellow-legged frog.

Lake or Streambed Alteration Agreement

Under section 1602 of the CFGC, the CDFW regulates activities that would alter the flow, or change or use any material from the bed, channel, or bank of any perennial, intermittent, or ephemeral river, stream (such as Sausal Creek), or lake. If any such activity would substantially adversely affect an existing fish or wildlife resource, a section 1602 permit (referred to as a lake or streambed alteration agreement) is required.

California Fish and Game Code—Sections 3503, 3503.5, 3513, and 4150

CFGC Section 3503 states that it is unlawful to take, possess, or needlessly destroy the nests or eggs of any bird—except as otherwise provided by the CFGC or any regulation made pursuant thereto. CFGC Section 3503.5 protects all birds of prey (raptors) and their eggs and nests. Section 3513 states that it is unlawful to take or possess any migratory nongame bird as designated in the MBTA. CFGC Section 4150 states that all non-game mammals or parts thereof may not be taken or possessed except as otherwise provided in the code or in accordance with regulations adopted by the California Fish and Game Commission. Section 4150 applies to all bat species.

The above CFGC sections apply to the Project due to the potential presence of nesting birds, including raptors, and roosting bats in the Project site and Sausal Creek portion of the study area.

Local Regulations

Under Section 53091 of the California Government Code, EBMUD, as a local agency and utility district, is not subject to building and land use zoning ordinances (such as tree ordinances) for projects involving facilities for the production, generation, storage, treatment, or transmission of water. However, EBMUD's practice is to work with local jurisdictions and neighboring communities during project planning and to consider local environmental protection policies for guidance.

City of Oakland General Plan

The City of Oakland General Plan (City of Oakland, 1996) is a comprehensive, long-range plan for the physical development of the city that identifies goals and policies. The Open Space, Conservation, and Recreation Element of the General Plan includes the following biological objectives and policies from Chapter 3, *Conservation*, that are relevant to the Project:

Objective CO-6: Surface Waters. To protect the ecology and promote the beneficial uses of Oakland's creeks, lakes, and nearshore waters.

***Policy CO-6.1*: **Protect Oakland's remaining natural creek segments by retaining creek vegetation, maintaining creek setbacks, and controlling bank erosion. Design future flood control projects to preserve the natural character of creeks and incorporate provisions for public access, including trails, where feasible. Strongly discourage projects that bury creeks or divert them into concrete channels.

***Policy CO 6.2*: **Strictly enforce local, state, and federal laws and ordinances on the maintenance of creeks and watercourses. Abate health and safety hazards along and within creeks through a variety of measures, including creek clean-up programs, stronger enforcement of litter and anti-dumping laws, and vegetation maintenance requirements for properties abutting creeks.

Objective CO-7: Protection of Native Plant Communities. To minimize the loss of native plant communities and restore these communities where they have been damaged of lost, and to preserve Oakland's trees unless there are compelling safety, ecological, public safety, or aesthetic reasons for their removal.

***Policy CO-7.1*: **Protect native plant communities, especially oak woodlands, redwood forests, native perennial grasslands, and riparian woodlands, from the potential adverse impacts of development. Manage development in a way that prevents or mitigates adverse impacts on these communities.

***Policy CO-7.4*: **Discourage the removal of large trees on already developed sites unless removal is required for biological, public safety, or public works reasons.

***Policy CO-7.6*: **Encourage programs that rehabilitate, enhance, or replace damaged or dead vegetation.

Objective CO-8: Wetlands. To conserve wetlands so that they continue to provide habitat for fish and wildlife.

***Policy CO-8.1*: Work with federal, state, and regional agencies on an ongoing basis to determine mitigation measures for development that could potentially impact wetlands. Strongly discourage development with unmitigatable adverse impacts.

Objective CO-9: Rare, Endangered, and Threatened Species. To protect rare, endangered, and threatened species from the impacts of urbanization.

***Policy CO-9.1*: Protect rare, endangered, and threatened species by conserving and enhancing their habitat and requiring mitigation of potential adverse impacts when development occurs within habitat areas.

Objective CO-11: Wildlife. To sustain a healthy wildlife population within the city of Oakland.

***Policy CO-11.1*: Protect wildlife from the hazards of urbanization, including loss of habitat and predation by domestic animals.

***Policy CO-11.2*: Protect and enhance migratory corridors for wildlife. Where such corridors are privately owned, require new development to retain native habitat or take other measures that help sustain local wildlife populations and migratory patterns.

The following policy is from the Land Use and Transportation Element (LUTE) of the General Plan:

***Policy W3.3*: Native plant communities, wildlife habitats, and sensitive habitats should be protected and enhanced.

City of Oakland Tree Ordinance

City of Oakland Tree Preservation and Removal Ordinance (Oakland Municipal Code [OMC] Chapter 12.36) prohibits the removal of protected trees under certain circumstances.

The following assessment factors would apply to a private project impacting protected trees on developed or undeveloped property associated with a development application:

> The number, type, size, location and condition of: (a) the protected trees to be removed and/or impacted by construction; and (b) the protected trees to remain, with special consideration given to native trees.[6]

[6] Oakland Planning Code section 17.158.280E2 states that "Development related" tree removal permits are exempt from CEQA if no single tree to be removed has a dbh of 36 inches or greater **and** the cumulative trunk area of all trees to be removed does not exceed 0.1 percent of the total lot area.

Protected trees include the following:

> Coast live oak measuring 4-inches dbh or larger, and any other tree measuring 9-inches dbh or larger except eucalyptus and Monterey pine; provided, however, that Monterey pine trees on City property and in development-related situations where more than five Monterey pine trees per acre are proposed to be removed are considered to be Protected trees.

Replacement plantings shall be required to prevent the excessive loss of shade, erosion control, groundwater replenishment, visual screening, and wildlife habitat in accordance with the following criteria:

- No tree replacement shall be required for the removal of non-native species, for the removal of trees that is required for the benefit of remaining trees, or where insufficient planting area exists for a mature tree of the species being considered.
- Replacement tree species shall consist of coast redwood (*Sequoia sempervirens*), coast live oak, madrone (*Ancutus merciesii*), California buckeye (*Aesculus californica*), or California bay laurel (*Umbelluiana californica*).
- Replacement trees shall be of 24-inch box size, except that three 15-gallon size trees may be substituted for each -24-inch box size tree where appropriate.

City of Oakland Creek Ordinance

Title 13, Chapter 13.16, City of Oakland Creek Protection, Storm Water Management, and Discharge Control Ordinance, provides a high level of protection for creeks within Oakland's city limits. The ordinance defines a creek as "…a watercourse that is a naturally occurring swale or depression, or engineered channel that carries fresh or estuarine water either seasonally or year-around." In addition, under the ordinance definition, a creek channel must be hydrologically connected to a waterway above or below a project site, and the channel must exhibit a defined bed and bank. A creek protection permit is required whenever work is to be undertaken on a creekside property. The ordinance prohibits, among other things, the discharge of concentrated stormwater or other modification of the natural flow of water in a watercourse, development within a watercourse or within 20-feet from the top of the bank, and the deposition or removal of any material within a watercourse without a permit. Depending on the type of activity being permitted, conditions of approval may include the submittal of a Creek Protection Plan and/or a Hydrology Report, revegetation with native plant species, the use of soil bioengineering techniques for bank stabilization and erosion control, and implementation of stormwater quality protection measures. The following activities would not be permitted for a private project impacting creeks on developed or undeveloped property associated with a development application:

- Removal of riparian vegetation.
- Culverting or undergrounding of a creek.;
- Moving the location of a creek.

- Structures spanning a creek.
- Riprap, rock gabions, or concrete within the bed or on the creek banks.

EBMUD Standard Construction Specifications

EBMUD Standard Construction Specification 01 35 44 (Environmental Requirements) sets forth the contract requirements for environmental compliance to which construction crews must adhere, including provisions for protection of water quality during construction (EBMUD, 2018). These measures minimize polluted run-off that could adversely affect aquatic biological resources in Sausal Creek, where stormwater from the Project site discharges. EBMUD also requires protection of biological resources during construction.

Standard Construction Specification 01 35 44 stipulates 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. Sections of Standard Construction Specification 01 35 44 that require planning documents and procedures related to protection of water quality and biological resources during construction are described below.

- **Controls on Site Activities, Section 1.1(B):** 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 run-off 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 [SWRCB], 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 run-off from the site.
- Construction staging areas shall be graded, or otherwise protected with BMPs, to contain surface run-off 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), Section 1.3 (A)(2):** 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 stormwater run-off 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, Section 1.3(B):** The Contractor shall submit a detailed Water Control and Disposal Plan for 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), run-off 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*: 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.

- **Noise Control, Section 3.6.** EBMUD requires noise controls on site activities and describes measures that shall be implemented to reduce the potential for noise disturbance at adjacent or nearby residences. Refer to Section 3.10, Noise, for more information, including noise control measures required by the specification.

- **Protection of Native and Non-Native Protected Trees, Section 3.7:**
  - *Tree Protection*
    - 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.
    - 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.

- Any tree injured during construction shall be evaluated as soon as possible by a certified arborist provided by the District.

- **Protection of Birds Protected Under the Migratory Bird Treaty Act and Roosting Bats, Section 3.8:**

  – The District will conduct biological reconnaissance in advance of construction and will conduct biologic monitoring during construction as necessary.

  – *Protected Species*

    - If protected species or suitable habitat for protected species is found during biological reconnaissance surveys:

      - 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 nonsupervisory 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:

        - 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 environmental training; and shall comply with all project environmental requirements.

        - Display an environmental training hard hat decal (provided by the District after completion of the training) at all times.

      - Birds Protected under the Migratory Bird Treaty Act (MBTA):

        - It is unlawful to intentionally pursue, hunt, take, capture, or kill any migratory bird without a permit issued by the U.S. Department of the Interior.

        - 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.

        - 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.

- 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.
- 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.

- Roosting Bats:
  - 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.
  - 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.
  - 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.
  - 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 CDFW to ensure that the bats are not injured.

- 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.

3.3.5 Impact Analysis

Methodology for Analysis

Impacts on biological resources are identified and evaluated based on relevant *CEQA Guidelines* and local standards, policies, and guidelines; on the likelihood that special-status species, sensitive habitats, wetlands and waters, and wildlife corridors are present within the study area; and on the likely effects that Project construction, operation, and maintenance might have on these resources. Special-status resources that have no or low potential to occur in the study area are not considered in the impact analysis. Appendix G includes the full list of species included as part of the database search. As described in Section 3.3.3, no special-status fish occur in the reach of Sausal Creek potentially affected by the Project and therefore are not considered in the following impact analysis.

This section analyzes potential Project impacts on biological resources from the construction phase (short-term) and the operations and maintenance phase (long-term). The analysis addresses potential direct, indirect, and cumulative impacts of the Project on special-status species and other protected biological resources, wetlands and other waters, and potential Project conflicts with local policies. Direct impacts are those resulting from the Project that occur at the same time and place. Indirect impacts are caused by the Project, but can occur later in time or farther removed in distance while still reasonably foreseeable and related to the Project. Impact analyses typically characterize effects on biological resources as temporary or permanent, with a permanent impact referring to areas that are developed or otherwise precluded from restoration to a pre-Project state.

For the purposes of this EIR, the word "substantial" as used in the significance criteria below is defined by the following three principal components:

i. Magnitude and duration of the impact
ii. Uniqueness of the affected resource (rarity)
iii. Susceptibility of the affected resource to disturbance

The approaches to the analyses of impacts related to construction and operations of the Project are described below under their respective headings.

Significance Criteria

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

1. 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 CDFW or USFWS.
2. Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations or by the CDFW or USFWS.
3. Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means.
4. 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.
5. Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.
6. Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Conservation Community Plan, or other approved local, regional, or state habitat conservation plan.

Criteria Requiring No Further Evaluation

Criteria listed above that are not applicable to actions associated with the Project are identified below, along with the supporting rationale as to why further consideration is unnecessary and a no-impact determination is appropriate.

- ***Criterion 6: Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Conservation Community Plan, or other approved local, regional, or state habitat conservation plan.*** There are no adopted Habitat Conservation Plans (HCP), Natural Community Conservation Plans (NCCP), or other local, regional, or state habitat conservation plans within the Project site (CDFW, 2017). Therefore, there would be no impacts associated with conflicts with HCPs or NCCPs.

Impacts and Mitigation Measures

Impact BIO-1: 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 CDFW or USFWS. (Criterion 1)

No special-status species, except for nesting birds and roosting bats, have the potential to be present at the Project site, where construction activities would occur. Sausal Creek, which is outside the construction footprint, is included in the study area because changes in the creek flow could impact rare plants, foothill yellow-legged frog, and western pond turtle in the unlikely circumstance they are present in the study area's riparian community.

Rare and Special-Status Plants

Construction

As described in Section 3.3.3, the habitats on the Project site are characteristic of disturbed and urban habitats and are dominated by planted landscaping and other non-native species; therefore, the Project site does not support rare or special-status plants.

The Sausal Creek portion of the study area (which is outside the construction footprint) has a low potential to support four rare plant species (Table 3.3-1). The riparian corridor mainly supports invasive non-native riparian vegetation; includes short sections of concrete or masonry along the channel bank; and has historically been exposed to common urban influences such as erosion. Construction of the Project would require reservoir dewatering, grading, excavation, changes in drainage patterns, and other soil-disturbing activities on the Project site, potentially delivering increased flows, sediment, and other pollutants to the study area’s riparian community potentially supporting rare plants. A substantial increase in flow and turbidity delivered from the Project site storm drain into Sausal Creek at the East 27th Street outfall over the 6-year construction period could result in adverse alterations riparian vegetation, including rare plants, if present. 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 EBMUD Standard Construction Specification 01 35 44, Section 1.1(B), which requires that activities on the construction site be controlled to prevent discharge of contaminated stormwater; Section 1.3(B), which identifies how the contractor will maintain proper control of discharge from the site; and Section 1.3(A) which contains the EBMUD-approved SWPPP that would be implemented to further prevent the discharge of contaminated stormwater run-off from the worksite. The EBMUD Practices and Procedures Monitoring and Reporting Plan (Appendix E) lists the applicable standard specification language. With the implementation of these procedures, contaminated stormwater will be prevented from leaving the site. Implementation of these construction specification would prevent a substantial increase in flow or turbidity into Sausal Creek from the Project site. Any changes in flow or turbidity into Sausal Creek would not result in riparian habitat modifications affecting plant survival. Therefore, impacts on the potentially occurring four rare plant species, if present, would be less than significant.

Operation

After eliminating the potential for reservoir leakage with Project implementation, dry season flows could be lower in Sausal Creek downstream of the East 27th Street outfall. The riparian vegetation in the Sausal Creek study area primarily depends on groundwater or surface water for survival. After eliminating the potential for reservoir leakage, lower amounts of stormwater run-off flowing from the East 27th Street outfall could modify the timing and amount of water entering the creek. The Sausal Creek water level supporting the riparian corridor is unlikely to be lowered by more than 1- to 2-inches after Project completion based on comparing observed depths upstream and downstream of the study area (ESA, 2017). Furthermore, in an urbanized watershed like Sausal Creek, reductions in peak water depths, velocities, and shear stresses can lead to habitat improvements in the creeks (LMA et al., 2010), which would occur once the Project is operational because the bioretention area would decrease peak stormwater flows relative to existing conditions. Because habitat quality is similar above and below the point where the underdrain discharges into the creek under existing conditions (ESA, 2018), the survivability of riparian vegetation, including rare plants if present would not be affected by reduced flows to the creek as a result of Project implementation. Therefore any potential impacts on rare plans species would be less than significant.

Significance Determination Before Mitigation

Less than significant.

Mitigation Measure

None required.

Special-Status and Common Nesting Bird Species

Construction

Several special-status raptors and passerine avian species, including sharp-shinned hawk (CDFW watch-list species), Cooper's hawk (CDFW watch-list species), yellow warbler (CDFW species of special concern and USFWS bird of conservation concern), and olive-sided flycatcher (CDFW species of special concern and USFWS bird of conservation concern), may nest in or near the Project site and Sausal Creek portion of the study area. Similarly, several common raptors and passerine birds protected by the MBTA and CFGC may nest in or near the study area.

Potential nesting sites include large trees, riparian corridors, and streamside vegetation. Disruption of nesting special-status or common avian species could occur as a result of tree removal throughout the Project site (described further under Impact BIO-5 below), or increased human activity (e.g., due to the use of heavy equipment and human activity) during the breeding season (approximately February through August) which is a potentially significant impact as it may result in direct mortality or disturb nesting avian species and lead to nest abandonment or poor reproductive success. 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, Environmental Requirements, Section 3.8, Protection of Birds Protected Under the Migratory Treaty Act and Roosting Bats, and Section 3.6, Noise Control, which include provisions for preconstruction biological reconnaissance, including nesting bird surveys, biologic monitoring during construction, delineation of active bird nest avoidance buffer zones, and requiring the contractor to implement noise control techniques. The EBMUD Practices and Procedures Monitoring and Reporting Plan (Appendix E) lists the applicable standard specification language. With implementation of these specifications, potential tree removal and increased human activity impacts on special-status and common migratory birds, including the destruction of potential nesting habitat, eggs, or occupied nests, direct mortalities of young, and the abandonment of nests with eggs or young birds prior to fledging, would be less than significant.

As described in the Project Description, Section 2.6.3, Construction Schedule and Hours, installation of the Cement Deep Soil Mixing (CDSM) columns is expected to take place over one 12-hour shift from approximately 7:00 a.m. to 7:00 p.m., with afterhours or weekend construction activity limited to unplanned/unexpected occurrences or critical shutdowns and emergencies. Increased nighttime lighting during CDSM construction would occur during the winter, around the tank pad area, on the north portion of the site, next to the CDSM drilled piers. Additionally, nighttime lighting for a maximum of 2 nights may be required when the new pipelines are connected to the existing distribution system at the corner of 25th Avenue and East 29th Street. Although most of this activity would occur outside the nesting bird season, construction-related nighttime lighting is to overlap with the nesting bird season during the construction activities described above. Any visual disturbance as a result of nighttime lighting could lead to nest abandonment or poor reproductive success; a significant impact related to special-status or common nesting birds.

Implementation of Mitigation Measure AES-1: Nighttime Lighting Controls, described in Section 3.1, Aesthetics, would reduce the impact on nesting birds from nighttime lighting to a less-than-significant level by requiring stationary lighting used during nighttime construction to be shielded and directed downward or oriented such that the light source is not directed beyond the immediate work area.

Operation

Once the Project is completed and operational, the Project site would gain additional potential nesting bird habitat, in comparison to existing conditions, with the planting of new native trees and shrubs. As described above, even though the study area is in a highly urbanized area, mature trees provide nesting bird habitat. Approximately 337 new trees would be planted, resulting in a total of approximately 571 trees after construction is complete, which would increase the available bird nesting habitat compared to existing conditions.

The only permanent light source used during Project operation would be the motion detected outdoor security lighting on the valve structure between the new tanks. As shown in Figure 2-3 in the Project Description, the valve structure would be between the three tanks and mostly shielded from the surrounding land uses by the tanks. Periodically, this additional lighting may be required in non-motion detect mode if evening maintenance is required. The frequency and duration of lighting use would be similar to the current operation conditions of Central Reservoir. Development in the vicinity of the Project is currently illuminated during the nighttime; and I-580 has increased ambient lighting adjacent to the Project site over the recent years. The Project would not appreciably increase the overall amount of lighting because the proposed security lighting is on the structure between the tanks, not directly adjacent to nesting bird habitat. The Project would not result in a substantial new source of light in the area. Further, the use of this lighting would be infrequent and short duration.

Project operations would require no additional vehicle trips relative to existing operation and maintenance activities. As such, operational impacts on nesting birds would be considered less than significant due to no change in maintenance activities from existing conditions and because lighting would be infrequent, of short duration, and shielded.

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.

Roosting Bats

Construction

Roosting habitat for special-status and common roosting bat species may be present in mature trees in the study area. Construction activities may result in the removal or disturbance of hibernation or maternal roost sites due to increased nighttime lighting during CDSM construction, tree removal, ground disturbance, noise, or human intrusion during the roosting season (approximately March through July) on the Project site. This is a potentially significant impact as it may result in direct mortality and reduction in reproductive success. 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, Environmental Requirements. Sections 3.8, Protection of Birds Protected Under the Migratory Treaty Act and Roosting Bats, and Section 3.6, Noise Control, include provisions for preconstruction roosting bat surveys during the maternity season, avoidance of maternal roosts during the maternal season, delineation of avoidance buffer zones, eviction of non-maternal roosts prior to structure modification or removal, and requiring the contractor to implement noise control techniques. The EBMUD Practices and Procedures Monitoring and Reporting Plan (Appendix E) lists the applicable standard specification language. With implementation of these specifications, impacts on special-status and common roosting bats, including the destruction of potential roosting habitat, occupied roosts, direct mortalities of young, and the abandonment of roosts with non-volant young, would be less than significant.

As described in the Project Description, Section 2.6.3, Construction Schedule and Hours, increased nighttime lighting during CDSM construction would occur during the winter, around the tank pad area, on the north portion of the site, next to the CDSM drilled piers. Additionally, nighttime lighting for a maximum of 2 nights may be required when the new pipelines are connected to the existing distribution system. Accordingly, if construction-related nighttime lighting overlaps with the bat roosting season, any visual disturbance as a result of nighttime lighting may disturb roosting bats and lead to roost abandonment or poor reproductive success which would be considered a potentially significant impact related to roosting bats.

However, implementation of Mitigation Measure AES-1: Nighttime Lighting Controls, described in Section 3.1, Aesthetics, would reduce this potential impact on roosting bats to a less-than-significant level by requiring stationary lighting used during nighttime construction to be shielded and directed downward, or oriented such that the light source is not directed beyond the immediate work area.

Operation

Once the Project is completed and operational, the Project site would gain additional potential roosting bat habitat, in comparison to existing conditions, with the planting of new native trees and shrubs. As described above, even though the study area is in a highly urbanized area, mature trees provide potential roosting bat habitat. Approximately 337 new trees would be planted, resulting in a total of approximately 571 trees after construction is complete, which would increase the available roosting bat habitat compared to existing conditions.

The only permanent light source used during operation of the Project would be the motion detected outdoor security lighting on the valve structure between the new tanks. As shown in Figure 2-3 in the Project Description, the valve structure would be between the three tanks and mostly shielded from the surrounding land uses by the tanks. Periodically, this lighting may be on consistently in non-motion detect mode, if evening maintenance is required. The Project site and development in the vicinity of the Project are currently illuminated during the nighttime, and I-580 has increased ambient lighting adjacent to the Project site over the recent years. The Project would not appreciably increase the overall amount of lighting because the proposed security lighting is on the structure between the tanks, not directly adjacent to roosting bat habitat. The Project would not result in a substantial new source of light in the area. Further, the use of this lighting would be infrequent and short duration.

Project operations would require no additional vehicle trips relative to existing operation and maintenance activities. As such, operational impacts on roosting bats would be considered less than significant due to no change in maintenance activities from existing conditions and because lighting would be infrequent, of short duration, and shielded.

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.

Foothill Yellow-legged Frog and Western Pond Turtle

Construction

Construction of the Project would require reservoir dewatering, grading, excavation, changes in drainage patterns, and other soil-disturbing activities on the Project site, potentially delivering increased flows, sediment, and other pollutants through the East 27th Street storm drain to the study area's riparian community. These activities could alter habitat potentially supporting foothill yellow-legged frog and western pond turtle over the 6-year construction period. As described above, the creek channel is not highly vegetated, with most riparian vegetation on the creek banks and upland areas. During construction, water at the bottom of the reservoir would be pretreated to reduce turbidity before it is discharged through the existing East 27th Street storm drain outfall into Sausal Creek. If the Sausal Creek riparian corridor is altered by these activities, an increased level in mortality of foothill yellow legged frogs could occur either by increased risk of predation or by dispersing frogs into inhospitable locations. If western pond turtle habitat is altered as the result of flow fluctuations downstream of the East 27th Street outfall, female turtles could discontinue seeking nest locations in the study area.

As described in the Project Description, a number of EBMUD standard practices and procedures, applicable to all EBMUD projects, have been incorporated into the Project, including EBMUD Standard Construction Specification 01 35 44, Section 1.1(B), which requires that activities on the construction site be controlled to prevent the discharge of contaminated stormwater through the Project's Water Control and Disposal Plan; EBMUD Standard Specification 01 35 44, Section 1.3(B), which identifies how the contractor will maintain proper control of discharge from the site; and the EBMUD-approved SWPPP per EBMUD Standard Specification 01 35 44, Section 1.3 (A)(2), which would be implemented to further prevent the discharge of contaminated stormwater run-off from the worksite. The EBMUD Practices and Procedures Monitoring and Reporting Plan (Appendix E) lists the applicable standard specification language. With implementation of the EBMUD Standard Construction Specifications, foothill yellow-legged frog and western pond turtle habitat in the Sausal Creek study area riparian corridor would not be subjected to an appreciable increase in turbidity and flow as a result of reservoir dewatering, grading, excavation, changes in drainage patterns, and other soil-disturbing activities on the Project site; therefore, impacts would be less than significant.

The Project would also be consistent with federal (FESA) and state (CESA) regulations, and the policies under City of Oakland General Plan Objective CO-9 (Rare, Endangered, and Threatened Species) because the Project would not allow for substantial adverse effects on special-status wildlife species or their habitat.

Operation

Once the Project is completed and operational, decreased water entering Sausal Creek directly downstream of the Project site during the dry season could indirectly impact riparian habitat potentially supporting foothill yellow-legged frog and western pond turtle. As described in Section 3.9, Hydrology and Water Quality, potential flow changes from Project implementation could be the result of changes in the existing reservoir's underdrain flows into Sausal Creek in the dry season, and lower amounts of stormwater run-off from the reduced acreage of impervious surfaces and the construction of a bioretention basin on the Project site. Section 3.9, Hydrology and Water Quality, further describes how the Project may reduce dry season base flows below East 27th Street by a value that could be as high as 50 percent of existing values or 20 gallons per minute (0.05 cubic feet per second). However, the aquatic habitat is similar above and below the point where the underdrain discharges into the creek under existing conditions (ESA, 2018), indicating that flows from the underdrain are not a factor in habitat quality in the study area.

The reproductive and adaptive strategies of plant and wildlife species in the riparian corridor are tuned to a highly variable physical environment, similar to the anticipated changes that would occur after Project implementation. In an urbanized watershed like Sausal Creek, reductions in peak water depths, velocities, and shear stresses can lead to habitat improvements in the creeks (LMA et al., 2010), which would occur once the Project is operational due to the reduction of impervious surfaces and the bioretention area that would decrease peak stormwater flows relative to existing conditions. A visual assessment of the creek channel indicated similar quality aquatic and riparian habitat downstream of the East 27th Street storm drain outfall and in the upstream reach (ESA, 2018). Because aquatic habitat quality was independent of existing underdrain flows based on habitat similarity both up- and downstream of the East 27th Street outfall, Project implementation is unlikely to affect aquatic habitat in Sausal Creek. Therefore, habitat quality for foothill yellow-legged frog and western pond turtle would not be significantly impacted by reduced flows to the creek as a result of Project implementation.

Significance Determination before Mitigation

Less than significant.

Mitigation Measures

None required.

Impact BIO-2: Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the CDFW or USFWS. (Criterion 2)

Construction

Riparian woodland habitat occurs as a corridor along the banks of Sausal Creek in the study area. This community is not considered a natural community of special concern; however, it is subject to CDFW jurisdiction under Section 1602 of the CFGC.

Construction of the Project would require reservoir dewatering, grading, excavation, changes in drainage patterns, and other soil-disturbing activities on the Project site, potentially delivering increased flows, sediment, and other pollutants to the riparian community in the study area. Water from Project construction may have high turbidity and therefore would be pretreated, if necessary, prior to being discharged into the storm drain system. An increase in flow, turbidity, and stormwater run-off entering the Sausal Creek riparian corridor is a potentially significant impact as it may result in habitat modifications affecting the value and function of the riparian corridor. 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 EBMUD Standard Construction Specification 01 35 44, Section 1.1(B), which requires control of site activities to manage surface water flows, including containing surface run-off; the Project's Water Control and Disposal Plan, per EBMUD Standard Specification 01 35 44, Section 1.3(B); and the EBMUD-approved SWPPP per EBMUD Standard Specification 01 35 44, Section 1.3(A)(2). With implementation of EBMUD Standard Construction Specifications, the Sausal Creek riparian corridor would not be subjected to an appreciable increase in turbidity or flow as a result of reservoir dewatering, grading, excavation, changes in drainage patterns, and other soil-disturbing activities on the Project site; therefore, impacts on riparian habitat or other sensitive natural communities would be less than significant. Furthermore, because the creek channel is not highly vegetated, any changes in flow would not be substantial enough to significantly affect riparian vegetation on the creek banks.

Operation

The riparian community in Sausal Creek is affected by numerous factors unrelated to summer dry season flow rates, including, but not limited to, winter baseflows, annual to semi-annual pool scouring flows, water quality, the presence of overhanging vegetation, and human impacts on the surrounding creek corridor. These factors, unrelated to the Project, would continue to influence the riparian community in the study area after Project implementation. After construction, multiple aspects of Project operation have the potential to affect riparian habitat which include reduced flow entering Sausal Creek directly downstream of the Project site as a result of changes in the existing reservoir's underdrain system flows in the dry season, the reduced acreage of impervious surfaces, and the construction of a bioretention basin on the Project site. The reduction in flows could potentially favor drought-adapted organisms supporting the survival of some native species (e.g., boxelder trees) competing against more moisture-dependent non-native invasive species (e.g., English ivy). However, the reduction in flows could negatively affect riparian-dependent aquatic wildlife species that require more perennial conditions if they were to exist in Sausal Creek downstream of the East 27th Street outfall. As described under Impact BIO-1, this change in flow would not substantially affect the riparian habitat between the East 27th Street outfall and Logan Street where Sausal Creek enters a culvert. Overall, the bioretention area and reduction in impervious surfaces at the Project site would remove pollutants from stormwater run-off and reduce peak discharge to the stormwater system, resulting in beneficial impacts on the downstream riparian corridor. Therefore, adverse impacts on the riparian community would be less than significant.

Significance Determination Before Mitigation

Less than significant.

Mitigation Measure

None required.

Impact BIO-3: Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means. (Criterion 3)

Sausal Creek and associated wetland vegetation in the study area are subject to the CWA under the SFBRWQCB jurisdiction (Section 401 of the CWA) and under the Corps' jurisdiction (Section 404 of the CWA).

Construction

Construction of the Project would require reservoir dewatering, grading, excavation, changes in drainage patterns, and other soil-disturbing activities on the Project site, potentially delivering increased flows, sediment, and other pollutants to the Sausal Creek study area's wetlands and water community. An increase in flow, turbidity, and stormwater run-off entering the Sausal Creek riparian corridor is a potentially significant impact as it may result in habitat modifications, affecting the value and function of the wetland community. 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 EBMUD Standard Construction Specification 01 35 44, Section 1.1(B), which requires control of site activities to manage surface water flows, including containing surface run-off; the Project's Water Control and Disposal Plan, per EBMUD Standard Specification 01 35 44, Section 1.3(B); and the EBMUD-approved SWPPP per EBMUD Standard Specification 01 35 44, Section 1.3 (A)(2). With implementation of EBMUD Standard Construction Specifications, potential impacts on the Sausal Creek the Sausal Creek riparian corridor would not be subjected to an appreciable increase in turbidity and flow as a result of reservoir dewatering, grading, excavation, changes in drainage patterns, and other soil-disturbing activities on the Project site; therefore, impacts on wetlands and waters would be less than significant.

Operation

Aquatic habitat in Sausal Creek is affected by numerous factors unrelated to summer dry season flow rates, including winter baseflows, annual to semi-annual pool scouring flows, water quality, the presence of overhanging vegetation, and human impacts on the surrounding creek corridor. These factors, unrelated to the Project, would continue to influence wetlands and waters in the study area after Project implementation. Project effects such as changes in the existing reservoir's underdrain system flows in the dry season; reducing the impervious area at the Project site; and adding a bioretention area to treat stormwater run-off from the remaining impervious areas on the Project site would improve water quality and reduce the erosive power of winter run-off to Sausal Creek, providing a beneficial effect to the creek wetlands and waters.

After completion of Project construction, the reduction in flows in Sausal Creek directly downstream of the Project site as a result of changes in the existing reservoir's underdrain system flows in the dry season; reducing the impervious area at the Project site; and adding a bioretention area to treat stormwater run-off from the remaining impervious areas on the Project site would not be considered a source of hydrological interruption in the study area because, as described under Impacts BIO-1 and BIO-2, areas immediately upstream and downstream of the East 27th Street outfall display similar habitat quality. Any decrease in water levels supporting the existing function of wetland vegetation and jurisdictional "other waters" in the study area would be less than significant.

Significance Determination Before Mitigation

Less than significant.

Mitigation Measure

None required.

Impact BIO-4: 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. (Criterion 4)

During both the construction and operational phases, the activities proposed at the Project site would not interfere substantially with the movement of wildlife species or impede the use of wildlife nursery sites. Potential impacts on migratory birds and roosting bats at the Project site are addressed under Impact BIO-1, and the loss of trees is addressed in Impact BIO-5. Substantial amounts of high-value wildlife corridor habitat for migratory birds and other wildlife are located outside of the study area, 2 miles to the northeast in Joaquin Miller Park and 3.5 miles to the southwest in the San Francisco Bay.

The open channel portion of Sausal Creek in the study area has the ability to support aquatic and riparian habitats for common fish and wildlife species. However, this portion of the study area has been exposed to a relatively high degree of human disturbance over the long term. Furthermore, the length of the creek within the study area is small relative to the larger, more open-channel contiguous reaches in the upper watershed, with a lack of wildlife corridors in the immediate vicinity of the study area. As such, the Project would result in a less-than-significant impact on the movement of any resident or migratory fish or wildlife species or with established resident or migratory wildlife corridors during both Project construction and operation. The Project would not impede the use of wildlife nursery sites due to the highly urbanized context of the study area.

Significance Determination Before Mitigation

Less than significant.

Mitigation Measure

None required.

Impact BIO-5: Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance. (Criterion 5)

The Project is consistent with the City of Oakland's Creek Protection, Storm Water Management, and Discharge Control Ordinance (Creek Ordinance), since reduction of underdrain flows to Sausal Creek would not result in a significant modification to the creek's natural flow of water, as described under Impact BIO-3 above. 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 EBMUD Standard Construction Specification 01 35 44, Section 1.1(B), which requires control of site activities to manage surface water flows, including containing surface run-off; the Project's Water Control and Disposal Plan, per EBMUD Standard Specification 01 35 44, Section 1.3(B); and the EBMUD-approved SWPPP per EBMUD Standard Specification 01 35 44, Section 1.3 (A)(2). With the implementation of these procedures, the Project would further comply with the City's Creek Ordinance. The Project is also consistent with the City of Oakland's General Plan Conservation Element policies under Objective CO-6: Surface Waters and Objective CO-8: Wetlands, described under Section 3.3.4, Regulatory Framework, above, through improved water quality with the addition of a bioretention area, replacing impervious surfaces with landscaped surfaces, and less potential for creek erosion impacting wetlands due to peak stormwater reduction. The Project would comply with the policies under Objective CO-9: Rare, Endangered, and Threatened Species because the Project would not result in substantial adverse effects on special-status wildlife species or their habitat. Furthermore, the Project would be consistent with the policies under Objective CO-11: Wildlife, through the implementation of EBMUD Standard Specification 01 35 44, Section 3.8, Protection of Birds Protected Under the Migratory Treaty Act and Roosting Bats, which would help protect against the loss of breeding habitat.

The City of Oakland Tree Protection Ordinance is not applicable to the Project; under Section 53091 of the California Government Code, EBMUD, as a local agency and utility district, is not subject to building and land use zoning ordinances (such as tree ordinances) for projects involving facilities for the production, generation, storage, treatment, or transmission of water. However, EBMUD's practice is to work with local jurisdictions and neighboring communities during project planning and to consider local environmental protection policies for guidance. In addition, as explained below, the Project would result in an over 50 percent increase in the overall number of trees on the site relative to existing conditions.

Tree removal is necessary for Project construction at the reservoir site, and some trees at the reservoir site should be removed because of poor health. No tree removal would occur in the Sausal Creek riparian corridor.

Of the approximate 377 existing trees on site, approximately 22 trees would be removed because they are in poor health. Approximately 121 trees would be removed to accommodate Project construction, 73 of which are considered "protected" by the City of Oakland Ordinance 12.36. Approximately 337 new trees would be planted, resulting in a total of approximately 571 trees after construction is complete. Furthermore, the Project proposes the addition of a biorentention area with native plantings, mulch application to unpaved portions of the site, and net gain of drought-tolerant native tree and shrub plantings, which would comply with the City of Oakland's General Plan policies under Objective CO-7: Protection of Native Plant Communities and Policy W3.3, which requires the enhancement of native plant communities and wildlife habitats.

Construction activities at the reservoir site may adversely affect retained trees by potential incidental damage, altered hydrology, and soil compaction within the root zone (generally beneath the dripline of the canopy). 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 EBMUD Standard Specification 01 35 44, Section 3.7, Protection of Native and Non-Native Protected Trees, which includes provisions to ensure the protection of trees that remain during construction by installing exclusion fencing around the trees to be protected outside of tree driplines, avoiding work within the tree protection zone, careful pruning of tree roots within the excavation zone, and careful pruning of tree limbs that may be damaged by heavy equipment; therefore, this impact would be less than significant.

Significance Determination Before Mitigation

Less than significant.

Mitigation Measure

None required.

Cumulative Impact Analysis

This section presents an analysis of the cumulative effects of the Project in combination with other present and reasonably foreseeable future projects that could cause cumulatively considerable impacts on biological resources.

As previously described, the Project would not conflict with the provisions of an adopted HCP, NCCP, or other local, regional, or state habitat conservation plan. Accordingly, the Project would not contribute to cumulative impacts related to this topic, which are not described further.

Ten water infrastructure projects are planned within the general vicinity of the Project site, including three EBMUD pipeline replacement projects that could potentially overlap with the Project's proposed construction time frame. Please refer to Table 3.0-1 for a comprehensive list of potential projects planned for construction within the general vicinity of the Project site. For the purposes of the cumulative analysis, projects that could present cumulatively considerable impacts related to biological resources are those that involve visual or noise disturbance, soil or drainage disturbance, riparian or wetland disturbance, or tree removal during construction in proximity to, and in a similar time frame as construction of the Project. Of the ten water infrastructure projects planned to occur within the general vicinity of the Project site, the Paramount Road Water Pipeline Replacement, Excelsior Avenue Water Pipelines Replacement, and the Montana Avenue Water Pipeline Replacement projects all occur within 1-mile of the Project site and could overlap with the Project construction time frame. As with the Project, these projects would be required to protect potentially present sensitive biological resources, or otherwise implement EBMUD Standard Construction Specification 01 35 44, including a project SWPPP, as referenced in this section. These projects would include excavation and trenching to replace the water infrastructure in areas that have been previously disturbed and are routinely exposed to a high level of human activity.

The geographic area affected by the Project and its potential to contribute to cumulative impacts on biological resources are limited to the Project study area. The area surrounding the study area is dominated by human development, including I-580, a residential neighborhood, and public streets. The impacts on biological resources in the study area are minor, as they take place over a relatively small area, over a short duration of time, and are offset by EBMUD Standard Specifications included in the Project Description and the mitigation measures proposed within this EIR. During the construction phase, impacts on biological resources associated with the Project include potential visual and noise disturbance to nesting birds and roosting bats (if present), and a temporary reduction in habitat available for nesting birds and roosting bats as a result of tree removal during construction. When combined with potential construction impacts of other projects in the vicinity, these effects would be less than significant after implementing Mitigation Measure AES-1: Nighttime Lighting Controls. Further, following completion of the Project, the site would be restored with shrubs and trees, which would enhance habitat for nesting birds and roosting bats, potentially benefitting bird and bat species displaced by other projects in the vicinity, in addition to those found within the study area. Accordingly, impacts on nesting birds and roosting bats, and their habitat, as a result of tree removal are limited in time and space, as the Project's replanting plan would replace and improve the habitat value offered by the trees removed.

During construction, impacts on the Sausal Creek study area associated with temporary reservoir dewatering, grading, excavation, changes in drainage patterns, and other soil-disturbing activities to foothill yellow-legged frog and western pond turtle habitat, and the value and function of riparian and wetland communities are limited in time and space. During Project operation, changes in the existing reservoir's underdrain system flows in the dry season, the bioretention area, and reduction in impervious surfaces at the Project site would remove pollutants from stormwater run-off and reduce peak discharge to the stormwater system, resulting in beneficial impacts on the downstream riparian and wetland communities. As such, Project operation would not present significant adverse impacts or accumulate additional impacts that when combined with impacts of other projects constructed close to the Project, would be cumulatively considerable.

During both the construction and operational phases, the activities proposed at the Project site and Sausal Creek riparian corridor would not substantially interfere with the movement of wildlife species or impede the use of wildlife nursery sites, as the construction impacts would take place over a relatively small area, over a short duration of time, and are offset by EBMUD Standard Specifications included in the Project Description and the mitigation measures proposed within this EIR.

Therefore, impacts on biological resources in the study area would not considerably contribute to cumulative effects relative to biological resources when taking into consideration the effects from nearby cumulative projects.

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3.4 Cultural Resources

This section describes the physical and regulatory setting for cultural resources and identifies and evaluates potential cultural impacts that could result from the construction and operation of the Project. This section is based on a Historic Resources Evaluation Report, which is included as Appendix H. Also described are the environmental setting and regulatory framework, the significance criteria used for determining environmental impacts, and potential impacts associated with the Project. Cultural resources include architectural resources, prehistoric and historic-era archaeological resources, human remains, and tribal cultural resources.

3.4.1 Environmental Setting

Cultural Setting

Natural Setting

The Project site is currently in developed urban land; nearly 2 miles from the marsh and bay resources of the San Francisco Bay and Lake Merritt. Prior to Euroamerican settlement, the Project site and vicinity consisted of a variety of natural communities ranging from the open waters of the bay, to salt and brackish marshes, to chaparral and oak woodlands. Habitat types in the general vicinity included annual grasslands, coastal scrub, riparian corridors, emergent wetlands, and urban/ruderal communities. The overall Northern California climate is Mediterranean in nature, which is characterized by warm, dry summers and cool, wet winters with the bulk of precipitation occurring as rain in the winter months.

The San Francisco Bay and the surrounding region contained an abundance of natural resources, which would have been taken advantage of by its Native American and early Euroamerican populations. A variety of migratory and year-round resident birds used the bay and associated creeks and marshes as habitat for nesting and feeding. Salmonids and other fish were historically present in local creeks, and the San Francisco Bay is still considered important fish habitat. Deer, elk, and waterfowl were plentiful in prehistory, as were marine resources such as seals, otters, abalone, mussels, oysters, and clams. Franciscan chert was an easily obtainable local raw material for stone tools. The closest obsidian sources were Annadel and Napa Glass Mountain, both north of the San Francisco Bay Area (Moratto, 1984).

Prehistoric Context

Archaeologists developed individual cultural chronological sequences tailored to the archaeology and material culture of each subregion of California. Each of these sequences is based principally on the presence of distinctive cultural traits and stratigraphic separation of deposits. Milliken et al. (2007) provide a framework for the interpretation of the San Francisco Bay Area, and divided human history in California into three periods: the *Early Period*, the *Middle Period*, and the *Late Period*. In many parts of California, four periods are defined, the fourth being the *Paleoindian Period* (11500–

8000 B.C.), characterized by big-game hunters occupying broad geographic areas. Evidence of human habitation during the Paleoindian Period has not yet been discovered in the San Francisco Bay Area. Economic patterns, stylistic aspects, and regional phases further subdivide cultural periods into shorter phases. This system uses economic and technological types, socio-politics, trade networks, population density, and variations of artifact types to differentiate between cultural periods.

During the Early Period (8000–3500 B.C.), geographic mobility continued from the Paleoindian Period and is characterized by specialized tools, such as the millingslab and handstone, as well as large wide-stemmed and leaf-shaped projectile points. The first cut shell beads and the mortar and pestle are first documented in burials during the Early Period (3500–500 B.C.), indicating the beginning of a shift to sedentism. During the Middle Period, which includes the Lower Middle Period (500 B.C.–A.D. 430) and Upper Middle Period (A.D. 430–1050), geographic mobility may have continued, although groups began to establish longer term base camps in localities from which a more diverse range of resources could be exploited. The first rich black middens are recorded from this period. The addition of milling tools, obsidian, and chert concave-base projectile points, as well as the occurrence of sites in a wider range of environments, suggest that the economic base was more diverse. By the Upper Middle Period, mobility was being replaced by the development of numerous small villages. Around A.D. 430, a dramatic cultural disruption occurred as evidenced by the sudden collapse of the *Olivella* saucer bead trade network. During the Initial Late Period (A.D. 1050–1550), social complexity developed toward lifeways of large, central villages with resident political leaders and specialized activity sites. Artifacts associated with the period include the bow and arrow, small corner-notched projectile points, and a diversity of beads and ornaments.

Ethnographic Context

Based on a compilation of ethnographic, historic, and archaeological data, Milliken (1995) describes a group known as the Ohlone as having occupied the general vicinity of the Project. While traditional anthropological literature portrayed the Ohlone peoples as having a static culture, today it is better understood that many variations of culture and ideology existed within and between villages. While these "static" descriptions of separations between native cultures of California make it an easier task for ethnographers to describe past behaviors, this masks Native adaptability and self-identity. California's Native Americans never saw themselves as members of larger "cultural groups," as described by anthropologists. Instead, they saw themselves as members of specific villages, perhaps related to others by marriage or kinship ties, but viewing the village as the primary identifier of their origins.

Levy (1978) describes the language group spoken by the Ohlone, known as "Costanoan." This term is originally derived from a Spanish word designating the coastal peoples of Central California. Today Costanoan is used as a linguistic term that references to a larger language family spoken by distinct sociopolitical groups that spoke at least eight languages (as different as Spanish is from French) of the same Penutian language group. The Ohlone once occupied a large territory from San Francisco Bay in the north to the Big Sur and Salinas Rivers in the south. The area of Alameda County, as well as a large part of the East Bay, is within the territory of the *Huchiun* people, who spoke the *Chochenyo* dialect (Levy, 1978; Milliken et al., 2009).

Economically, the Ohlone engaged in hunting and gathering. Their territory encompassed both coastal and open valley environments that contained a variety of resources, including grass seeds, acorns, bulbs and tubers, bear, deer, elk, antelope, a variety of bird species, and rabbit and other small mammals. The Ohlone acknowledged private ownership of goods and songs, and village ownership of rights to land and/or natural resources; they appear to have aggressively protected their village territories, requiring monetary payment for access rights in the form of clamshell beads, and even shooting trespassers if caught. After European contact, Ohlone society was severely disrupted by missionization, disease, and displacement. Today, the Ohlone still have a strong presence in the San Francisco Bay Area, and are highly interested in their historic and prehistoric past. There are six culturally affiliated tribes or individuals associated with the Oakland area; however, none have been federally recognized.

Historic Background

The first Europeans to visit the East Bay area were the Spanish explorers Pedro Fages and Reverend Juan Crespí, who passed through the area during their exploration of California in 1772. After Mexico won independence from Spain in 1821, large tracts of land in California were granted to military heroes and loyalists. The Project site was part of the 17,939-acre San Pablo land grant given in 1823 by Governor Luís Antonio Argüello to Francisco María Castro, a former soldier at the San Francisco Presidio and one-time *alcalde* of the Pueblo of San José.

The discovery of gold in 1848 led to a huge population boom in California, with settlers establishing themselves on parts of the ranchos. The 1851 California Land Claims Act required Mexican landowners in California to prove the validity of their claim on land held under Mexican titles. Lands under rejected claims were deemed public and available for arriving settlers. As the average length of time required to prove ownership was 17 years after submitting a claim, many landowners went bankrupt and were forced to sell large portions of their land to the settlers they had been attempting to evict (Rawls and Bean, 2002). After legal conflicts lasting more than 30 years, the San Pablo land grant was patented to Joaquín Ysidro Castro in 1878, and the El Sobrante land grant was patented to Juan José Castro and Victor Castro in 1883.

The Project site is within the Rancho San Antonio land grant that was granted to Luís Maria Peralta on August 3, 1820 for his service to the Spanish government. The nearly 44,000-acre rancho (eventually divided between Peralta's four sons) included the present-day cities of Oakland, Piedmont, Berkeley, Alameda, Emeryville, Albany, and parts of San Leandro. Peralta's land grant was confirmed after Mexico's independence from Spain in 1822, and the title was honored when California entered the Union by the Treaty of Guadalupe Hidalgo in 1848. Despite the confirmation of his ownership, by the middle of the 19th century, squatters had moved in to occupy portions of Peralta's undeveloped land. The Gold Rush and California statehood brought miners, businessmen, lumbermen, and other speculators to the area in search of opportunities. Early settlers of that period include Edson Adams, Andrew Moon, and Horace Carpentier, who squatted on 480 acres of Vicente Peralta's (one of Luis Peralta's sons) land. Adams, Moon, and Carpentier subsequently hired Julius Kellsersberger, an Austrian-educated Swiss military engineer, to plot a new city, Oakland, which was incorporated in 1852.

The city of Oakland originally encompassed the area roughly bordered by the Oakland Estuary on the south, Market Street on the west, 14th Street on the north, and the Lake Merritt Channel (estuary) on the east. Broadway served as the main street. The majority of the early city dwellers, numbering under 100, lived near the foot of Broadway in proximity to the estuary. From there, city development moved north along the street car lines of Broadway and Telegraph Avenue toward the Oakland-Berkeley Hills and ultimately connecting with the separate towns that came to form East Oakland. The Central Reservoir is within the historic boundary of the town of Brooklyn (est. 1856), which was annexed as part of Oakland in 1872. The town, just east of Lake Merritt, was named for the ship *Brooklyn* that brought a community of Mormon settlers to California in 1846. In 1872, Oakland annexed the area from about 22nd Street to 36th Street.

The 1906 earthquake and subsequent fires that ravaged San Francisco generated further growth in Oakland for several decades, as the city absorbed refugees displaced by the disasters across the San Francisco Bay. The first several years of the post-earthquake boom resulted in almost total development of the remaining unbuilt areas of North Oakland, as well as many other outlying portions of the city.

East Bay Municipal Utility District

Several 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. Land 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 (EBMUD, 1991, 2005).

EBMUD was formed on May 8, 1923, the product of a bond issue passed by the voters of Oakland, Berkeley, Alameda, Emeryville, Albany, San Leandro, and El Cerrito. Richmond and Piedmont would later become part of the system. EBMUD was formed under the California Municipal Utilities District Act, which permitted the formation of multipurpose government agencies to provide public services on a regional basis. 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).

In 1928, 5 years after EBMUD was formed, a $26 million bond was used to purchase the existing facilities 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). By 1930, EBMUD was serving 35 million gallons per day (MGD) to a population of 460,000.

Central Reservoir

Constructed in 1910, the Central Reservoir is EBMUD's oldest and largest distribution reservoir in operation. Plans for construction of the reservoir date back as far as 1889, when the Contra Costa Water Company (a predecessor of EBMUD) purchased the land for a central reservoir near Fruitvale for approximately $16,500 (Oakland Tribune, 1890). However, construction of the reservoir was abandoned soon afterwards for unclear reasons (Oakland Tribune, 1900), and by 1906 the Contra Costa Water Company was nearly bankrupt. In August 1906, the People's Water Company was formed, combining the Contra Costa Water Company, the Richmond Water Company, and the Syndicate Water Company. The new company's financial troubles remained, however, with the post-earthquake boom in population covered within the company's service area overextending the limited water storage facilities in the East Bay. New lands were purchased, with reservoirs (including Central Reservoir) and facilities constructed to store and transport water.

The People's Water Company constructed the approximately 150-million-gallon capacity, concrete-lined reservoir at a cost of approximately $352,000 to serve the water needs of Oakland and Alameda County (Oakland Tribune, 1910). The reservoir was designed by M. [sic] Kempkey[1], under the direction of A.L. Adams, and its construction was completed by the Piedmont Construction Company under the supervision of G.H. Wilhelm, chief engineer of the People's Water Company. Newspaper articles at the time describe it as potentially the largest concrete reservoir on the Pacific Coast (Unknown, 1911).

The reservoir was anticipated to be expanded to meet future water needs, and was intended as a backup water supply in case of the loss of primary water sources (i.e., Alvarado pumping station or Lake Chabot) (Oakland Tribune, 1911; Daniels, 1920). The lining was repaired in 1955, and in 1958 EBMUD began significant improvements to the reservoir, including constructing an auxiliary embankment and adding a roof, as a result of the construction of the MacArthur Freeway (Interstate 580) on the north portion of the reservoir. In the 2000s, the roof was covered with corrugated metal, which is currently in place today (EBMUD, 2012).

Existing Conditions

Northwest Information Center Database Search

On June 4, 2018, ESA staff conducted a records search of the Project site and immediate vicinity at the Northwest Information Center (NWIC) at Sonoma State University (NWIC #17-2912). The NWIC is the California Historical Resources Information System (CHRIS) repository housing records for Alameda County. The study area for the records search includes the Project site and areas within 1/8-mile for built resources, and 1/2-mile for archaeological resources. The records search included a review of NWIC base maps (*Oakland East, CA* 7.5-minute U.S. Geological Survey [USGS] topographic quadrangle), previously recorded resource records, and previous cultural resources study reports for

1 Additional archival review determined that "M Kempkey" likely was a mis-identification of Augustus Kempkey who worked on several projects in Alameda County under Adams.

the study area. Additional sources reviewed during the records search included historic maps, the Directory of Properties in the Historic Property Data File for Alameda County, the National Register of Historic Places (National Register), the California Register of Historical Resources (California Register), the *California Inventory of Historic Resources* (1976), the *California Historical Landmarks* (1996), and the *California Points of Historical Interest* (1992). Historic-period topographic maps (USGS, 1915, 1949, 1959, 1968) and aerial imagery (1946, 1958, 1968) were also reviewed.

The objectives of the records search were to: (1) determine whether known historic-era architectural resources have been recorded within or adjacent to the Project site, and whether known archaeological resources have been recorded within a 1/2-mile of the Project site; (2) assess the likelihood of unrecorded cultural resources in the Project site and vicinity based on historical references and the distribution of environmental settings of nearby sites; and (3) develop a context for the identification and preliminary evaluation of cultural resources.

The records search indicated that only one cultural resource study has been completed within 1/8-mile of the Project site (a survey of portions of Highlands Hospital by Siegel & Strain Architects in 2010). The records search did not identify any previously recorded historic-age architectural resources within the Project area or immediate vicinity. Review of the records search results and Historic Properties Directory for Alameda County identified no architectural resources within the records search area. In addition, no archaeological resources are recorded within the Project site or within a 1/2-mile. The nearest prehistoric archaeological resources to the Project site are nearly 2 miles to the west and 1.5 miles to the south, nearer to the shoreline areas adjacent to Lake Merritt and the San Antonio Creek channel.

Architectural Survey and Evaluation

An ESA architectural historian surveyed the Project site on June 18, 2018 and recorded the buildings and structures at the Central Reservoir through field notes and digital photography.

The Central Reservoir is on 27 acres and was built in 1910 to store water from Lake Chabot (through the Chabot Filter Plant) and from wells operated by the People’s Water Company. The Central Reservoir includes two components, the reservoir basin and the material storage building. The Central Reservoir basin is a 154-million-gallon open-cut reservoir that is trapezoidal-shaped, concrete lined with pre-cast columns and timber beam/girders, and covered by a corrugated metal roof. The reservoir has been reconfigured, and a roof was added with the construction of the MacArthur Freeway beginning in 1958. Virtually no portion of the Central Reservoir remains as it appeared in 1910. The material storage building has historically been used for maintenance and storage since its original construction in 1922 (EBMUD, 1922), but has also functioned as a soil and concrete testing laboratory as recent as the mid-1990s. The steel-reinforced concrete building consists of the original structure and an L-shaped addition that wraps around the north and east façades. The original structure is approximately 1.5 stories tall, with a flat roof with recessed concrete panels framing each façade. The original structure reflects classical elements, including symmetrical design, flat roof, dentilled cornice, and a decorated roofline panel imprinted with geometric designs.

The Central Reservoir was evaluated for listing in the California Register of Historical Resources according to the significance criteria and integrity considerations outlined in Public Resources Code (PRC) Section 5024.1 (see Section 3.4.2, Regulatory Framework, below). The following criteria are specific to the California Register and used to establish baseline environmental conditions; they are not indicative of CEQA significance. Archival review indicated that the Central Reservoir is significant in its association with the development of water supply and distribution in the East Bay. While not the first reservoir in the East Bay (in 1869, Anthony Chabot created Lake Temescal, the Temescal Reservoir, as the East Bay's first artificial reservoir, and in 1875 Lake Chabot was constructed), the Central Reservoir is one of EBMUD's oldest water storage facilities. It was, at the time of its construction, toted as the largest man-made lake for filtered water west of Chicago (Oakland Tribune, 1958). This distinction, however, does not raise the Central Reservoir site to a level of significance for its association with historical events (California Register Criterion 1). While a component of the EBMUD system providing water for Oakland and the surrounding community, the Central Reservoir was not the largest nor the most significant reservoir in the East Bay. Nor did it rise to national significance as a result of its construction as the largest man-made reservoir in the West. As such, the Central Reservoir is not eligible for the California Register under Criterion 1.

Archival research also failed to indicate that the engineers who designed the Central Reservoir were significant persons in local or state history (Criterion 2). Archival research did not identify any significant associations between the Central Reservoir site and any other noteworthy individuals in history; therefore, the Central Reservoir site is not eligible for the California Register under Criterion 2.

The Central Reservoir site does not rise to the level of distinction needed for eligibility under Criterion 3. The reservoir basin is a simple, vernacular mid-century structure (as reconstructed in the 1960s), with little ornamentation or architectural distinction.

Lastly, the Central Reservoir does not have the potential to yield additional information about the history of the reservoir or water storage in Alameda County and, therefore, is not eligible under Criterion 4.

Based on the results of the evaluation, the Central Reservoir is not eligible for listing in the California Register and, therefore, does not qualify as a historical resource for the purposes of CEQA.

Archaeological Surface Survey

An ESA archaeologist conducted a pedestrian survey of the Project site on June 18, 2018 in narrow 5-meter-wide transects to observe as much visible ground surface as feasible. Ground visibility in undeveloped areas was good, at approximately 80 percent. The Project site is highly disturbed from construction of the existing reservoir and associated infrastructure. No archaeological resources or other evidence of past human use or occupation was identified during the surface survey. Given the environmental setting, relatively steep slope, and previous disturbance, there is a low potential to encounter prehistoric or historic-era archaeological resources during Project implementation.

3.4.2 Regulatory Framework

Federal Regulations

National Historic Preservation Act of 1966, as Amended

Cultural resources are considered through the National Historic Preservation Act (NHPA) of 1966, as amended (54 United States Code [U.S.C.] Section 307103), and its implementing regulation, Protection of Historic Properties (36 Code of Federal Regulations [CFR] Part 800), the Archaeological and Historic Preservation Act of 1974, and the Archaeological Resources Protection Act of 1979. Prior to implementing an "undertaking" (e.g., issuing a federal permit), Section 106 of the NHPA requires federal agencies to consider the effects of the undertaking on historic properties and to afford the Advisory Council on Historic Preservation and the State Historic Preservation Officer a reasonable opportunity to comment on any undertaking that would adversely affect properties eligible for listing in the National Register. As indicated in Section 101(d)(6)(A) of the NHPA, properties of traditional religious and cultural importance to a tribe are eligible for inclusion in the National Register. Under the NHPA, a resource is considered significant if it meets the National Register listing criteria (36 CFR Section 60.4).

National Register of Historic Places

The National Register was established by the NHPA as "an authoritative guide to be used by federal, state, and local governments, private groups and citizens to identify the Nation's historic resources and to indicate what properties should be considered for protection from destruction or impairment" (36 CFR Section 60.2). The National Register recognizes both historic-era and prehistoric archaeological properties that are significant at the national, state, and local levels.

To be eligible for listing in the National Register, a resource must be significant in American history, architecture, archaeology, engineering, or culture. Districts, sites, buildings, structures, and objects of potential significance must meet one or more of the following four established criteria (U.S. Department of the Interior, 1995):

A. Are associated with events that have made a significant contribution to the broad patterns of our history;

B. Are associated with the lives of persons significant in our past;

C. Embody the distinctive characteristics of a type, period, or method of construction or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or

D. Have yielded, or may be likely to yield, information important in prehistory or history.

Unless the property possesses exceptional significance, it must be at least 50 years old to be eligible for National Register listing (U.S. Department of the Interior, 1995).

In addition to meeting the criteria of significance, a property must have integrity. Integrity is defined as "the ability of a property to convey its significance" (U.S. Department of the Interior, 1995). The National Register recognizes seven qualities that, in various combinations, define integrity: location, design, setting, materials, workmanship, feeling, and association. To retain historic integrity, a property must possess several, and usually most, of these seven aspects. The retention of the specific aspects of integrity is paramount for a property to convey its significance.

State Regulations

California Environmental Quality Act

Under CEQA (PRC Section 21084.1), a project would have a significant effect on the environment if it causes a substantial adverse change in the significance of a historical resource. The *CEQA Guidelines* (14 California Code of Regulations [CCR] Section 15064.4) recognize that a historical resource includes: (1) a resource listed in, or determined to be eligible by the State Historical Resources Commission, for listing in the California Register; (2) a resource included in a local register of historical resources, as defined in PRC Section 5020.1(k) or identified as significant in a historical resource survey meeting the requirements of PRC Section 5024.1(g); and (3) any object, building, structure, site, area, place, record, or manuscript that a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California, provided the lead agency's determination is supported by substantial evidence in light of the whole record. The fact that a resource does not meet the three criteria outlined above does not preclude the lead agency from determining that the resource may be a historical resource as defined in PRC Section 5020.1(j) or 5024.1.

If a lead agency determines that an archaeological site is a historical resource, then the provisions of PRC Section 21084.1 and *CEQA Guidelines* Section 15064.4 apply. If a project may cause a substantial adverse change (defined as physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of a historical resource would be materially impaired) in the significance of a historical resource, then the lead agency must identify potentially feasible measures to mitigate these effects (14 CCR Section 15064.4[b][1], 15064.4[b][4]).

If an archaeological site does not meet the historical resource criteria contained in the *CEQA Guidelines*, then the site may be treated in accordance with the provisions of Section 21083, which is a unique archaeological resource. As defined in PRC Section 21083.2, a "unique" archaeological resource is an archaeological artifact, object, or site, for which it can be clearly demonstrated that without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria:

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

If an archaeological site meets the criteria for a unique archaeological resource as defined in PRC Section 21083.2, then the site is to be treated in accordance with the provisions of PRC Section 21083.2, which state that if the lead agency determines that a project would have a significant effect on unique archaeological resources, the lead agency may require reasonable efforts be made to permit any or all of these resources to be preserved in place (PRC Section 21083.1[a]). If preservation in place is not feasible, mitigation measures shall be required.

If an archaeological resource is neither a unique archaeological nor a historical resource, then the effects of the project on those resources shall not be considered a significant effect on the environment (14 CCR Section 15064.4[c][4]).

Assembly Bill 52

Governor Brown approved the CEQA amendments set forth in Assembly Bill No. 52 (AB 52), relating to Native Americans, in 2014. The AB 52 amendments to CEQA specify that a project with an effect that may cause a substantial adverse change in the significance of a tribal cultural resource, as defined in PRC Section 21074, is one that may have a significant effect on the environment. AB 52 requires a lead agency to begin consultation with a California Native American tribe that is traditionally and culturally affiliated with the geographic area of a proposed project, if the tribe requested to the lead agency, in writing, to be informed by the lead agency of proposed projects in that geographic area and the tribe requests consultation, prior to determining which form of CEQA documentation is required for a project.

California Register of Historical Resources

Created in 1992 and implemented in 1998, the California Register is "an authoritative guide in California to be used by state and local agencies, private groups, and citizens to identify the state's historical resources and to indicate what properties are to be protected, to the extent prudent and feasible, from substantial adverse change." Certain properties, including those listed in, or formally determined eligible for listing in, the National Register and California Historical Landmarks numbered 770 and higher, automatically are included in the California Register. Other properties recognized under the California Points of Historical Interest Program, identified as significant in historic resources surveys or designated by local landmarks programs, may be nominated for inclusion in the California Register. A resource, either an individual property or a contributor to a historic district, may be listed in the California Register if the State Historical Resources

Commission determines that it meets one or more of the following criteria, which are modeled on National Register criteria:

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 in our past.
3. It embodies the distinctive characteristics of a type, period, region, or method of construction; represents the work of an important creative individual; or possesses high artistic values.
4. It has yielded, or may be likely to yield, information important in history or prehistory.

Furthermore, under state law (PRC Section 5024.1; 14 CCR Section 4852[c]), a cultural resource must retain integrity to be considered eligible for the California Register. Specifically, it must retain sufficient character or appearance to be recognizable as a historical resource and convey reasons of significance. Integrity is evaluated with regard to retention of such factors as location, design, setting, materials, workmanship, feeling, and association.

Typically, an archaeological site in California is recommended eligible for listing in the California Register based on its potential to yield information important in prehistory or history (Criterion 4). Important information includes chronological markers such as projectile point styles or obsidian artifacts that can be subjected to dating methods, or undisturbed deposits that retain their stratigraphic integrity. Sites such as these have the ability to address research questions. However, archaeological sites may also be recommended eligible under California Register Criteria 1, 2, and/or 3.

California Public Resources Code and Health and Safety Code

Native American Heritage Commission

PRC Section 5097.91 established the Native American Heritage Commission (NAHC), the duties of which include inventorying places of religious or social significance to Native Americans and identifying known graves and cemeteries of Native Americans on private lands. PRC Section 5097.98 specifies a protocol to be followed when the NAHC is notified by a county coroner of a discovery of Native American human remains.

California Health and Safety Code Sections 7050 and 7052

California Health and Safety Code Section 7050.5 declares that, in the event of the discovery of human remains outside of a dedicated cemetery, all ground disturbance must cease and the county coroner must be notified. California Health and Safety Code Section 7052 establishes a felony penalty for mutilating, disinterring, or otherwise disturbing human remains, except by relatives.

Local Regulations

Under Section 53091 of the California Government Code, EBMUD, as a local agency and utility district, is not subject to building and land use zoning ordinances (such as tree ordinances) for projects involving facilities for the production, generation, storage, treatment, or transmission of water. However, EBMUD's practice is to work with local jurisdictions and neighboring communities during project planning and to consider local environmental protection policies for guidance.

City of Oakland – Local Plans, Policies, and Regulations

In the city of Oakland, for purposes of evaluating environmental impacts under CEQA, a historical resource is a resource that meets any of the following criteria:

1. A resource listed in, or determined to be eligible for listing in, the California Register;
2. A resource included in Oakland's Local Register of historical resources, unless the preponderance of evidence demonstrates that it is not historically or culturally significant;
3. A resource identified as significant (e.g., rated 1–5) in a historical resource survey recorded on Department of Parks and Recreation (DPR) Form 523, unless the preponderance of evidence demonstrates that it is not historically or culturally significant;
4. Any object, building, structure, site, area, place, record, or manuscript that the Oakland City Council determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California, provided the determination is supported by substantial evidence in light of the whole record. Generally, a resource is considered "historically significant" if it meets the criteria for listing on the California Register *CEQA Guidelines* Section 15064.5; or
5. A resource that is determined by the City Council to be historically or culturally significant even though it does not meet the other four criteria listed here.

A "local register of historical resources" means a list of properties officially designated or recognized as historically significant by a local government pursuant to a local ordinance or resolution, unless the preponderance of evidence demonstrates otherwise.

General Plan Historic Preservation Element

In March 1994, the Oakland City Council adopted the Historic Preservation Element (HPE) of the Oakland General Plan (amended July 21, 1998). The HPE sets out a graduated system of ratings and designations resulting from the Oakland Cultural Heritage Survey and Oakland Zoning Regulations. The following HPE goal addresses historical resources under CEQA:

Goal 2: To preserve, protect, enhance, perpetuate, use, and prevent the unnecessary destruction or impairment of properties or physical features of special character or special historic, cultural, educational, architectural, or aesthetic interest or value.

Such properties or physical features include buildings, building components, structures, objects, districts, sites, natural features related to human presence, and activities taking place on or within such properties or physical features.

EBMUD Standard Construction Specifications

EBMUD Standard Construction Specification 01 35 44 (Environmental Requirements), sets forth the contract requirements for environmental compliance to which construction crews must adhere. Section 3.9 defines provisions for protection of cultural resources during construction. The contractor would be required to comply with the following:

- Conform to the requirements of statutes as they relate to the protection and preservation of cultural resources. Unauthorized collection of prehistoric or historic artifacts or fossils along the Work Area, or at Work facilities, is strictly prohibited.
- Before beginning construction, all Contractor construction personnel shall attend a cultural resources training course provided by the EBMUD 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 an EBMUD designated location, conducted by a qualified archaeologist provided by EBMUD or EBMUD 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 EBMUD. Prior to accessing or performing construction work, all Contractor personnel shall sign an attendance sheet by the Engineer verifying that they 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" (Section 00 73 00); and shall comply with all project environmental requirements.
- In the event that potential cultural resources are discovered at the site of construction, the following procedures shall be instituted:
  - 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.
    - The Contractor shall immediately notify the Engineer who shall engage a qualified archaeologist provided by EBMUD to evaluate the find. The Contractor is responsible for stopping work and notifying the proper personnel and shall not recommence work until authorized to do so by the Engineer.
    - EBMUD 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 mitigation plan has been prepared, approved by EBMUD, 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 EBMUD, the archaeologist (and Native American representative) will determine when construction can resume.

- Discovery of human remains requires that all construction activities immediately cease at the location of discovery, and within 100 feet of the discovery.
  - The Contractor shall immediately notify the Engineer who will engage qualified archaeologist provided by EBMUD to evaluate the find. The Contractor is responsible for stopping work and notifying the proper personnel and shall not recommence work until authorized to do so by the Engineer.
  - EBMUD 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 EBMUD for the appropriate means of treating the human remains and any associated funerary objects.

- If EBMUD determines that the find requires further evaluation, at the direction of Engineer, Contractor shall suspend all construction activities at the location of the find and within a larger radius, as required.

3.4.3 Impact Analysis

Methodology for Analysis

Architectural Resources

Potential impacts on architectural resources are assessed by identifying whether Project implementation could affect resources that have been identified as historical resources for the purposes of CEQA. Individual properties and districts identified as historical resources under CEQA include those that are significant because of their association with important events, people, or architectural styles or master architects, or for their informational value (California Register Criteria 1, 2, 3, and 4) and that retain sufficient historic integrity to convey their significance. Criterion 4, however, is typically applied to the evaluation of archaeological resources and not to architectural resources, as described below. Once a resource has been identified as significant, it must be determined whether the Project impacts would “cause a substantial adverse change in the significance” of the resource (*CEQA Guidelines* Section 15064.5[b]). A substantial adverse change in the significance of a historical resource means “physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of [the] historical resource would be materially impaired" (*CEQA Guidelines* Section 15064.5[b][1]). A historical resource is materially impaired through the demolition or alteration of the resource's physical characteristics that convey its historical significance and that justify its inclusion in (or eligibility for inclusion in) the California Register or a qualified local register (*CEQA Guidelines* Section 15064.5[b][2]).

Archaeological Resources

The significance of most prehistoric and historic-period archaeological sites is usually assessed under California Register Criterion 4. This criterion stresses the importance of the information potential contained within the site, rather than its significance as a surviving example of a type or its association with an important person or event. Archaeological resources may qualify as historical resources under the definition provided in *CEQA Guidelines* Section 15064.5[a], or they may also be assessed under CEQA as unique archaeological resources, defined as archaeological artifacts, objects, or sites that contain information needed to answer important scientific research questions (PRC Section 21083.2). A substantial adverse change in the significance of an archaeological resource is assessed similarly to other historical resources (i.e., whether the project would result in the destruction or adverse material alteration of those physical resource characteristics that convey its significance under the appropriate criteria (*CEQA Guidelines* Section 15064.5[b][2]).

Human Remains

Human remains, including those buried outside of formal cemeteries, are protected under several state laws, including PRC Section 5097.98 and California Health and Safety Code Section 7050.5. These laws are identified above in *State Regulations*. This CEQA analysis considers impacts including the intentional disturbance, mutilation, or removal of interred human remains.

Tribal Cultural Resources

Impacts on tribal cultural resources are assessed in consultation with affiliated Native American tribes that have requested consultation in accordance with PRC Section 21080.3. This CEQA analysis considers whether the Project would cause damaging effects to any tribal cultural resource, including archaeological resources and human remains.

Significance Criteria

A project would result in significant impacts on cultural resources if it would:

1. Cause a substantial adverse change in the significance of a historical resource as defined in *CEQA Guidelines* Section 15064.5;
2. Cause a substantial adverse change in the significance of an archaeological resource pursuant to *CEQA Guidelines* Section 15064.5;
3. Disturb any human remains, including those interred outside of formal cemeteries; or

4. Cause a substantial adverse change in the significance of a tribal cultural resource, defined in PRC Section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:

    a. Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in PRC Section 5020.1(k), or

    b. A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of PRC Section 5024.1. In applying the criteria set forth in subdivision (c) of PRC Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.

Impacts and Mitigation Measures

Impact CUL-1: Cause a substantial adverse change in the significance of a historical resource, as defined in Section 15064.5. (Criterion 1)

The following focuses on architectural resources. Archaeological resources, including those that are potentially historical resources according to *CEQA Guidelines* Section 15064.5, are addressed under Impact CUL-2, below.

To evaluate the Project's potential effects on significant historic-age built cultural resources, ESA completed an architectural resources evaluation of the Project site (ESA, 2018). The effort included a literature review, contact with local historical societies, field survey to document historic-age architectural resources within the Project site, and evaluation of resources for eligibility for listing in the California Register.

The Central Reservoir, including both the basin and 1922 materials storage building, was evaluated for its eligibility for listing in the California Register as described above and was determined not eligible due to a lack of significant historical associations as well as a lack of physical integrity resulting from the 1960s modernization efforts. Because Central Reservoir is not considered a historical resource under CEQA, demolition and replacement of the reservoir is considered to be a less-than-significant impact related to architectural historical resources.

Significance Determination Before Mitigation

Less than significant.

Mitigation Measures

None required.

Impact CUL-2: Cause a substantial adverse change in the significance of an archaeological resource, pursuant to *CEQA Guidelines* Section 15064.5. (Criterion 2)

This section describes archaeological resources that are potentially historical resources according to *CEQA Guidelines* Section 15064.5, as well as unique archaeological resources, as defined in PRC Section 21083.2(g).

The results of the background research and surface survey indicate that there are no prehistoric or historic-era archaeological resources within the Project site and that there is a low potential to uncover resources during Project implementation. However, the possibility of inadvertent discovery cannot be entirely discounted, and could result in a potentially significant impact. As detailed in the Project Description, EBMUD standard practices and procedures, applicable to all EBMUD projects, have been incorporated into the Project, including EBMUD's Standard Construction Specification 01 35 44, Environmental Requirements, Section 3.9, Protection of Cultural and Paleontological Resources. This standard specification, which includes appropriate cultural resources management practices and complies with statutory requirements, outlines the following procedures:

- Preconstruction cultural resources training is required for all construction personnel.
- In the event that a cultural resource is identified during preconstruction activities or during excavation for construction activities, all work within 100 feet of the resource shall be halted until a qualified archaeologist can review, identify, and evaluate the resource for its significance. Should the archaeologist determine that an archaeological resource has the potential to be a tribal cultural resource, a Native American monitor shall be retained by EBMUD to monitor work in the area where the tribal cultural resource was discovered.

Because Section 3.9, Protection of Cultural and Paleontological Resources, of EBMUD's Standard Construction Specification 01 35 44, Environmental Requirements, has been incorporated into the Project, and requires implementation of cultural resources procedures that address the inadvertent discovery of cultural resources and ensures compliance with legal requirements regarding the protection of such resources, the Project's construction impacts related to archaeological resources are less than significant. The EBMUD Practices and Procedures Monitoring and Reporting Plan (Appendix E) lists the applicable standard specifications language.

Significance Determination Before Mitigation

Less than significant.

Mitigation Measures

None required.

Impact CUL-3: Disturb any human remains, including those interred outside of dedicated cemeteries. (Criterion 3)

There is no indication from the archival research or survey effort that any part of the Project site has been used for human burial purposes in the recent or distant past. Therefore, it is unlikely that human remains would be encountered during construction of the Project. However, the possibility of inadvertent discovery cannot be entirely discounted, and could result in a potentially significant impact. As detailed in the Project Description, EBMUD standard practices and procedures, applicable to all EBMUD projects, have been incorporated into the Project, including EBMUD's Standard Construction Specification 01 35 44, Environmental Requirements. Section 3.9, Protection of Cultural and Paleontological Resources, which includes appropriate cultural resources management practices and complies with statutory requirements, outlines procedures in regards to the discovery of human remains:

- Discovery of human remains requires that all construction activities shall immediately cease at the location of discovery and within 100 feet of the discovery. EBMUD shall 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 shall contact the Native American Heritage Commission (NAHC). The NAHC shall 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 EBMUD for the appropriate means of treating the human remains and any associated funerary objects.

Because EBMUD's Standard Construction Specification 01 35 44, Environmental Requirements, Section 3.9, Protection of Cultural and Paleontological Resources requires implementation of procedures that address the inadvertent discovery of human remains and follows statutory law, the Project's impact related to human remains are less than significant. The EBMUD Practices and Procedures Monitoring and Reporting Plan (Appendix E) lists the applicable standard specifications language.

Significance Determination Before Mitigation

Less than significant.

Mitigation Measures

None required.

Impact CUL-4: Cause a substantial adverse change in the significance of a tribal cultural resource as defined in PRC Section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe. (Criterion 4)

The results of the background research at the NWIC indicates that there are no archaeological tribal cultural resources within the Project site and that there is a low potential to uncover resources during Project implementation. EBMUD has not received any requests for consultation related to the Project. Despite the low archaeological sensitivity, the possibility of inadvertent discovery cannot be entirely discounted, and could result in a potentially significant impact. As detailed in the Project Description, EBMUD standard practices and procedures, applicable to all EBMUD projects, have been incorporated into the Project, including EBMUD's Standard Construction Specification 01 35 44, Environmental Requirements. Section 3.9, Protection of Cultural and Paleontological Resources, which includes appropriate cultural resources management practices and complies with statutory requirements, outlines the following procedures:

- Preconstruction cultural resources training is required for all construction personnel.
- In the event that a cultural resource is identified during preconstruction activities or during excavation for construction activities, all work within 100 feet of the resource shall be halted until a qualified archaeologist can review, identify, and evaluate the resource for its significance. Should the archaeologist determine that an archaeological resource has the potential to be a tribal cultural resource, a Native American monitor shall be retained by EBMUD to monitor work in the area where the tribal cultural resource was discovered.

Because Section 3.9, Protection of Cultural and Paleontological Resources, of EBMUD's Standard Construction Specification 01 35 44, Environmental Requirements, has been incorporated into the Project, and requires implementation of procedures that address the inadvertent discovery of cultural resources and ensures compliance with legal requirements regarding the protection of such resources, the Project's construction impacts related to tribal cultural resources are less than significant. The EBMUD Practices and Procedures Monitoring and Reporting Plan (Appendix E) lists the applicable standard specifications language.

Significance Determination Before Mitigation

Less than significant.

Mitigation Measures

None required.

Cumulative Impact Analysis

The Project would not contribute to significant cultural impacts. The geographic scope of analysis for cumulative impacts on historical resources, archaeological resources, tribal cultural resources, and human remains encompasses areas where development would occur in the vicinity of the Project site.

There are no known historic architectural resources that qualify as historical resources, archaeological resources, tribal cultural resources, or human remains in the Project site; therefore, the Project would not contribute to a significant cumulative effect on cultural resources.

The cumulative impact analysis combines cultural resources into a single, non-renewable resource base and considers the additive effect of potential Project impacts on the following: architectural resources and archaeological resources that qualify as historical resources, as defined in *CEQA Guidelines* Section 15064.5; tribal cultural resources, as defined in PRC Section 21083.09; and human remains. A cumulatively significant impact could result if incremental effects of the Project, after implementation of EBMUD's Standard Construction Specifications, combined with the impacts of one or more cumulative projects, after implementation of their mitigation, cause a substantial adverse effect on the same cultural resource.

Federal, state, and local laws can generally protect cultural resources in most instances. Development in the geographic scope would be required to comply with the same provisions of CEQA and implement measures similar to those identified above (EBMUD's Standard Construction Specification 01 35 44, Environmental Requirements, Section 3.9, Protections of Cultural and Paleontological Resources). These measures would require protocols for responding in the event of inadvertent discovery of archaeological resources or human remains.

Through compliance with applicable regulations and implementation of associated avoidance and minimization measures, the Project would not have a considerable contribution to adverse effects on cultural resources of the region. This cumulative impact would be less than significant.

Significance Determination Before Mitigation

Less than significant.

Mitigation Measures

None required.

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3.5 Energy

This section describes the physical and regulatory setting for energy resources, and identifies and evaluates potential energy-related impacts that could result from construction and operation of the Project. The Project's impacts related to energy usage as it may affect climate change are discussed in Section 3.7, Greenhouse Gas Emissions.

3.5.1 Environmental Setting

Electricity and Natural Gas

In 2017, California's energy mix totaled 290,000 gigawatt hours (GWh) of electricity, of which 71 percent was from in-state electricity generation and the remaining 29 percent imported from the northwestern and southwestern states. Of the electricity generated in California, about 43.4 percent was produced by natural gas, 17.9 percent from hydroelectricity, 8.7 percent from nuclear, and 29.7 percent was produced by renewable sources such as wind, solar, geothermal, biomass, and small hydroelectric facilities with the remaining 0.3 percent from coal and other sources (California Energy Commission [CEC], 2018a).

Pacific Gas and Electric Company (PG&E) is the local electricity and natural gas supplier in the City of Oakland. PG&E provides natural gas and electric service to approximately 16 million people throughout a 70,000-square-mile service area in northern and central California (PG&E, 2017). About 33 percent of PG&E's electrical generation is from renewable resources, such as wind, geothermal, biomass, solar, and small hydroelectric facilities.

EBMUD is a net energy generator, producing more energy through hydropower, solar power, and biogas production than is used by its water and wastewater facilities. EBMUD sells hydropower to electric power providers when the water system generates excess energy. EBMUD generates on average 185,000 megawatt-hours (MWh) of electricity annually at its two hydroelectric power plants. EBMUD's photovoltaic generation capacity is 930 MWh annually. EBMUD's wastewater treatment plant is also a net producer of renewable energy, selling energy back to the electrical grid to help reduce California fossil fuel use. It can generate more than 55,000 MWh annually. EBMUD's sustainability practices minimize energy use and greenhouse gas (GHG) emissions (EBMUD, 2018a).

Petroleum

Petroleum used in California in 2017 came from California (31 percent), Alaska (12.3 percent), and foreign sources (56.7 percent), and is refined to produce gasoline, diesel fuel, and a variety of other liquid petroleum products (CEC, 2018a). There are five oil refineries in the San Francisco Bay Area.

Gasoline is the most used transportation fuel in California, with 97 percent of all gasoline consumed by light-duty cars, pickup trucks, and sport utility vehicles (CEC, 2018c). Diesel fuel is the second largest transportation fuel used in California, representing

17 percent of total fuel sales behind gasoline. Nearly all heavy-duty trucks, delivery vehicles, buses, trains, ships, boats and barges, farm, construction and heavy-duty military vehicles and equipment have diesel engines. Diesel is the fuel of choice because it has 12 percent more energy per gallon than gasoline and has fuel properties that prolong engine life making it ideal for heavy-duty vehicle applications (CEC, 2018d). According to the State Board of Equalization (BOE), 15.5 billion gallons of gasoline and 3.0 billion gallons of diesel, including off-road diesel, were sold in California in 2016 (BOE, 2017a and 2017b). In Alameda County, it is estimated that 583 million gallons of gasoline and 58 million gallons of diesel were sold in 2016 (CEC, 2018e).

3.5.2 Regulatory Framework

Federal Regulations

National Energy Conservation Policy Act

The National Energy Conservation Policy Act serves as the underlying authority for federal energy management goals and requirements. Signed into law in 1978, it has been regularly updated and amended by subsequent laws and regulations. The National Energy Conservation Policy Act is the foundation of most federal energy requirements.

National Energy Policy Act of 2005

The National Energy Policy Act of 2005 sets equipment energy efficiency standards and seeks to reduce reliance on non-renewable energy resources and provide incentives to reduce current demand on these resources. For example, under the National Energy Policy Act of 2005, consumers and businesses can attain federal tax credits for purchasing fuel-efficient appliances and products, including hybrid vehicles; constructing energy-efficient buildings; and improving the energy efficiency of commercial buildings. Additionally, tax credits are available for the installation of qualified fuel cells, stationary microturbine power plants, and solar power equipment.

Executive Order 13423 (Strengthening Federal Environmental, Energy, and Transportation Management), signed in 2007, strengthens the key energy management goals for the federal government and sets more challenging goals than the Energy Policy Act of 2005. The energy reduction and environmental performance requirements of Executive Order 13423 were expanded upon in Executive Order 13514 (Federal Leadership in Environmental, Energy, and Economic Performance), and signed in 2009.

Energy and Independence Security Act of 2007 and Corporate Average Fuel Economy Standards

The Energy and Independence Security Act of 2007 sets federal energy management requirements in several areas, including energy reduction goals for federal buildings, facility management and benchmarking, performance standards for new buildings and major renovations, high-performance buildings, energy savings performance contracts, metering, energy-efficient product procurement, improved fuel economy and reduction in petroleum use and increase in alternative fuel use. The Energy and Independence

Security Act of 2007 also amends portions of the National Energy Policy Conservation Act and includes provisions to increase the supply of renewable alternative fuel sources by setting a mandatory Renewable Fuel Standard, which requires transportation fuel sold in the United States to contain a minimum of 36 billion gallons of renewable fuels annually by 2022. In addition, the law sets the Corporate Average Fuel Economy standard at 35 miles per gallon for passenger cars and light trucks by the year 2020.

State Regulations

California Energy Action Plan II

California's Energy Action Plan II is the state's principal energy planning and policy document (CEC and California Public Utilities Commission [CPUC], 2008). California Energy Action Plan II describes a coordinated implementation plan for state energy policies and refines and strengthens California's original Energy Action Plan I published in 2003. California Energy Action Plan II identifies specific action areas to ensure that California's energy is adequate, affordable, technologically advanced, and environmentally sound. It adopts a loading order of preferred energy resources to meet the state's needs and reduce reliance on natural gas and other fossil fuels, also important for achieving GHG emission reductions from the electricity sector.

Energy efficiency and demand response[1] are considered the first ways to meet the energy needs of California's growing population. Renewable energy and distributed generation are the best ways to achieve this on the supply side. To the extent that energy efficiency, demand response, renewable resources, and distributed generation are unable to satisfy increasing energy and capacity needs, CEC supports clean and efficient fossil fuel-fired generation to meet California's energy needs. The 2008 Energy Action Plan Update provides a status update to the 2005 Energy Action Plan II and continues the goals of the original California Energy Action Plan (CEC and CPUC, 2008).

State of California Integrated Energy Policy Report

Senate Bill (SB) 1389 was signed into law in 2002 and requires the CEC to "conduct assessments and forecasts of all aspects of energy industry supply, production, transportation, delivery and distribution, demand, and prices." These assessments and forecasts are used to develop recommendations for energy policies that conserve state resources, protect the environment, provide reliable energy, enhance the state's economy, and protect public health and safety. The CEC is required to issue a report every 2 years, and the most recent report is the 2016 Integrated Energy Policy Report (CEC, 2017), which provides the results of the CEC's assessments of a variety of energy issues facing California including "environmental performance of the electricity generation system, landscape-scale planning, the response to the gas leak at the Aliso Canyon natural gas storage facility, transportation fuel supply reliability issues, updates on Southern California electricity reliability, methane leakage, climate adaptation activities for the

[1] Demand response is the reduction of customer energy usage during peak periods in order to address system reliability and support the best use of energy infrastructure.

energy sector, climate and sea level rise scenarios, and the California Energy Demand Forecast" (CEC, 2017).

State Alternatives Fuels Plan

The State Alternatives Fuels Plan (California Air Resources Board [CARB] and CEC, 2007) presents strategies and steps that California must take to increase the use of alternative fuels without adversely affecting air quality, water quality, or causing negative health effects. The State Alternatives Fuels Plan recommends alternative fuel targets of 9 percent in 2012, 11 percent in 2017, and 26 percent by 2022. The State Alternatives Fuels Plan also presents a 2050 Vision that extends the plan outcomes and presents a transportation future that greatly reduces the energy needed for transportation, provides energy through a diverse set of transportation fuels, eliminates over-dependency on oil, and achieves an 80 percent reduction in GHG emissions. With these goals, more than 4 billion gasoline gallon equivalents (20 percent) would be displaced by alternative fuels in 2020. CEC estimates that by 2050, alternative fuels could provide more than half of the energy needed to power California's transportation system.

Senate Bill 350

SB 350 was signed into law in October 2015, and establishes a requirement for California to reduce the use of petroleum in cars by 50 percent, to generate half of its electricity from renewable resources, and to increase energy efficiency by 50 percent at new and existing buildings, all by the year 2030.

Title 24 - California Energy Efficiency Standards

The Energy Efficiency Standards for Residential and Nonresidential Buildings specified in Title 24, Part 6 of the California Code of Regulations were established in 1978 in response to a legislative mandate to reduce California's energy consumption. The standards are periodically updated to allow for consideration and possible incorporation of new energy efficiency technologies and methods. The CEC adopted the most recent update to its standards in 2016. These new standards continue to improve upon previous standards for new construction of, and additions and alterations to, residential and non-residential buildings. The next update to the standards is expected in 2019, which will go into effect on January 1, 2020.

Local Regulations

Under Section 53091 of the California Government Code, EBMUD, as a local agency and utility district, is not subject to building and land use zoning ordinances (such as tree ordinances) for projects involving facilities for the production, generation, storage, treatment, or transmission of water. However, EBMUD's practice is to work with local jurisdictions and neighboring communities during project planning and to consider local environmental protection policies for guidance.

City of Oakland General Plan

The *City of Oakland General Plan* (City of Oakland, 1996) Open Space, Conservation, and Recreation Element includes the following policies relevant to energy resources.

> ***Policy CO 13.1*: *Reliable Energy Network*.** Promote a reliable local energy network which meets future needs and long-term economic development objectives at the lowest practical cost.
>
> ***Policy CO 13.2*: *Energy Efficiency*.** Support public information campaigns, energy audits, the use of energy-saving appliances and vehicles, and other efforts which help Oakland residents, businesses, and City operations become more energy efficient.
>
> ***Policy CO 13.3: Construction Methods and Materials*.** Encourage the use of energy-efficient construction and building materials. Encourage site plans for new development which maximize energy efficiency.
>
> ***Policy CO 13.4: Alternative Energy Sources*.** Accommodate the development and use of alternative energy resources, including solar energy and technologies which convert waste or industrial byproducts to energy, provided that such activities are compatible with surrounding land uses and regional air and water quality requirements.

City of Oakland Energy and Climate Action Plan

The Oakland Energy and Climate Action Plan (ECAP) was adopted by City Council on December 4, 2012. Its purpose is to identify and prioritize actions the City can take to reduce energy consumption and GHG emissions. The primary sources of Oakland's GHG emissions are transportation and land use, building energy use, and material consumption and waste. The ECAP includes a 10-year plan with more than 150 actions (Action Items) that will enable Oakland to achieve a 36 percent reduction in GHG emissions for each of these GHG sources, as well as a framework for coordinating implementation, monitoring, and reporting on progress. Between 2016 and 2018, City staff worked with municipal departments, green business groups, social justice organizations, and environmental stakeholders to update the ECAP. This included cataloguing the Action Items that have been completed or are fully underway; reprioritizing existing Action Items based on new economic, technological, or other realities; updating cost estimates; and including the most recent GHG emissions inventory. This revised ECAP does not add any new Action Items to the 2012 version of the document, and the overall goals remain the same as the original document – to reduce GHG emissions 36 percent by 2020 and 83 percent by 2050 (City of Oakland, 2018).

EBMUD Sustainability Policy

EBMUD adopted a sustainability policy in 2008 that focuses on using resources (economic, environmental, and human) in a responsible manner that meets the needs of today without compromising the ability of future generations to meet the needs of tomorrow. The sustainability policy uses a holistic view and minimizes waste; conserves energy and natural resources; promotes long-term economic viability; supports safety and well-being for employees, communities, and customers; and is beneficial to society (EBMUD, 2018c).

EBMUD Strategic Plan

EBMUD's Strategic Plan outlines the goals, strategies, objectives, and key performance indicators that it uses to carry out the mission of managing natural resources, providing reliable, high-quality water and wastewater services at fair and reasonable rates for the people of the East Bay, and by preserving and protecting the environment for future generations. The long-term water supply goal in the Strategic Plan includes a strategy to address climate change. Strategy 4 of the long-term water supply goal notes that EBMUD shall: Maintain an updated Climate Change Monitoring and Response Plan to inform EBMUD's planning efforts for future water supply, water quality, and infrastructure and support sound water and wastewater infrastructure investment decisions (EBMUD, 2016).

EBMUD Climate Change Monitoring and Response Plan

The purpose of the Climate Change Monitoring and Response Plan is to help EBMUD understand the potential climate change threats, prepare adaptation strategies, and guide mitigation of GHG emissions, which contribute to climate change (EBMUD, 2014). The Climate Change Monitoring and Response Plan established objectives for EBMUD, including encouraging and promoting cost-effective use and the generation of renewable energy within its water and wastewater operations.

EBMUD Standard Construction Specifications

EBMUD Standard Construction Specification 01 35 44 (Environmental Requirements), Section 3.4(A) requires implementation of the following measures that are aimed at reductions of emissions, but also ensure energy-efficient use of equipment (EBMUD, 2018b):

- 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.
  - Follow applicable regulations for fuel, fuel additives, and emission standards for stationary, diesel-fueled engines.
  - 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.

- Demolition debris shall be recycled for reuse to the extent feasible.

3.5.3 Impact Analysis

Methodology for Analysis

Consistent with Public Resources Code 21100(b)(3), this impact analysis evaluates the potential for the Project to result in a substantial increase in energy demand and/or wasteful use of fuel, water, or energy during Project construction and operations. The impact analysis is informed by Appendix G of the *CEQA Guidelines*.

The analysis of construction impacts uses a qualitative approach to discuss energy demand from construction activities, and describes conservation measures that would minimize the use of fuel, water, and energy and ensure that they are not used in a wasteful manner. The Project's operational energy impacts would be similar to existing conditions and are therefore discussed qualitatively.

Significance Criteria

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

1. Result in a potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during Project construction or operation.
2. Conflict with or obstruct a state or local plan for renewable energy or energy efficiency.

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 or obstruct a state or local plan for renewable energy or energy efficiency:*** The Project would comply with federal standards for vehicle fuel efficiency because all vehicles and machinery that are sold within the United States are required to meet those standards. EBMUD has long been committed to renewable energy generation and wise energy use, and generates energy through hydropower, solar power, and biogas production at its wastewater treatment plants. However, the Project would neither affect the generation nor use of renewable energy. The Project would comply with other applicable energy efficiency policies or standards including EBMUD standard practices and procedures that require a variety of measures to reduce the inefficient use of fuels. Therefore, there would be no impact associated with conflicts with energy plans and policies related to renewable energy or energy efficiency.

Impacts and Mitigation Measures

Impact EN-1: Result in wasteful, inefficient, or unnecessary consumption of energy resources during Project construction or operation. (Criterion 1)

Construction

Construction of the Project would require the use of various fuels (primarily gasoline, diesel, and motor oil) for a variety of construction activities, including excavation, grading, and vehicle travel. During these activities, using emissions estimated by CalEEMod as an indicator of fuel consumption, fuel for construction worker commute trips and material hauling trips to and from the site would be minor in comparison to the fuel used by construction equipment. Construction would also indirectly use energy for the production of construction materials.

While the precise amount of construction energy consumption is uncertain, use of these fuels would be consistent with typical construction and manufacturing practices and would not be wasteful or unnecessary because doing so would not be economically sustainable for contractors. Construction vehicles and equipment would comply with federal standards for vehicle fuel efficiency because all vehicles and machinery that are sold in the United States must meet those standards. Construction activities have been designed to minimize energy use as much as possible; EBMUD would store as much excavated soil on site as possible and reuse the soils as backfill, so as to minimize fuel consumption associated with haul trucks for soil disposal.

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, Environmental Requirements. Section 3.4(A), Air Quality and Emissions Control, of Standard Construction Specification 01 35 44 requires a variety of measures that would reduce the inefficient use of fuels, including limiting idling, keeping engines properly tuned, maintaining appropriate tire pressure, requiring the use of alternative-fueled construction equipment, and recycling or reusing construction waste or demolition materials to the extent feasible.

Because Section 3.4(A), Air Quality and Emissions Control, of EBMUD's Standard Construction Specification 01 35 44, Environmental Requirements, has been incorporated into the Project and includes best management practices (BMPs) to ensure the efficient use of construction-related fuels, the Project construction impacts related to energy use and impacts on energy resources would be less than significant. The EBMUD Practices and Procedures Monitoring and Reporting Plan (Appendix E) lists the applicable standard specifications language.

Operation

Operational energy use would be similar to or less than existing operations, and would primarily consist of occasional trips to the site by maintenance workers. The Project would not increase operational energy consumption.

Significance Determination Before Mitigation

Less than significant.

Mitigation Measure

None required.

Cumulative Impact Analysis

As discussed above, the Project's energy impacts would be primarily associated with the construction phase and there would be no operational impacts. Therefore, the cumulative analysis below focuses on other projects that could be constructed in the City of Oakland within the vicinity of the Project site at the same time. Based on information of current and pending projects from various agencies, ten projects within a 1-mile distance of the Project site were identified, three of which whose construction could occur during the same time frame as the Project.

Construction of these projects would result in the consumption of fuels in construction equipment as well as vehicles used for worker commute and material hauling. However, as with the Project, use of these fuels would be consistent with standard construction and manufacturing practices and would not be considered wasteful or unnecessary. Additionally, all construction vehicles and equipment would be required to comply with federal standards for vehicle fuel efficiency. Therefore, although the use of energy for construction would constitute an irreversible use of a finite resource, given that construction activities are short term and given that construction practices and equipment used would be consistent with applicable standards and regulations, this would not be considered a cumulatively significant impact. The Project's contribution to this less-than-significant cumulative impact would be further reduced by the implementation of a number of EBMUD standard practices and procedures, applicable to all EBMUD projects, including Standard Construction Specification 01 35 44, Environmental Requirements.

The Project would not contribute considerably to any cumulative impact related to energy usage.

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3.6 Geology, Soils, and Seismicity

This section describes the physical and regulatory setting for geologic, soil, and seismic resources and identifies and evaluates potential impacts associated with geology, soils, and seismic resources that could result from construction and operation of the Project. For the purposes of this discussion, the Project site is shown on Figure 2-1 in Chapter 2, Project Description.

3.6.1 Environmental Setting

Site Geology

The Central Reservoir and the on-site pipelines occupy the flatlands between the San Francisco Bay and the Oakland-Berkeley Hills. A geologic map of the Oakland East Quadrangle indicates that the Project area is situated on Pleistocene-age alluvial fan and fluvial deposits (Qpaf). These deposits are characterized as dense, gravely, and clayey sand or gravel that become finer-grained sandy clay at shallower depths, and have an estimated maximum thickness of approximately 165 feet (USGS, 2000). These Qpaf deposits are composed of the eroded material from the Oakland-Berkeley Hills to the east and northeast, which are part of the larger Southern Coast Ranges Province. The Oakland-Berkeley Hills are drained by numerous creeks that flow toward the San Francisco Bay, a process that created the alluvial fan where the Project area is located.

Faults and Seismicity

The Project area is in a seismically active region of California that contains both active (Holocene age within the last 11,000 years; the United States Geological Survey [USGS] uses 15,000 years) and potentially active (Quaternary age or within the last 1.6 million years) faults (CGS, 2010). As shown in Figure 3.6-1 and listed below in Table 3.6-1, the Project site is near multiple known active faults. Throughout the Project region, there is potential for damage resulting from movement along any one of a number of active faults, seismic shaking, and seismically induced ground failures (e.g., liquefaction).

The Working Group on California Earthquake Probabilities (WGCEP), comprised of the USGS, the California Geological Survey (CGS), and the Southern California Earthquake Center, evaluates the probability of one or more earthquakes of M_W[1] 6.7 or higher occurring in the state of California over the next 30 years. The San Francisco Bay Area as a whole has an estimated 72 percent chance of experiencing an earthquake of M_w 6.7 or higher over the next 30 years; among the various active faults in the region, the Hayward and Calaveras Faults are the most likely to cause such an event (WGCEP, 2015a).

1 The moment magnitude (M_W) of an earthquake is the measure of the total energy expended during an earthquake; it is used here in place of the local magnitude (M_L) (i.e., the Richter magnitude scale), as local magnitude is an inaccurate measure of large earthquakes (USGS, 2018).

SOURCE: USGS, 2010

EBMUD Central Reservoir Replacement Project

Figure 3.6-1
Regional Faults

ESA

TABLE 3.6-1
NEARBY ACTIVE FAULTS

Fault or Fault Zone	Approximate Distance from Project Site	Fault Classification	Historical Seismicity [a]	Maximum Credible Earthquake [b]
Hayward, Northern Section	1.3 miles northeast	Active	M6.8 in 1868 Many <M4.5	7.1
Concord-Green Valley, Avon Section	14.5 miles northeast	Active	Active creep	6.9
Calaveras, Northern Section	14.5 miles southeast	Active	M5.6 to M6.4 in 1861 M4 to M4.5 in 1970 and 1990	6.8
San Andreas, Peninsula Section	17 miles west	Active	M7.1 in 1989 M8.25 in 1906 M7.0 in 1838 Many <M6	7.9

NOTES:
[a] M denoted magnitude and does not differentiate between the older Richter and more recent moment magnitude measurement scales.
[b] The maximum credible earthquake is an estimated moment magnitude (M) for the largest earthquake capable of occurring on a fault.

SOURCES: CGS, 2010; WGCEP, 2015a

According to the WGCEP, there is a 32 percent probability that there will be a magnitude 6.7 earthquake, or larger, in the next 30 years on the Hayward Fault; as modeled by the USGS ShakeMap (USGS, 2016a), very strong to violent groundshaking is expected.

According to the Earthquake Zones of Required Investigation Oakland East Quadrangle (CGS, 2003a), the Central Reservoir and its associated pipeline infrastructure are not located within any Earthquake Fault Zone as delineated by the State Geologist, as required by the Alquist-Priolo Earthquake Fault Zoning Act; no known active faults have been mapped underneath the Project site.

Hayward Fault Zone

The Hayward Fault Zone extends northwest approximately 55 miles from San Jose to Point Pinole. It is a right-lateral, strike-slip fault and is designated as an Alquist-Priolo Earthquake Fault Zone. The fault is active, producing large historic earthquakes, fault creep, and abundant geomorphic evidence of fault rupture. The Hayward Fault Zone has a 14.11 percent probability of generating an earthquake with a magnitude equal to or greater than 6.7 M_w over the next 30 years (WGCEP, 2015b).

Concord-Green Valley Fault

Formerly considered two faults because their surface expressions are separated by Suisun Bay, the Concord-Green Valley Fault is a right-lateral, strike-slip fault and is the easternmost expression of the northwest movement in the San Andreas Fault System in the San Francisco Bay Area. Segments of the fault on both sides of Suisun Bay are historically active, and the fault is designated as an Alquist-Priolo Earthquake Fault Zone. The Concord-Green Valley Fault has a 3.53 percent probability of generating an earthquake with a magnitude equal to or greater than 6.7 over the next 30 years (WGCEP, 2015b).

Calaveras Fault Zone

The 75-mile-long Calaveras Fault Zone extends north from Hollister through the Diablo Range, east of San Jose, and along the Pleasanton-Dublin-San Ramon urban corridor. The Calaveras Fault is not a single fault trace but rather a system of active faults designated as an Alquist-Priolo Earthquake Fault Zone. The Calaveras Fault has a 6.98 percent probability of generating an earthquake with a magnitude equal to or greater than 6.7 over the next 30 years (WGCEP, 2015b).

San Andreas Fault Zone

The San Andreas Fault Zone is the major structural feature in the region and forms a boundary between the North American and Pacific tectonic plates (USGS, 2016). The San Andreas Fault is a major northwest-trending, right-lateral, strike-slip fault zone. The fault zone extends for about 600 miles from the Gulf of California in the south to Cape Mendocino in the north. The San Andreas is not a single fault trace but rather a system of active faults that diverges from the main fault south of the city of San Jose. The San Andreas Fault Zone has produced numerous large earthquakes, including the 1906 San Francisco earthquake. The San Andreas Fault Zone has a 6.4 percent probability of generating an earthquake in the San Francisco Bay Area with a magnitude equal to or greater than 6.7 M_w over the next 30 years (WGCEP, 2015b).

Groundshaking

The amplitude and frequency content of groundshaking is related to the size of an earthquake, the distance from the causative fault, the type of fault (e.g., strike-slip), and the response of the geologic materials at the site. Groundshaking can be described in terms of acceleration, velocity, and displacement of the ground. As a rule, the greater the earthquake magnitude and the closer the fault rupture to a site, the greater the intensity of groundshaking. The groundshaking hazard estimated at the Project site using the CGS Ground Motion Interpolator estimates a peak ground acceleration of 0.667g (CGS, 2008b). Based on the Modified Mercalli Intensity Scale, this peak ground acceleration would result in an Intensity Value of VIII, very strong shaking, at the Project site.

Liquefaction and Lateral Spreading Potential

Liquefaction is the rapid loss of shear strength experienced in saturated, predominantly loose granular soils below the groundwater level during strong earthquake groundshaking, and occurs due to an increase in pore water pressure (VT, 2013). Liquefaction-induced lateral spreading is defined as the finite, lateral displacement of gently sloping ground as a result of pore-pressure buildup or liquefaction in a shallow underlying deposit during an earthquake. Liquefaction-induced lateral spreading is dependent on many complex factors, including the intensity and duration of groundshaking, particle-size distribution, and density of the soil.

The potential damaging effects of liquefaction include differential settlement, loss of ground support for foundations, ground cracking, heaving and cracking of structure slabs due to sand boiling, and buckling of deep foundations due to ground settlement. Dynamic settlement (i.e., pronounced consolidation and settlement from seismic shaking) may also occur in loose, dry sands above the water table, resulting in settlement of and possible damage to overlying structures. In general, a relatively high potential for liquefaction exists in loose, sandy soils that are within 50-feet of the ground surface and are saturated (below the groundwater table). Lateral spreading can move blocks of soil, placing strain on buried pipelines that can lead to leaks or pipeline failure.

Localities most susceptible to liquefaction-induced damage are underlain by loose, water-saturated, granular sediment within 40-feet of the ground surface (CGS, 2003b). As the Project site is underlain completely by alluvial deposits that surround the San Francisco Bay, there is potential for liquefaction at the Project site. The CGS published a composite map of the Oakland East Quadrangle overlain with Alquist-Priolo Earthquake Fault Zones and Seismic Hazard Zones (i.e., liquefaction and earthquake-induced landslides). The map indicates that the Project site is adjacent to Liquefaction Zones to the south of the Central Reservoir (CGS, 2003a).

Landslides

Slope failures, commonly referred to as landslides, include many phenomena that involve the downslope displacement and movement of material, either triggered by static (i.e., gravity) or dynamic (i.e., earthquake) forces. Slope stability depends on several complex variables, including the geology, structure, and the amount of groundwater present, as well as external processes such as climate, topography, slope geometry, and human activity. Landslides can occur on slopes of 15 percent or less, but the probability is greater on steeper slopes that exhibit old landslide features such as scarps, slanted vegetation, or transverse ridges. Landslides typically occur within slide-prone geologic units that contain excessive amounts of water or are located on steep slopes, or where planes of weakness are parallel to the slope angle.

According to the composite regulatory map that depicts Seismic Hazard Zones for the Oakland East Quadrangle, the Project site is bounded by Earthquake-Induced Landslide Zones directly to the south and north of the Central Reservoir, as well as approximately 600-feet to the east (CGS, 2003a).

Expansive Soils

Expansive soils are soils that possess a “shrink-swell” characteristic, also referred to as linear extensibility. Shrink-swell is the cyclic change in volume (expansion and contraction) that occurs in fine-grained clay sediments from the process of wetting and drying; the volume change is reported as a percent change for the whole soil. Changes in soil moisture can result from a variety of sources, including rainfall, landscape irrigation, utility leakage, roof drainage, etc. Expansive soils are typically very fine-grained and have a high to very high percentage of clay. Structural damage may occur incrementally over a long period of time, usually as a result of inadequate soil and foundation engineering or the placement of structures directly on expansive soils. The Natural Resources Conservation Service (NRCS) relies on linear extensibility measurements for the shrink-swell potential of soils. If the linear extensibility is more than 3 percent, shrinking and swelling may cause damage to building, roads, and other structures (NRCS, 2018).

The NRCS Web Soil Survey provides soil data and maps for soils across the nation. The Web Soil Survey has no available data regarding the linear extensibility of the soils at the Project site (NRCS, 2017).

Corrosive Soils

The corrosivity of soils pertains to the potential for certain soils to cause an electrochemical or chemical reaction that can corrode or weaken uncoated steel or concrete. The rate at which these materials corrode depends on several variables, including but not limited to soil moisture, texture, mineral content, and acidity. The rate of corrosion of steel is based on soil moisture, particle-size distribution, acidity, and electrical conductivity. Corrosion of concrete is based on the sulfate and sodium content, texture, moisture, and acidity of the soil. The risk of corrosion is expressed as low, moderate, or high. The Web Soil Survey has no available data regarding the corrosivity of the soils at the Project site (NRCS, 2017).

Subsidence

Subsidence is the gradual lowering of the land surface due to compaction of underlying materials. Subsidence can occur as a result of the extraction of groundwater and oil, which can cause subsurface clay layers to compress and lower the overlying land surface. The subsidence occurs because the presence of water in the pore spaces in between grains helps to support the skeletal structure of the geologic unit. If the water is removed, the structure becomes weaker and can subside. Project activities do not include any extraction of groundwater or oil.

Paleontological Setting

Paleontological resources are the fossilized remains of plants and animals, including vertebrates (animals with backbones), invertebrates (e.g., starfish, clams, ammonites, and marine coral), microscopic plants and animals (microfossils), and trace fossils (footprints, burrows, etc.). The age and abundance of fossils depend on the location, topographic setting, and particular geologic formation in which they are found. Fossil discoveries not only provide a historical record of past plant and animal life but can assist geologists in dating rock formations. Fossil discoveries can expand our understanding of the time periods and the geographic range of existing and extinct flora and fauna.

The Society of Vertebrate Paleontology (SVP) established guidelines for the identification, assessment, and mitigation of adverse impacts on nonrenewable paleontological resources (SVP, 2010). Most practicing paleontologists in the United States adhere closely to the SVP's assessment, mitigation, and monitoring requirements as outlined in these guidelines, which were approved through a consensus of professional paleontologists. Many federal, state, county, and city agencies have either formally or informally adopted the SVP's standard guidelines for the mitigation of adverse construction-related impacts on paleontological resources. The SVP has helped define the value of paleontological resources and, in particular, indicates that geologic units of high paleontological potential are those from which vertebrate or significant invertebrate or plant fossils have been recovered in the past (i.e., are represented in institutional collections). Geologic units of low paleontological potential are those that are not known to have produced a substantial body of significant paleontological material. As such, the sensitivity of an area with respect to paleontological resources hinges on its geologic setting and whether significant fossils have been discovered in the area or in similar geologic units.

The Central Reservoir was constructed on early Pleistocene alluvium weathered from Franciscan Complex sedimentary rocks of the Cretaceous period (Witter et al., 2007). Pleistocene sediments date back between 0.78–2.58 million years ago and have a rich fossil history in central and northern California. The most common Pleistocene terrestrial mammal fossils include the bones of mammoth, bison, deer, and small mammals, but other taxa (including horse, lion, cheetah, wolf, camel, antelope, peccary, mastodon, capybara, and giant ground sloth) have been reported, as well as reptiles such as frogs, salamanders, and snakes. The abundant fossil record listed above has been vital in studies of extinction (e.g., Sandom et al., 2014), ecology (e.g., Connin et al., 1998), and climate change (e.g., Roy et al., 1996).

Because of the likelihood to encounter significant paleontological resources in late Pleistocene older surficial sediments, Pleistocene is considered to have high paleontological sensitivity per the SVP standards. However, despite the general sensitivity of Pleistocene alluvium, the Project would be constructed within the existing reservoir basin, which is already highly disturbed. Paleontological resources are thus not expected to be present in the Project site.

3.6.2 Regulatory Framework

Federal Regulations

Federal regulations that apply directly to addressing the seismic and geotechnical aspects of the Project have been delegated to the state level.

State Regulations

Alquist-Priolo Earthquake Fault Zoning Act

The Alquist-Priolo Earthquake Fault Zoning Act (Alquist-Priolo Act) was passed in 1972 to mitigate the hazard of surface faulting to structures for human occupancy. In accordance with the Alquist-Priolo Act, the State Geologist established regulatory zones, called "Earthquake Fault Zones," around the surface traces of active faults and published maps showing the earthquake fault zones. Within the fault zones, buildings for human occupancy cannot be constructed across the surface trace of active faults. Each earthquake fault zone extends approximately 200- to 500-feet on either side of the mapped fault trace because many active faults are complex and consist of more than one branch that may experience ground surface rupture. California Code of Regulations (CCR) Title 14, Section 3601(e) defines buildings intended for human occupancy as those that would be inhabited for more than 2,000 hours per year. The Project site is not mapped within an active earthquake fault zone per the Alquist-Priolo Act and does not include any buildings that meet the CCR Title 14 criterion for human occupancy. Therefore, the Alquist-Priolo Act does not apply to the Project.

California Building Code

The California Building Code (CBC) was adopted by the California Building Standards Commission on January 1, 2017, and is based on the 2015 International Building Code with the addition of more extensive structural seismic provisions. The CBC is included in Title 24 of the CCR, California Building Standards Code, and is a compilation of three types of building standards from three different origins:

- Building standards that have been adopted by state agencies without change from building standards contained in national model codes.;
- Building standards that have been adopted and adapted from the national model code standards to meet California conditions.
- Building standards authorized by the California legislature that constitute extensive additions not covered by the model codes that have been adopted to address particular California concerns.

Seismic sources and the procedures used to calculate seismic forces on structures are defined in Section 1613 of the CBC. The CBC requires that all structures and permanently attached nonstructural components be designed and built to resist the effects of earthquakes. The CBC also addresses grading and other geotechnical issues, building specifications, and non-building structures. EBMUD’s Reservoir Design Guide requires that all projects comply with CBC requirements (EBMUD, 2017b), which would make the Project consistent with the CBC.

California Division of Safety of Dams

Since 1929, the state of California has supervised the construction and operation of dams to prevent failure and to safeguard life and property. The California Division of Safety of Dam (DSOD) supervises the construction, enlargement, alteration, repair, maintenance, operation, and removal of dams and reservoirs. DSOD has jurisdiction over all dams in the state that are not federally owned, that are 25-feet or higher, and that have a storage capacity of 50 acre-feet of water or greater, with the exclusion of dams that are 6-feet or less in height (regardless of storage) and dams with a storage capacity of 15 acre-feet or less (regardless of height). DSOD conducts annual inspections of dams under its jurisdiction and periodically requires that they be evaluated with respect to safety and seismic stability.

The Central Reservoir is under DSOD jurisdiction due to its height (approximately 55 feet) and also due to its capacity (approximately 485 acre-feet) (DWR, 2018).

Seismic Hazards Mapping Act

The Seismic Hazards Mapping Act was passed in 1990 following the Loma Prieta earthquake to reduce threats to public health and safety and to minimize property damage caused by earthquakes. The act requires the State Geologist to delineate various seismic hazard zones, and cities, counties, and other local permitting agencies to regulate certain development projects within these zones. For projects that would locate structures for human occupancy within designated Zones of Required Investigation, the act requires project applicants to perform a site-specific geotechnical investigation to identify the potential site-specific seismic hazards and corrective measures prior to receiving building permits. The *CGS Guidelines for Evaluating and Mitigating Seismic Hazards* (Special Publication 117A) provides guidance for evaluating and mitigating seismic hazards (CGS, 2008a). The CGS is in the process of producing official maps based on USGS topographic quadrangles, as required by the act. The Project site lies within the Oakland East Quadrangle, and the CGS has identified the potential for seismic hazards at the Project site.

California Excavation Notification Requirements

CCR Section 4216 requires that construction contractors report a project that involves excavation 48-hours prior to breaking ground. CCR Section 4216 allows owners of buried installations to identify and mark the location of its facilities before any nearby excavation projects commence. Adherence to CCR Section 4216 by contractors of projects reduces the potential of inadvertent pipeline and utility damage and leaks. All contractors are required to comply with California excavation notification requirements, which would make the Project consistent with California excavation notification requirements.

California Occupational Safety and Health Administration Regulations

Occupational safety standards exist in federal and state laws to minimize worker safety risks from both physical and chemical hazards in the workplace. In California, the California Division of Occupational Safety and Health (Cal/OSHA) and the federal Occupational Safety and Health Administration (OSHA) are the agencies responsible for ensuring worker safety in the workplace.

The OSHA Excavation and Trenching standard (29 Code of Federal Regulations [CFR] 1926.650) covers requirements for excavation and trenching operations, which are among the most hazardous construction activities. OSHA requires that all excavations in which employees could potentially be exposed to cave-ins be protected by sloping or benching the sides of the excavation, supporting the sides of the excavation, or placing a shield between the side of the excavation and the work area. Cal/OSHA is the implementing agency for both state and federal OSHA standards. All contractors are required to comply with OSHA regulations, which would make the Project consistent with OSHA.

NPDES Construction General Permit

Construction associated with the Project would disturb more than 1 acre of land surface potentially affecting the quality of stormwater discharges into waters of the United States.

The Project would therefore be subject to the *National Pollutant Discharge Elimination System (NPDES) General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities* (Order 2009-0009-DWQ, NPDES No. CAS000002, Construction General Permit; as amended by Orders 2010-0014-DWQ and 2012-006-DWQ). The Construction General Permit regulates discharges of pollutants in stormwater associated with construction activity to waters of the United States from construction sites that disturb 1 or more acres of land surface, or that are part of a common plan of development or sale that disturbs more than 1 acre of land surface. The permit regulates stormwater discharges associated with construction or demolition activities, such as clearing and excavation; construction of buildings; and linear underground projects, including the installation of water pipelines and other utility lines.

The Construction General Permit requires that construction sites be assigned a Risk Level of 1 (low), 2 (medium), or 3 (high), based both on the sediment transport risk at the site and the receiving waters risk during periods of soil exposure (e.g., grading and site stabilization). The sediment risk level reflects the relative amount of sediment that could potentially be discharged to receiving water bodies and is based on the nature of the construction activities and the location of the site relative to receiving water bodies. The receiving waters risk level reflects the risk to the receiving waters from the sediment discharge. Depending on the risk level, the construction projects could be subject to the following requirements:

- Effluent standards
- Good site management "housekeeping"
- Non-stormwater management
- Erosion and sediment controls
- Run-on and run-off controls
- Inspection, maintenance, and repair
- Monitoring and reporting requirements

The Construction General Permit requires the development and implementation of a Stormwater Pollution Prevention Plan (SWPPP) that includes specific best management practices (BMPs) to prevent sediment and pollutants from contacting stormwater from moving off site into receiving waters. The BMPs fall into several categories, including erosion control, sediment control, waste management, and good housekeeping, and are intended to protect surface water quality by preventing the off-site migration of eroded soil and construction-related pollutants from the construction area. Routine inspection of all BMPs is required under the provisions of the Construction General Permit. In addition, the SWPPP is required to contain a visual monitoring program, a chemical monitoring program for non-visible pollutants, and a sediment monitoring plan if the site discharges directly to a water body listed on the 303(d) list for sediment.[2]

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2 Clean Water Act Section 303(d) List of Impaired Water Bodies triggers development of a Total Maximum Daily Load (TMDL) for that water body and a plan to control the associated pollutant/stressor on the list. The TMDL is the maximum amount of a pollutant/stressor that a water body can assimilate and still meet the water quality standards. Refer to Section 3.9, Hydrology and Water Quality for more information regarding the 303(d) list.

The SWPPP must be prepared before the construction begins. The SWPPP must contain a site map(s) that delineates the construction work area, existing and proposed buildings, parcel boundaries, roadways, stormwater collection and discharge points, general topography both before and after construction, and drainage patterns across the Project site. The SWPPP must list BMPs and the placement of those BMPs that the applicant would use to protect stormwater run-off. Examples of typical construction BMPs include scheduling or limiting certain activities to dry periods, installing sediment barriers such as silt fence and fiber rolls, and maintaining equipment and vehicles used for construction. Non-stormwater management measures include installing specific discharge controls during certain activities, such as paving operations, vehicle and equipment washing, and fueling. The Construction General Permit also sets post-construction standards (i.e., implementation of BMPs to reduce pollutants in stormwater discharges from the site following construction).

At the Project site, the Construction General Permit is implemented and enforced by the San Francisco Bay Regional Water Quality Control Board (SFBRWQCB), which administers the stormwater permitting program. Dischargers are required to electronically submit a notice of intent and permit registration documents in order to obtain coverage under this Construction General Permit. Dischargers are responsible for notifying the SFBRWQCB of violations or incidents of non-compliance, as well as for submitting annual reports identifying deficiencies of the BMPs and how the deficiencies were corrected. The risk assessment and SWPPP must be prepared by a State Qualified SWPPP Developer, and implementation of the SWPPP must be overseen by a State Qualified SWPPP Practitioner. A Legally Responsible Person, who is legally authorized to sign and certify permit registration documents, is responsible for obtaining coverage under the permit.

Paleontological Resources

Paleontological resources are also afforded protection by environmental legislation set forth under the California Environmental Quality Act (CEQA). Appendix G (part V) of the *CEQA Guidelines* provides guidance relative to significant impacts on paleontological resources, stating that a project will normally result in a significant impact on the environment if it will directly or indirectly destroy a unique paleontological resource or site or unique geologic feature". The *CEQA Guidelines* do not define "directly or indirectly destroy," but it can be reasonably interpreted as the physical damage, alteration, disturbance, or destruction of a paleontological resource. The *CEQA Guidelines* also do not define the criteria or process to determine whether a paleontological resource is significant or "unique." The SVP has set significance criteria for paleontological resources (1995, 2010). Most practicing professional vertebrate paleontologists adhere closely to the SVP's assessment, mitigation, and monitoring requirements as specifically provided in its standard guidelines. Most state regulatory agencies with paleontological laws, ordinances, regulations, and standards accept and use the professional standards set forth by the SVP.

Local Regulations

Under Section 53091 of the California Government Code, EBMUD, as a local agency and utility district, is not subject to building and land use zoning ordinances (such as tree ordinances) for projects involving facilities for the production, generation, storage, treatment, or transmission of water. However, EBMUD's practice is to work with local jurisdictions and neighboring communities during project planning and to consider local environmental protection policies for guidance.

City of Oakland General Plan

The City of Oakland General Plan (2004) is a comprehensive, long-range plan for the physical development of the city that identifies goals and policies. The General Plan includes the following geology, soils, and seismicity policies that are relevant to the Project:

- **Open Space, Conservation, and Recreation Element**

  Policy CO-1.2: **Soil Contamination Hazards**. Minimize hazards associated with soil contamination through the appropriate storage and disposal of toxic substances, monitoring of dredging activities, and clean-up of contaminated sites. In this regard, require soil testing for development of any site or dedication of any parkland or community garden where contamination is suspected due to prior activities on the site.

  Objective CO-2: Land Stability. To minimize safety hazards, environmental impacts, and aesthetic impacts associated with development on hillsides and in seismic high-risk areas.

  Policy CO-2.1: **Slide Hazards**. Encourage development practices that minimize the risk of landslides.

  Policy CO-2: **Unstable Geologic Features**. Retain geologic features known to be unstable, including serpentine rock, areas of known landslides, and fault lines, as open space. Where feasible, allow such lands to be used for low-intensity recreational activities.

  Action CO-2.2.1: **Geo-technical Study Requirements.** Maintain Standard Operating Procedures in the Office of Planning and Building, which require geotechnical studies for major developments in areas with moderate to high groundshaking or liquefaction potential or other geologically unstable features.

- **Safety Element**

  Policy GE-1: Develop and continue to enforce and carry out regulations and programs to reduce seismic hazards and hazards from seismically triggered phenomena.

  Policy GE-2: Continue to enforce ordinances and implement programs that seek specifically to reduce the landslide and erosion hazards.

Policy GE-4: Work to reduce potential damage from earthquakes to "lifeline" utility and transportation systems.

Action GE-4.4: As knowledge about the mitigation of geologic hazards increases, encourage public and private utility providers to develop additional measures to further strengthen utility systems against damage from earthquakes, and review and comment on proposed mitigation measures.

EBMUD Standard Construction Specifications

EBMUD's Standard Construction Specification 01 35 44 (Environmental Requirements), includes practices and procedures for preventing soil erosion, as described below.

- **Section 1.1(B), Site Activities**
  - 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.
  - Maintain construction sites to ensure that drainage from these sites will minimize erosion of stockpiled or stored materials and the adjacent native soil material (EBMUD, 2018).
- **Section 1.3(A), Storm Water Management**
  - Requires that, before the start of construction, the contractor must submit a SWPPP that describes measures that shall be implemented to prevent the discharge of contaminated stormwater run-off 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.
- **Section 3.9, Protection of Cultural and Paleontological Resources**
  - Defines provisions for protection of cultural and paleontological resources during construction. The contractor would be required to comply with the following:
    - Discovery of paleontological resources requires that all construction activities immediately cease at, and within 100 feet of the location of discovery.
      - The Contractor shall immediately notify the Engineer who will engage a qualified paleontologist provided by EBMUD 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.

- EBMUD 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 EBMUD, and implemented to the satisfaction of the paleontologist. In consultation with EBMUD, the paleontologist will determine when construction can resume.

EBMUD's Standard Construction Specification 01 35 24, Project Safety Requirements, includes practices and procedures for preventing subsidence and soil collapse, as described below.

- **Section 1.3(C), Excavation Safety Plan**
  - 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, dewatering, means of access and egress, storage of materials, and equipment restrictions. If plan is modified or changed, submit revised plan (EBMUD 2017a).

EBMUD Standard Practices

Reservoirs

EBMUD's Reservoir Design Guide establishes the minimum requirements to follow in the design of EBMUD above- and belowground drinking water reservoirs. The Reservoir Design Guide provides a list of goals, with each project design team using its engineering judgment for project-specific applications. Chapter 4 of the Reservoir Design Guide includes criteria specific to the design of prestressed concrete reservoirs, which is the type of reservoir design proposed for the Central Reservoir site. The Reservoir Design Guide requires the completion of a geotechnical investigation during design and incorporation of geotechnical design recommendations in project plans and specifications. EBMUD also follows the applicable seismic design standards found in the latest editions of the CBC, American Society of Civil Engineers 7 (ASCE-7 Minimum Design Loads for Buildings and Other Structures), and the American Water Works Association (AWWA D110 Wire- and Strand-wound, Circular, Prestressed Concrete Water Tanks) (EBMUD, 2017b).

Pipelines

To address geologic hazards, EBMUD uses two primary Engineering Standard Practices for the design of water pipelines in its distribution system. Engineering Standard Practice 512.1, Water Main and Services Design Criteria, establishes basic criteria for the design of water pipelines and establishes minimum requirements for pipeline construction materials. Engineering Standard Practice 550.1, Seismic Design Requirements, addresses seismic design of the pipelines to withstand seismic hazards including groundshaking, and requires that EBMUD establish project-specific seismic design criteria for pipelines with a diameter of greater than 12-inches.

Practices and procedures to avoid seismic hazards include selecting appropriate routing to avoid seismic hazards, use of appropriate materials to withstand seismic hazards, and providing flexibility at locations where the pipeline crosses from one soil condition to another. Engineering Standard Practice 550.1 also requires the use of steel pipe with restrained joints or the equivalent to address seismic hazards.

Engineering Standard Practice 550.1 is based on Guidelines for the Seismic Design of Oil and Gas Pipeline Systems prepared by the American Society of Civil Engineers Committee on Gas and Liquid Fuel Lifelines in 1984. In addition to the practices and procedures listed above, EBMUD follows the recommendations of the AWWA for the design and installation of steel pipe, including design for the appropriate wall thickness, external loadings, pipeline supports, pipe joints, fittings and appurtenances, corrosion control, and protective coatings and linings.

3.6.3 Impact Analysis

Methodology for Analysis

General

Information for the assessment of impacts on geology, soils, and seismicity is based on a review of literature research (geologic, seismic, and soils reports and maps), information from geologic and seismic databases, and the City of Oakland General Plan. This information was used to identify potential impacts on workers, the public, or the environment.

The Project would be regulated by the various laws, regulations, and policies summarized in the *Regulatory Framework* section. Project compliance with applicable federal, state, and local laws and regulations is assumed in this analysis, and local and state agencies would be expected to continue to enforce applicable requirements to the extent that they do so now. Note that compliance with many of the regulations is a condition of permit approval. As described in more detail below, the analysis of geologic, soils, and seismic impacts in this section takes into account that EBMUD would incorporate into its facility designs the engineering recommendations provided by the geotechnical investigation.

Paleontological Resources

The paleontological analysis identifies the potential to encounter paleontological resources (i.e., plant, animal, or invertebrate fossils or microfossils) during excavations associated with the Project. A potentially significant impact on paleontological resources would occur if fossil resources were damaged or destroyed during construction activities. The SVP paleontological potential assessment can be used to identify where mitigation measures are needed to avoid a significant impact, primarily when construction would move or excavate previously undisturbed geologic bedrock or sediments with high paleontological potential.

Significance Criteria

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

1. Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:
    a. 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 CGS Special Publication 42 (2018).
    b. Strong seismic groundshaking.
    c. Seismic-related ground failure, including liquefaction.
    d. Landslides.
2. Result in substantial soil erosion or the loss of topsoil.
3. 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.
4. Be located on expansive[3] soil, creating substantial direct or indirect risks to life or property.
5. Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater.
6. Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.

[3] The CBC, based on the International Building Code and the now defunct Uniform Building Code, no longer includes a Table 18-1-B, which used to define expansive soils. Instead, Section 1803.5.3 of the CBC describes the criteria for analyzing expansive soils.

Criteria Requiring No Further Evaluation

Criteria listed above that are not applicable to actions associated with the Project are identified below, along with the supporting rationale as to why further consideration is unnecessary and a no-impact determination is appropriate.

- ***Criterion 1(a): 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.*** The Project site is not within any mapped fault zones. Therefore, there would be no impacts associated with rupture of a fault.
- ***Criterion 5: 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.*** Wastewater generation or disposal is not a part of the Project; therefore, land would not be used for the 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. Therefore, there would be no impacts associated with capability of soils to dispose of wastewater.

Impacts and Mitigation Measures

Impact GEO-1: Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving: strong seismic groundshaking; seismic-related ground failure (liquefaction, lateral spreading); or landslides. (Criterion 1(b) (c) (d))

Seismic-related groundshaking and the hazardous conditions created by it (e.g., liquefaction, lateral spreading, and landslides) present a serious risk to people and structures. As described above in the *Environmental Setting*, there is a 14.11 percent probability that there will be a magnitude 6.7 earthquake, or larger in the next 30 years on the Hayward Fault, and very strong to violent groundshaking is expected. Groundshaking of this magnitude is known to trigger secondary hazardous conditions (e.g., liquefaction, lateral spreading, and landslides), and would result in potentially significant impacts on the Project site. To withstand strong seismic groundshaking and seismic-related ground failure, the tanks would be constructed on an engineered foundation. The foundation would consist of the existing soil foundation reinforced with Cement Deep Soil Mixed (CDSM) columns, overlain with a 30-foot thick fill pad consisting of soil reinforced with cement and/or lime.

In compliance with EBMUD's Reservoir Design Guide, a design-level geotechnical investigation would also be conducted subsequent to the reservoir demolition to identify the potential for seismic hazards. EBMUD would incorporate into the Project design the recommendations outlined in the geotechnical investigation. Additionally, EBMUD's Reservoir Design Guide specifies minimum requirements to follow in the design of drinking water reservoirs. The Project design would follow the CBC requirements as well as EBMUD's Engineering Standard Practices 512.1 and 550.1 for reservoir and pipeline construction projects. Engineering Standard Practice 550.1 for seismic design requirements specifies design features for prestressed concrete tanks, while Engineering Standard Practice 512.1 for pipelines includes practices to reduce the risk of seismic damage. The combined practices here would reduce the potential for seismic-related impacts to less than significant, by ensuring that all facilities are designed to withstand seismic hazards.

Significance Determination Before Mitigation

Less than significant.

Mitigation Measures

None required.

Impact GEO-2: Result in substantial soil erosion or the loss of topsoil. (Criterion 2)

The excavation and grading activities that are planned during construction would increase exposure of topsoil to erosion. Storm weather (e.g., wind and rain) would also result in soil erosion. 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, Environmental Requirements, Section 1.1(B), Site Activities, which includes provisions for preventing soil erosion and loss of soil during construction, including the diversion of surface waters and maintenance of the construction site to minimize erosion and loss of soil. EBMUD's Standard Construction Specification Section 01 35 44, Environmental Requirements, Section 1.3(A), Storm Water Management, also requires contractors to submit a SWPPP to EBMUD and the SFBRWQCB for coverage under the state Construction General Permit that describes measures to prevent the run-off of polluted stormwater from the construction site.[4] Additionally, in compliance with EBMUD's Reservoir Design Guide, a design-level geotechnical investigation would be conducted subsequent to the reservoir demolition to confirm the characteristics of the subsurface and to identify any soil control measures. EBMUD would incorporate into the Project design the recommendations outlined in the geotechnical investigation. Through compliance with EBMUD's Standard Construction Specification 01 35 44 and the Construction General Permit, and by implementing the recommendations of the design-level geotechnical investigation, the impacts related to soil erosion and loss of topsoil would be less than significant.

Significance Determination Before Mitigation

Less than significant.

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4 The EBMUD Practices and Procedures Monitoring and Reporting Plan (Appendix E) lists the applicable standard specifications language.

Mitigation Measures

None required.

Impact GEO-3: Be located on strata or soil that is unstable or that would become unstable as a result of the Project, and potentially could result in on-site or off-site landslides, lateral spreading, subsidence (i.e., settlement), liquefaction, or collapse. (Criterion 3)

Landslides: As depicted on the CGS regulatory map, the Project site is bounded by Earthquake-Induced Landslide Zones to the north and south. A landslide zone is also located approximately 600 feet east of the Project site. Landslides can be triggered by the addition of water to potentially unstable soils within a landslide zone. The Project design would include a subdrain that would collect and remove water from under the tanks. The Project would also be subject to EBMUD's Reservoir Design Guide, which specifies minimum design requirements to follow in the design of drinking water reservoirs, as well as requires that the Project conduct a geotechnical investigation to identify the potential for seismic hazards. Any recommendations in the geotechnical investigation would be incorporated into the Project design. EBMUD also follows applicable seismic design standards in the latest editions of guidance from the CBC, American Society of Civil Engineers, and the AWWA. Application of these design standards would reduce impacts associated with landslides to less than significant.

Liquefaction and Lateral Spreading: As depicted on the CGS regulatory map, the Project site is adjacent to a Liquefaction Zone to the south of the Central Reservoir. However, the accompanying supplemental report to the CGS regulatory map used to identify liquefaction potential includes a more detailed analysis of the Qpaf unit (referred to as Qof in the CGS report), and concludes that the Pleistocene alluvial deposits have a low susceptibility to liquefaction that gets progressively lower with depth (i.e., liquefaction typically occurs at shallow depths). The Project is subject to EBMUD's Reservoir Design Guide, which specifies minimum design requirements to follow in the design of drinking water reservoirs, as well as requires that the Project conduct a geotechnical investigation to identify the potential for seismic hazards. Any recommendations in the geotechnical investigation would be incorporated into the Project design. EBMUD also follows applicable seismic design standards in the latest editions of guidance from the CBC, American Society of Civil Engineers, and the AWWA. Application of these design standards would reduce impacts associated with liquefaction to less than significant.

Subsidence and Soil Collapse: Soils that are susceptible to subsidence or collapse are typically associated with projects that include the injection or extraction of groundwater and/or oil, or are in Karst terrain (carbonate rock terrains where dissolution cavities occur). As described in Section 3.9, Hydrology and Water Quality, the Project would not change the existing groundwater levels. Impacts associated with dewatering-induced settlement thus would be less than significant. Unsupported excavations into soft or loose soils can cause soil collapse. 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 24, Project Safety Requirements, Section 1.3(C), Excavation Safety Plan, which includes practices and procedures for preventing subsidence and soil collapse. The EBMUD Practices and Procedures Monitoring and Reporting Plan (Appendix E) lists the applicable standard specifications language. Implementation of the required safety measures would reduce the risk of soil collapse to less than significant.

Significance Determination Before Mitigation

Less than significant.

Mitigation Measures

None required.

Impact GEO-4: Be located on expansive soil creating substantial direct or indirect risks to life or property. (Criterion 4)

The NRCS Web Soil Survey has no available data on the expansiveness or corrosion potential of the soil at the Project site. It is possible that the proposed pipeline alignment areas may contain expansive or corrosive soils, which would result in a potentially significant impact due to the effect those soils could have on the stability and longevity of the reservoir and associated pipeline. However, during the Project design phase, EBMUD would perform a design-level geotechnical investigation to identify the potential for expansive and corrosive soils at the Project site. Any recommendations in the geotechnical investigation would be incorporated into the Project design. Additionally, a cathodic protection system and protective coatings would be used to protect the pipelines from corrosion resulting from corrosive soils. EBMUD would incorporate into the Project design the recommendations in the geotechnical investigation, and the design would follow the guidance outlined in EBMUD's Engineering Standard Practices 512.1 and 550.1 for pipeline construction projects. All facilities would be designed to withstand the effects of expansive or corrosive soils by incorporating cathodic protection, and would follow recommendations of the geotechnical investigation to ensure that pipelines can withstand expansive soils. Through implementation of these practices, EBMUD would ensure that the impacts of the Project associated with soils expansion and corrosion would be less than significant.

Significance Determination Before Mitigation

Less than significant.

Mitigation Measures

None required.

Impact GEO-5: Directly or indirectly destroy a unique paleontological resources or site or unique geologic feature. (Criterion 6)

The Project would be constructed on the highly disturbed land at the Central Reservoir site. Because this area has been previously disturbed, soils in these areas are not expected to contain fossils. In the unlikely event that fossils are encountered during construction, impacts could be potentially significant. 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, Environmental Requirements, Section 3.9, Protections of Cultural and Paleontological Resources, which requires that staff be trained to recognize paleontological resources and that if resources are encountered, construction must be stopped so that paleontological resources can be evaluated and protected. Because Section 3.9, Protection of Cultural and Paleontological Resources, has been incorporated into the Project, and requires implementation of procedures that address the inadvertent discovery of paleontological resources and ensures compliance with legal requirements regarding the protection of such resources, the Project's construction impacts related to paleontological resources are less than significant. The EBMUD Practices and Procedures Monitoring and Reporting Plan (Appendix E) lists the applicable standard specifications language.

Significance Determination Before Mitigation

Less than significant.

Mitigation Measures

None required.

Cumulative Impact Analysis

This section presents an analysis of the cumulative effects of the Project in combination with other present and reasonably foreseeable future projects that could cause cumulatively considerable impacts.

As previously described, the Project would have no impact with respect to fault rupture or having soils capable of supporting the use of septic tanks. Accordingly, the Project could not contribute to cumulative impacts related to these topics and are not described further.

Impacts on geology and soils are generally localized and do not result in regionally cumulative impacts. The geographical extent for cumulative geologic impacts includes areas in and immediately adjacent to the Project site because impacts relative to geologic hazards are generally site-specific. For example, the effect of erosion would tend to be limited to the localized area of a project and could only be cumulative if erosion occurred as the result of two or more adjacent projects that spatially overlapped.

The time frame during which the Project could contribute to cumulative geologic hazards includes the construction and operations phases. For the Project, the operations phase is permanent. However, similar to the geographic limitations described above, impacts relative to geologic hazards are generally time-specific. Geologic hazards could only be cumulative if two or more geologic hazards occurred at the same time, as well as overlapping at the same location.

Ten projects listed in Table 3.0-1 (Chapter 3, Environmental Setting, Impacts, and Mitigation Measures) would be near or adjacent to the Project site that could be constructed at the same time, which could result in cumulative erosion effects. However, the state Construction General Permit would require that these projects prepare and implement a SWPPP. The SWPPPs would describe BMPs to control run-off and prevent erosion for each project. Through compliance with this requirement, the potential for erosion impacts would be controlled. The Construction General Permit has been developed to address cumulative conditions arising from construction throughout the state, and is intended to maintain cumulative effects of projects subject to this requirement below levels that would be considered significant. For example, the ten adjacent construction sites would be required to implement BMPs to reduce and control the release of sediment and/or other pollutants in any run-off leaving their respective sites. The run-off water from all sites would be required to achieve the same action levels, measured as the maximum amount of sediment or pollutant allowed per unit volume of run-off water. Thus, even if the run-off waters were to combine after leaving the sites, the sediments and/or pollutants in the combined run-off would still be at concentrations (the amount of sediment or pollutants per volume of run-off water) below action levels and would not be cumulatively considerable (less than significant).

Seismically induced groundshaking, liquefaction and lateral spreading, and expansive or corrosive soils could cause structural damage or ruptures during construction and operations phases. However, state building regulations and standards address and reduce the potential for such impacts to occur. The Project and cumulative projects would be required to comply with the same applicable provisions of these laws and regulations. Through compliance with these requirements, the potential for impacts would be reduced. The CBC regulates and controls the design, construction, quality of materials, use/occupancy, location, and maintenance of all buildings and structures within its jurisdiction; by design, it is intended to reduce the cumulative risks from buildings and structures. Based on compliance with these requirements, the incremental impacts of the Project, combined with impacts of other projects in the area, would not combine to cause a significant cumulative impact related to seismically induced groundshaking, liquefaction and lateral spreading, or expansive or corrosive soils. Therefore, the Project's contributions to a cumulative effect would be less than significant.

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3.7 Greenhouse Gas Emissions

This section describes the physical and regulatory setting for greenhouse gas (GHG) emissions and identifies and evaluates potential GHG impacts that could result from the construction and operation of the Project. Discussed is an overview of climate change and the various GHGs identified as drivers of climate change; environmental and regulatory setting pertinent to GHG emissions, including those at the federal, state, and local levels; the criteria used for determining the significance of environmental impacts; and potential impacts associated with implementation of the Project. Refer to Appendix F for supporting information, including air quality and greenhouse gases modeling outputs.

3.7.1 Environmental Setting

Greenhouse Gases and Climate Change

Gases that trap heat in the atmosphere are called GHGs. The process by which heat is held in the atmosphere is similar to the effect greenhouses have in raising the internal temperature, hence the name GHGs. Emissions of GHGs, if not sufficiently curtailed, are likely to contribute further to increases in global temperatures. According to the United States Environmental Protection Agency (U.S. EPA), the term "climate change" refers to any significant change in measures of climate (such as temperature, precipitation, or wind) lasting for an extended period (over several decades or longer). There is scientific consensus that climate change is occurring and that human activity contributes in some measure (perhaps substantially) to that change. The potential effects of climate change in California include sea level rise and reductions in snowpack, as well as an increased number of extreme-heat days per year, high ozone days, large forest fires, and drought years (CARB, 2014). Globally, climate change could affect numerous environmental resources through potential, although uncertain, changes in future air temperatures and precipitation patterns. According to the International Panel on Climate Change (IPCC), the projected effects of climate change will likely vary regionally but are expected to include the following direct effects (IPCC, 2007):

- Higher maximum temperatures and more hot days over nearly all land areas
- Higher minimum temperatures and fewer cold days and frost days over nearly all land areas
- Reduced diurnal temperature range over most land areas
- Increase in heat index over most land areas
- More intense precipitation events

Many secondary effects are also projected to result from climate change, including a global rise in sea level, ocean acidification, impacts on agriculture, changes in disease vectors, and changes in habitat and biodiversity. The possible outcomes and feedback mechanisms involved are not fully understood, and much research remains to be done; however, over the long term, the potential exists for substantial environmental, social, and economic consequences.

GHG emissions are a global concern. GHG emissions cumulatively contribute to planet-wide atmospheric accumulations and consequently, there are no regional "hot spots" of elevated concentrations of carbon dioxide (CO_2) or any other GHG. Therefore, GHG emissions, existing or future, are not a localized phenomenon and there are no localized geographical constraints within the Project area relative to GHG emissions.

Greenhouse Gas Emissions

GHG emissions from human activities primarily include CO_2, with much smaller amounts of nitrous oxide (N_2O), methane (CH_4, often from unburned natural gas), sulfur hexafluoride (SF_6) from high-voltage power equipment, and hydrofluorocarbons (HFCs) and perfluorocarbons (PFCs) from refrigeration/chiller equipment. Because these GHGs have different warming potentials (i.e., the amount of heat trapped in the atmosphere by a certain mass of the gas), and CO_2 is the most common reference gas for climate change, GHG emissions are often quantified and reported as CO_2-equivalent (CO_2e) emissions. For example, while SF_6 represents a small fraction of the total annual GHGs emitted worldwide, this gas is very potent, with 22,800 times the global warming potential of CO_2. Therefore, an emission of 1 metric ton of SF_6 would be reported as 22,800 metric tons CO_2e (MT CO2e). The global warming potential of CH_4 and N_2O are 25 times and 298 times that of CO_2, respectively (CARB, 2018). The principal GHGs from human activity that enter and accumulate in the atmosphere are described below.

Carbon Dioxide (CO_2)

CO_2 is a naturally occurring gas that enters the atmosphere through natural as well as anthropogenic (human) sources. Key anthropogenic sources include the burning of fossil fuels (e.g., oil, natural gas, and coal), solid waste, trees, wood products, and other biomass, as well as industrial chemical reactions such as those associated with manufacturing cement. CO_2 is removed from the atmosphere when it is absorbed by plants as part of the biological carbon cycle.

Methane (CH_4)

Like CO_2, CH_4 is emitted from both natural and anthropogenic sources. Key anthropogenic sources of CH_4 include gaseous emissions from landfills, releases associated with the mining and materials extraction industries (in particular coal mining), and fugitive releases from the extraction and transport of natural gas and crude oil. Livestock and agricultural practices also emit CH_4. Small quantities of CH_4 are released during fossil fuel combustion.

Nitrous Oxide (N_2O)

N_2O is emitted from both natural and anthropogenic sources. Important anthropogenic sources include industrial activities, agricultural activities (primarily the application of nitrogen fertilizer), the use of explosives, combustion of fossil fuels, and decay of solid waste.

Fluorinated Gases (HFCs, PFCs, and SF_6)

HFCs, PFCs, and SF_6 are synthetic gases emitted from a variety of industrial processes and contribute substantially more to the greenhouse effect on a pound-for-pound basis than the previously described GHGs. Fluorinated gases are often used as substitutes for ozone-depleting substances (i.e., chlorofluorocarbons, HFCs, and halons). These gases are typically emitted in small quantities, but because of their potency they are sometimes referred to as "high global warming potential gases."

Greenhouse Gas Sources

Human activities are responsible for almost all of the increase in GHGs in the atmosphere over the last 150 years. The largest source of GHG emissions from human activities in the United States is from burning fossil fuels for electricity, heat, and transportation (U.S. EPA, 2018).

The primary sources of GHG emissions in the United States are: transportation (nearly 28.5 percent of 2016 GHG emissions), electricity production (28.3 percent), industry (21.6 percent), commercial and residential (11.5 percent), agriculture (9.4 percent), and emissions from U.S. territories (0.7 percent). Land use and forestry offset 11 percent of the total emissions by acting as a sink that absorbs CO_2 from the atmosphere. In the United States, since 1990, managed forests and other lands have absorbed more CO_2 from the atmosphere than they emit (U.S. EPA, 2018).

In 2016, California produced approximately 430 million MT CO_2e emissions. Transportation was the source of 39 percent of the state's GHG emissions, followed by industrial at 21 percent, electricity generation at 16 percent, and commercial and residential sources at 9 percent. Recycling and waste, high global warming potential gases, and agricultural sources represent the remaining 15 percent. California's GHG emissions from 2010 to 2016 are presented in Table 3.7-1.

TABLE 3.7-1
CALIFORNIA GREENHOUSE GAS EMISSIONS (MILLION METRIC TONS CO_2E)

Emission Inventory Category	2010	2011	2012	2013	2014	2015	2016 [a]	
Transportation	163.01	159.68	159.44	158.14	160.03	164.63	169.38	39%
Electric Power	90.34	88.06	95.09	89.65	88.24	83.67	68.58	16%
Commercial and Residential	45.05	45.50	42.89	43.54	37.37	37.92	39.36	9%
Industrial	91.01	90.65	90.90	93.48	93.77	91.71	89.61	21%
Recycling and Waste	8.37	8.47	8.49	8.52	8.59	8.73	8.81	
High Global Warming Potential Gases	13.64	14.74	15.74	16.82	17.82	19.05	19.78	15%
Agriculture	34.64	35.28	36.42	34.93	36.03	34.65	33.84	
Total Gross Emissions	**446.06**	**442.38**	**448.97**	**445.08**	**441.85**	**440.36**	**429.36**	**100%**

[a] Percentage in right column is percentage of total GHG emissions for 2016.

SOURCE: CARB, 2017a.

In the nine-county San Francisco Bay Area, GHG emissions from the transportation sector represent the largest source of the Bay Area's GHG emissions in 2015 at 41 percent, followed by stationary industrial sources at 26 percent, electricity generation and co-generation at 14 percent, and fuel use (primarily natural gas) by building at 11 percent. The remaining 8 percent of emissions is comprised of fluorinated gas emissions and emissions from solid waste and agriculture. Of the total transportation emissions in 2015, on-road sources accounted for approximately 87 percent, while off-road sources accounted for the remainder (BAAQMD, 2017a).

In 2015, core GHG emissions, which refer to emissions generated within city limits in Oakland, equaled 2,497,088 MT CO_2e. About 56 percent of core emissions were generated in the transportation and land use sectors of the community, including both vehicle emissions and stationary emitters such as the wastewater treatment plant. About 33 percent of emissions came from buildings and energy use, including electricity and natural gas use in homes, businesses, and other buildings. Less than 3 percent came from material consumption and waste, specifically from emissions associated with the breakdown of biological landfill contributions from Oakland homes and businesses. GHG emissions from waste degradation are considered core emissions as the waste is generated within the city even though the degradation may take place within a landfill not within the city limits. Finally, about 6 percent came from the Port of Oakland and just 1.3 percent from City government activities (City of Oakland, 2018a).

3.7.2 Regulatory Framework

Federal Regulations

Clean Air Act

In response to a lawsuit filed by California, other states, cities, and environmental organizations on April 2, 2007, the U.S. Supreme Court found that GHGs are air pollutants covered by the Clean Air Act. The Court held that the U.S. EPA must determine whether GHG emissions from new motor vehicles cause or contribute to air pollution that may reasonably be anticipated to endanger public health or welfare, or whether the science is too uncertain to make a reasoned decision. In making such decisions, the U.S. EPA is required to follow the language of Section 202(a) of the Clean Air Act, which obligates it to prescribe (and from time to time revise) standards applicable to the emission of any air pollutant from any class or classes of new motor vehicles or new motor vehicle engines. The Supreme Court decision resulted from a petition for rulemaking under Section 202(a) filed by more than a dozen environmental, renewable energy, and other organizations.

On December 7, 2009, the U.S. EPA Administrator signed two findings regarding GHGs under Section 202(a) of the federal Clean Air Act:

- **Endangerment Finding:** The current and projected concentrations of six key GHGs—CO_2, CH_4, N_2O, HFCs, PFCs, and SF_6—in the atmosphere threaten the public health and welfare of current and future generations.

- **Cause or Contribute Finding:** The combined emissions of these GHGs from new motor vehicles and new motor vehicle engines contribute to GHG pollution that threatens public health and welfare.

40 Code of Federal Regulations (CFR) – Protection of the Environment

Pursuant to 40 CFR Part 52*, Proposed Prevention of Significant Deterioration and Title V Greenhouse Gas Tailoring Rule*, the U.S. EPA has mandated that Prevention of Significant Deterioration (PSD) and Title V requirements apply to facilities whose stationary source CO_2e emissions exceed 100,000 tons per year (U.S. EPA, 2010). The Project would not trigger PSD or Title V permitting under this regulation because it would generate less than 100,000 tons of CO_2e emissions per year.

State Regulations

The California Air Resources Board (CARB) is the agency responsible for coordination and oversight of state and local air pollution control programs in California. There are currently no state regulations in California that establish ambient air quality standards for GHGs. However, California has passed laws directing CARB to develop actions to reduce GHG emissions, and several state legislative actions related to climate change and GHG emissions have come into play in the past decade.

Senate Bill 97

Senate Bill (SB) 97, signed in August 2007, acknowledges that climate change is a prominent environmental issue requiring analysis under CEQA. SB 97 directed the Governor's Office of Planning and Research (OPR) to prepare, develop, and transmit guidelines to the California Natural Resources Agency for the feasible mitigation of GHG emissions or the effects of GHG emissions, as required by CEQA, no later than July 1, 2009. The California Natural Resources Agency was required to certify or adopt those guidelines by January 1, 2010. On December 30, 2009, the Natural Resources Agency adopted the state *CEQA Guidelines* amendments, as required by SB 97. These state *CEQA Guidelines* amendments provide guidance to public agencies regarding the analysis and mitigation of the effects of GHG emissions in draft CEQA documents. The amendments became effective March 18, 2010.

CEQA Guidelines

CEQA Guidelines, Section 15064.4 addresses the significance of GHG emissions. Section 15064.4 calls for a lead agency to make a "good-faith effort" to "describe, calculate or estimate" GHG emissions in CEQA environmental documents. Section 15064.4 further states that the analysis of GHG impacts should include consideration of: (1) the extent to which a project may increase or reduce GHG emissions, (2) whether project emissions would exceed a locally applicable threshold of significance, and (3) the extent to which a project would comply with "regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of GHG emissions." The revisions also state that a project's incremental contribution to a cumulative effect is not cumulatively considerable if the project would comply with the requirements in a previously approved plan or mitigation program (including plans or regulations for the reduction of GHG emissions) that provides specific requirements that would avoid or substantially lessen the cumulative problem within the geographic area in which the project is located (*CEQA Guidelines* Section 15064(h)(3)). The *CEQA Guidelines* revisions do not, however, set a numerical threshold of significance for GHG emissions.

The revisions also include the following guidance on measures to mitigate GHG emissions, when such emissions are found to be significant:

> Consistent with Section 15126.4(a), lead agencies shall consider feasible means, supported by substantial evidence and subject to monitoring or reporting, of mitigating the significant effects of greenhouse gas emissions. Measures to mitigate the significant effects of greenhouse gas emissions may include, among others:
>
> (1) Measures in an existing plan or mitigation program for the reduction of emissions that are required as part of the lead agency's decision;
>
> (2) Reductions in emissions resulting from a project through implementation of project features, project design, or other measures;
>
> (3) Off-site measures, including offsets that are not otherwise required, to mitigate a project's emissions;
>
> (4) Measures that sequester greenhouse gases; and
>
> (5) In the case of the adoption of a plan, such as a general plan, long range development plan, or plans for the reduction of greenhouse gas emissions, mitigation may include the identification of specific measures that may be implemented on a project-by-project basis. Mitigation may also include the incorporation of specific measures or policies found in an adopted ordinance or regulation that reduces the cumulative effect of emissions.
>
> (*CEQA Guidelines* Section 15126.4(a).)

Executive Order S-3-05

In 2005, in recognition of California's vulnerability to the effects of climate change, Governor Arnold Schwarzenegger established Executive Order S-3-05, which established a series of target dates by which statewide emissions of GHGs would be progressively reduced, as follows:

- By 2010, reduce GHG emissions to 2000 levels.
- By 2020, reduce GHG emissions to 1990 levels.
- By 2050, reduce GHG emissions to 80 percent below 1990 levels.

As discussed below, the 2020 reduction target was codified in 2006 as Assembly Bill 32. However, the 2050 reduction target has not been codified and the California Supreme

Court has ruled that CEQA lead agencies are not required to use it as a significance threshold (*Cleveland National Forest Foundation v. San Diego Association of Governments* (2017) 3 Cal.5th 497).

Assembly Bill 32 and the California Climate Change Scoping Plan

In 2006, the California legislature passed Assembly Bill (AB) 32 (Health and Safety Code §38500 et seq., or AB 32), also known as the Global Warming Solutions Act. AB 32 requires CARB to design and implement feasible and cost-effective emission limits, regulations, and other measures, such that statewide GHG emissions are reduced to 1990 levels by 2020 (representing a 25 percent reduction in emissions). AB 32 anticipates that the GHG reduction goals will be met, in part, through local government actions. CARB identified a GHG reduction target of 15 percent from current levels for local governments and noted that successful implementation relies on local governments' land use planning and urban growth decisions.

Pursuant to AB 32, CARB adopted a Scoping Plan in December 2008 (CARB, 2009), which was re-approved by CARB on August 24, 2011, that outlines measures to meet the 2020 GHG reduction goals by reducing the state's GHG emissions by 30 percent below projected 2020 business-as-usual emissions levels or about 15 percent from 2008 levels. The Scoping Plan recommended measures for further study and possible state implementation, such as new fuel regulations. It estimated that a reduction of 174 million MT CO_2e (about 191 million U.S. tons) from the transportation, energy, agriculture, and forestry sectors and other sources could be achieved should the state implement all of the measures in the Scoping Plan. The Scoping Plan relies on the requirements of SB 375 (discussed below) to implement the carbon emission reductions anticipated from land use decisions.

The Scoping Plan is required by AB 32 to be updated at least every 5 years. The first update to the AB 32 Scoping Plan was approved on May 22, 2014 by CARB (CARB, 2014). The 2017 Scoping Plan Update was adopted on December 14, 2017. The Scoping Plan Update addresses the 2030 target established by SB 32 as discussed below, and establishes a proposed framework of action for California to meet a 40 percent reduction in GHG emissions by 2030 compared to 1990 levels. Continuing the efforts made since 2006 under AB 32, the Plan focuses on programs including Cap-and-Trade Regulation; Low Carbon Fuel Standard; cleaner cars, trucks, and freight movement; renewable energy; and reducing methane emissions from agriculture and waste (CARB, 2017b).

Executive Order S-1-07

Executive Order S-1-07, signed by Governor Schwarzenegger in 2007, identified the transportation sector as the main source of GHG emissions in California, generating more than 40 percent of statewide emissions. Executive Order S-1-07 established a goal to reduce the carbon intensity of transportation fuels sold in California by at least 10 percent by 2020 and also directed CARB to determine whether this Low Carbon Fuel Standard (LCFS) could be adopted as a discrete early-action measure as part of the effort to meet the mandates in AB 32.

On April 23, 2009, CARB approved the proposed regulation to implement the LCFS. The LCFS will reduce GHG emissions from the transportation sector in California by about 16 million metric tons in 2020.

Executive Order B-30-15 and Senate Bill 32

California Executive Order B-30-15 (April 29, 2015) set an “interim” statewide emission target to reduce GHG emissions to 40 percent below 1990 levels by 2030, and directed state agencies with jurisdiction over GHG emissions to implement measures pursuant to statutory authority to achieve this 2030 target. Specifically, the executive order directed CARB to update the Scoping Plan to express this 2030 target in metric tons. On September 8, 2016, Governor Jerry Brown signed SB 32, which codified the 2030 reduction target called for in Executive Order B-30-15. CARB’s 2017 Scoping Plan update addresses the 2030 target, as discussed above (CARB 2017b).

Senate Bill 375

SB 375 builds on the existing framework of regional planning to tie together the regional allocation of housing needs and regional transportation planning in an effort to reduce GHG emissions from motor vehicle trips. SB 375 directs the CARB to set regional targets for reducing greenhouse gas emissions in an effort to establish a “bottom up” approach to ensure that cities and counties are involved in the development of regional plans to achieve those targets. To increase public participation and local government input, the law strengthens several existing requirements for public involvement in regional planning. It establishes a collaborative process between regional and state agencies to set regional GHG reduction targets, and provides CEQA incentives for development projects that are consistent with a regional plan that meets those targets. Cities and counties maintain their existing authority over local planning and land use decisions.

Senate Bill 605

On September 21, 2014, Governor Jerry Brown signed SB 605, which required CARB to develop a comprehensive strategy to reduce emissions of short-lived climate pollutants in the state no later than January 1, 2016. As defined in SB 605, short-lived climate pollutant means “an agent that has a relatively short lifetime in the atmosphere, from a few days to a few decades, and a warming influence on the climate that is more potent than that of carbon dioxide.” SB 605, however, does not prescribe specific compounds as short-lived climate pollutants or add to the list of GHGs regulated under AB 32. In developing the strategy, the CARB completed an inventory of sources and emissions of short-lived climate pollutants in the state based on available data, identified research needs to address data gaps, identified existing and potential new control measures to reduce emissions, and prioritized the development of new measures for short-lived climate pollutants that offer co-benefits by improving water quality or reducing other air pollutants that impact community health and benefit disadvantaged communities.

Local Regulations

Under Section 53091 of the California Government Code, EBMUD, as a local agency and utility district, is not subject to building and land use zoning ordinances (such as tree ordinances) for projects involving facilities for the production, generation, storage, treatment, or transmission of water. However, EBMUD's practice is to work with local jurisdictions and neighboring communities during project planning and to consider local environmental protection policies for guidance.

BAAQMD CEQA Guidelines

The Bay Area Air Quality Management District (BAAQMD) *CEQA Air Quality Guidelines* (Guidelines) advise lead agencies on how to evaluate potential air quality impacts during the environmental review process consistent with CEQA requirements, including establishing quantitative and qualitative thresholds of significance (BAAQMD, 2017b).

The BAAQMD considers GHG emissions and global climate change to represent cumulative impacts. GHG emissions contribute, on a cumulative basis, 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. The combination of GHG emissions from past, present, and future projects contribute substantially to global climate change and its associated environmental impacts. BAAQMD's approach to developing a Threshold of Significance for GHG emissions is to identify the emissions level for which a project would not be expected to substantially conflict with existing California legislation adopted to reduce statewide GHG emissions. If a project would generate GHG emissions above the threshold level, it would be considered to contribute substantially to a cumulative impact, and would be considered significant. The BAAQMD Guidelines include operational thresholds of 10,000 MT CO_2e per year for stationary sources and 1,100 MT CO_2e per year for land use development projects not including stationary sources and does not include any GHG thresholds for construction emissions.

2017 Clean Air Plan

The 2017 Clean Air Plan, Spare the Air, Cool the Climate (2017 Plan) was adopted by the BAAQMD on April 19, 2017. It focuses on two closely related goals: protecting public health and protecting the climate. Consistent with the GHG reduction targets adopted by the state of California, the 2017 Plan lays the groundwork for a long-term effort to reduce Bay Area GHG emissions by 40 percent below 1990 levels by 2030 and 80 percent below 1990 levels by 2050 (BAAQMD, 2017c). The 2017 Plan includes a range of proposed control measures, which consist of actions to reduce combustion-related activities, decrease fossil fuel combustion, improve energy efficiency, and decrease emissions of potent GHGs. The 2017 Plan updates the *Bay Area 2010 Clean Air Plan* and complies with state air quality planning requirements as codified in the California Health and Safety Code. It includes 85 measures to address the reduction of several pollutants, including GHGs.

City of Oakland General Plan

The *City of Oakland General Plan* Open Space, Conservation, and Recreation Element (City of Oakland, 1996) includes the following policies relevant to the reduction in energy use, which would also reduce GHG emissions.

> ***Policy CO-13.2*: Energy Efficiency.** Support public information campaigns, energy audits, the use of energy-saving appliances and vehicles, and other efforts which help Oakland residents, businesses, and City operations become more energy efficient.
>
> ***Policy CO-13.3:* Construction Methods and Materials.** Encourage the use of energy-efficient construction and building materials. Encourage site plans for new development which maximize energy efficiency.
>
> ***Policy CO-13.4:* Alternative Energy Sources.** Accommodate the development and use of alternative energy resources, including solar energy and technologies which convert waste or industrial byproducts to energy, provided that such activities are compatible with surrounding land uses and regional air and water quality requirements.

City of Oakland Energy and Climate Action Plan

The Oakland Energy and Climate Action Plan (ECAP) was adopted by the Oakland City Council on December 4, 2012 (City of Oakland, 2018b). Optimizing the use of energy and minimizing associated energy costs and GHG emissions are important components of Oakland's sustainable city vision. The purpose of the ECAP is to identify and prioritize actions the City can take to reduce energy consumption and GHG emissions. The ECAP establishes GHG reduction actions, as well as frameworks for coordinating implementation and monitoring and reporting on progress. The ECAP assists the City of Oakland in continuing its legacy of leadership on energy, climate, and sustainability issues.

The City and its partners throughout the community have made significant progress implementing the priority actions identified in the ECAP. In October 2018, the Oakland City Council passed Resolution 87183 adopting a citywide GHG emissions reduction target of 56 percent below 2005 levels by the year 2030 to keep the City on track to meeting its 2050 target, and approved an update to the existing 2012 ECAP (City of Oakland, 2018b) for achieving the target. The revised ECAP does not add any new Action Items to the 2012 version of the document, and the overall goals remain the same as the original document – to reduce greenhouse gas emissions 36 percent by 2020 and 83 percent by 2050. The City is now developing a new Equitable Climate Action Plan which will establish actions that the City and its partners will take to equitably reduce Oakland’s GHG emissions to achieve the new GHG reduction target of 56 percent relative to the 2005 baseline year by 2030.

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 MT CO_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 as described below (EBMUD, 2018).

Air Quality and Emissions Control. EBMUD Standard Construction Specification 01 35 44, Section 3.4(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 East Bay Municipal Utility District Leland Reservoir Replacement Project EIR Greenhouse Gas Emissions 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.

3.7.3 Impact Analysis

Methodology for Analysis

For quantifying a project's GHG emissions, BAAQMD recommends that all GHG emissions from a project be estimated, including a project's direct and indirect GHG emissions from operations. Direct emissions refer to emissions produced from the on-site combustion of energy, such as natural gas used in furnaces and boilers, emissions from industrial processes, and fuel combustion from mobile sources. Indirect emissions are emissions produced off site from energy production and water conveyance due to a project's energy use and water consumption. BAAQMD has provided guidance on detailed methods for modeling GHG emissions from proposed projects (BAAQMD, 2017b).

The BAAQMD *CEQA Guidelines* include significance thresholds for land use development projects and other projects with stationary sources that generate GHGs. However, for the Project, construction activities would be the primary source of GHG emissions. Once operational, the Project would not include any direct stationary sources on the site. GHG emissions from worker trips for maintenance activities as well as indirect emissions from electricity use for operation and maintenance would also be unchanged from existing conditions. The BAAQMD *CEQA Guidelines* do not include significance thresholds for construction-related GHG emissions, but recommend that construction-related GHG emissions be quantified and disclosed. The analysis presented below uses operational thresholds as a conservative tool to assess construction impacts. The California Emissions Estimator Model (CalEEMod, Version 2016.3.2) was used to estimate GHG emissions from construction activities including off-road equipment emissions, and on-road construction worker, haul, and vendor truck emissions. Model outputs are provided in Appendix F.

Project GHG emissions are analyzed in context of the goals of AB 32 and the *2017 Scoping Plan Update,* SB 32*,* the BAAQMD's *2017 Clean Air Plan*, and the Oakland ECAP to determine whether the Project would conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs.

Both BAAQMD and the California Air Pollution Control Officers Association (CAPCOA) consider GHG impacts to be exclusively cumulative impacts, in that no single project could, by itself, result in a substantial change in climate (BAAQMD, 2017b and CAPCOA, 2008). Therefore, the evaluation of GHG impacts evaluates whether the Project would make a considerable contribution to cumulative climate change effects.

Significance Criteria

Based on *CEQA Guidelines* Sections 15064.4 and 15064.4(c), as well as Appendix G of the *CEQA Guidelines*, a GHG emissions impact would be considered significant if the Project would:

1. Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment.
2. Conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs.

Impacts and Mitigation Measures

Impact GHG-1: Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment. (Criterion 1)

Construction

Project construction would generate GHG emissions. The use of fossil fuels in construction equipment to develop the Project would generate GHGs such as carbon dioxide, methane, and nitrous oxide.

The Project would involve the demolition of the existing facilities and construction of the replacement tanks and associated facilities (valve structure, rate control station, and pipelines). Construction would occur over a period of approximately 6 years and require the use of off-road construction equipment, trucks for material delivery and hauling, and worker vehicles, all of which would emit GHGs. Table 3.7-2 presents construction emissions for the Project in each construction year from on-site and off-site emission sources. CalEEMod outputs can be found in Appendix F.

TABLE 3.7-2
ESTIMATED ANNUAL GREENHOUSE GAS EMISSIONS FROM CONSTRUCTION

Year	CO_2	CH_4	N_2O	CO_2e
	Metric Tons per Year			
2024	1,032.3	0.16	<0.01	1,036.2
2025	563.0	0.06	<0.01	564.6
2026	568.6	0.06	<0.01	570.3
2027	746.5	0.09	<0.01	748.7
2028	693.7	0.06	<0.01	695.2
2029	551.8	0.06	<0.01	553.3

SOURCE: Calculations provided by ESA 2018 (Appendix F)

Neither the state nor BAAQMD has adopted a quantitative threshold, such as those that exist for criteria pollutants, to evaluate the significance of an individual project's construction-related contribution to GHG emissions. However, as shown in Table 3.7-2, Project emissions for each construction year would be below both the BAAQMD operational thresholds of 10,000 MT CO_2e per year for stationary sources and 1,100 MT CO_2e per year for projects not including stationary sources and would therefore be considered 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 would use excavated material as backfill where feasible, thereby minimizing GHG emissions associated with construction haul trucks and solid waste disposal. Additionally, 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, Environmental Requirements. Standard Construction Specification 01 35 44 Section 3.4(A), Air Quality and Emissions Control, 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 3.4(A), 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 that would reduce GHG emissions from fuel combustion, the Project construction impacts related to GHG emissions would be less than significant. The EBMUD Practices and Procedures Monitoring and Reporting Plan (Appendix E) lists the applicable standard specifications language.

Operation

After construction, operational and maintenance practices for the Project would not change substantially, and the direct GHG emissions associated with the operational and maintenance traffic would be similar to existing levels. Indirect operational GHG emissions would be associated with emissions from electricity generation for line power provided by the Pacific Gas and Electric Company to Project facilities. However, electricity use associated with operation of the Project would be similar to existing use and therefore not result in an increase in indirect GHG emissions resulting in a less than significant impact.

Significance Determination Before Mitigation

Less than significant.

Mitigation Measure

None required.

Impact GHG-2: Conflict with a plan, policy, or regulation adopted for the purpose of reducing GHG emissions. (Criterion 2)

Construction

Project GHG emissions are analyzed in the context of the GHG reduction goals of AB 32, SB 32, the *2017 Scoping Plan Update,* the BAAQMD's *2017 Clean Air Plan*, and the Oakland ECAP to determine whether the Project would conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions.

Construction of the replacement tanks and associated facilities (valve structure, rate control station, and pipelines) would involve operation of diesel-fueled off-road construction equipment and on-road vehicles associated with worker commute, material delivery, and hauling that would directly generate GHG emissions. Actions in the *2017 Scoping Plan Update* pertinent to Project construction relate to emission controls imposed in the future, including; future implementation of Phase 2 controls to reduce GHG emissions in new heavy-duty vehicles beyond 2018 and continued implementation of diesel controls to reduce black carbon emissions from heavy-duty on-road engines as well as off-road engines. These actions would be implemented by CARB as new standards and policies and the BAAQMD through the implementation of its *2017 Clean Air Plan*. Heavy-duty vehicles used during Project construction would comply with all applicable emission standards. In addition, both the *2017 Clean Air Plan* and the City of Oakland ECAP identify goals requiring adoption of ordinances to promote community-wide zero waste goals and recycling of construction and demolition materials in commercial and public construction projects. Consistent with the goals of the *2017 Clean Air Plan* and ECAP, the City of Oakland implements its waste reduction goal through its Construction and Demolition Debris Recycling Ordinance. The Project would reuse or recycle building materials on site to the extent feasible, including concrete demolition materials and excavated earth and therefore be consistent with the goals in the *2017 Clean Air Plan* and the Oakland ECAP. 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., *2017 Scoping Plan Update* actions, *2017 Clean Air Plan,* and the City of Oakland ECAP). Additionally, 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, Environmental Requirements. Standard Construction Specification 01 35 44 Section 3.4(A), Air Quality and Emissions Control, requires that construction crews use alternative-fueled construction equipment and recycle or reuse construction waste or demolition materials to the extent feasible. Implementation of EBMUD Standard Construction Specification 01 35 44, Section 3.4(A) would ensure that construction diesel trucks and off-road equipment would comply with the latest vehicle emission standards established by CARB pursuant to the *2017 Scoping Plan Update* resulting in a less than significant impact.

Operation

According to EBMUD's *2014 Climate Change Monitoring and Response Plan*, the majority of EBMUD's total operational GHG emissions are indirect GHG emissions associated with the use of electrical energy, and 22 percent of EBMUD's total GHG emissions are direct GHG emissions associated with fleet operations (vehicles and portable equipment). After construction, operational and maintenance practices for the tanks and associated facilities would be the same as existing conditions, which would include periodic maintenance. GHG emissions associated with maintenance traffic would be similar to existing levels with no substantial increase in direct operational 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 *2017 Scoping Plan Update*. Therefore, the Project's direct operational GHG emissions would not conflict with Scoping Plan actions, or the *2017 Clean Air Plan*.

With respect to indirect operational GHG emissions associated with electrical energy use, the Project would not increase electricity demand over existing conditions. However, indirect GHG emissions from electricity used by the Project would continue to be subject to measures in EBMUD's *2014 Climate Change Monitoring and Response Plan,* which 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 EBMUD facilities through equipment upgrades and metering
- Reviewing the EBMUD's master equipment specifications to ensure that 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 *2014 Climate Change Monitoring and 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, resulting in a less-than-significant impact.

Significance Determination Before Mitigation

Less than significant.

Mitigation Measure

None required.

Cumulative Impact Analysis

Climate change is a global problem. GHGs are global pollutants, which are pollutants of regional and local concern. Whereas pollutants with localized air quality effects have relatively short atmospheric lifetimes (about 1 day), GHGs have long atmospheric lifetimes (1 year to several thousand years). GHGs persist in the atmosphere for long enough time periods to be dispersed around the globe. Therefore, the effects of GHGs are also experienced globally. The atmospheric concentration of GHGs determines the intensity of climate change, with current levels already leading to increases in global temperatures, sea level rise, severe weather, and other environmental impacts. The continued increase in atmospheric GHG concentrations will only worsen the severity and intensity of climate change, leading to irrevocable environmental changes. Therefore, in the context of CEQA, GHG impacts on global climate change are inherently cumulative. No single project could generate enough GHG emissions to contribute noticeably to a change in the global average temperature. However, the combination of GHG emissions from present and future projects contributes substantially to the phenomenon of global climate change and its associated environmental impacts.

As discussed under Impacts GHG-1 and GHG-2, GHG emissions from the construction and development of the Project would be less than significant. The Project would also comply with the goals and actions of applicable GHG reduction plans at the local and state levels that aim to achieve the 2030 target established by SB 32 for California to meet a 40 percent reduction in GHG emissions by 2030 compared to 1990 levels. Therefore, Project contribution to the global cumulative impact would be less than significant.

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3.8 Hazards and Hazardous Materials

This section describes the physical and regulatory setting for hazardous resources, and identifies and evaluates potential impacts associated with hazardous resources that could result from construction and operation of the Project. Potential hazards addressed in this section include releases of hazardous materials from equipment and materials during construction and operation, exposure to hazardous materials from existing hazardous materials sites, wildfires, airport safety, and emergency access and response plans.

Definitions of Hazardous Materials

Definitions of terms used in the characterization of baseline conditions, regulatory framework, and impact analysis for hazards and hazardous materials are provided below.

- **Hazardous Material:** The term "hazardous material" has varying definitions depending on the regulatory programs. For the purposes of this Environmental Impact Report (EIR), the term refers to both hazardous materials and hazardous wastes. The California Health and Safety Code Section 25501(n) defines hazardous material as: any material that because of its quantity, concentrations, or physical or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment if released into the workplace or the environment. Hazardous materials include, but are not limited to, hazardous substances, hazardous waste, and any material that a handler or the administering agency has a reasonable basis for believing would be injurious to the health and safety of persons or harmful to the environment if released into the workplace or the environment.

- **Hazardous Waste:** A "hazardous waste" is a waste that because of its quantity, concentration, or physical, chemical, or infectious characteristic, causes or significantly contributes to an increase in mortality or illness or poses substantial or potential threats to public health or the environment (42 United States Code [U.S.C.] 6903(5)). Hazardous wastes are further defined under the Resource Conservation and Recovery Act (RCRA) as substances exhibiting the characteristics of ignitability, reactivity, corrosivity, or toxicity. Chemical-specific concentrations used to define whether a material is a hazardous, designated, or nonhazardous waste include Total Threshold Limit Concentrations (TTLCs), Soluble Threshold Limit Concentrations (STLCs), and Toxic Characteristic Leaching Procedures (TCLPs), listed in California Code of Regulations (CCR) Title 22, Chapter 11, Article 3, Section 66261, and are used as waste acceptance criteria for landfills. Waste materials with chemical concentrations above TTLCs, STLCs, and TCLPs must be sent to Class I disposal facilities, may be sent to Class II disposal facilities depending on the waste material, and may not be sent to Class III disposal facilities[1].

[1] Class I disposal facilities are specifically for hazardous waste, as defined by CCR Title 22, Class II facilities are "designated" waste facilities and must acquire special permitting to accept designated types of hazardous materials, and Class III disposal facilities are strictly for non-hazardous waste (CCR Title 23, Division 3, Chapter 15).

- **Screening Levels for Hazardous Materials in Soil, Soil Gas, or Groundwater:** The U.S. Environmental Protection Agency (U.S. EPA) Regional Screening Levels and San Francisco Bay Area Regional Water Quality Control Board (SFBRWQCB) Environmental Screening Levels (ESLs) are guidelines used to evaluate the potential risk associated with chemicals in soil or groundwater where a release of hazardous materials has occurred. Although developed and maintained by the SFBRWQCB, ESLs are used by regulatory agencies throughout the state. Screening levels have been established for both residential and commercial/industrial land uses, and for construction workers. Residential screening levels are the most restrictive. Soil with chemical concentrations below these ESLs generally would not require remediation and would be suitable for unrestricted uses if disposed of offsite.

  Commercial/industrial screening levels are generally less restrictive than residential screening levels because they are based on potential worker exposure to hazardous materials in the soil (and these are generally less than residential exposures). Screening levels for construction workers are also less restrictive than for commercial/industrial workers because construction workers are only exposed to the chemical of concern during the duration of construction, while industrial workers are assumed to be exposed over a working lifetime. Chemical concentrations below these screening levels generally would not require remediation and would be suitable for unrestricted uses. In addition, there are other more specific but similar screening levels used for more narrowly focused human health or ecological risk assessment considerations.

3.8.1 Environmental Setting

Regional Setting

The Project site is surrounded entirely by urban development in the city of Oakland; bounded by Ardley Avenue and 23rd Avenue to the west, Sheffield Avenue to the east, the 25th Avenue and East 29th Street intersection to the south, and Interstate 580 (I-580) to the north. The Central Reservoir Recreation Area borders the southeast portion of the site, with Redwood Day School adjacent to the site boundary to the northeast. The remainder of land uses that surround the Project site are residential.

Local Setting

Central Reservoir Site

The reservoir roof contains asbestos-containing materials (ACM), which was encapsulated with a corrugated metal roof; the panel craft lining system contains polychlorinated biphenyls (PCBs); pentachlorophenol may be present in the reservoir timber girders; and lead-based paint (LBP) may be present at the on-site material storage building. The first phase of construction would involve demolition of most of the existing reservoir (i.e., liner, roof, and columns) as well as the material storage building.

Known Contamination Sites

A search of the Department of Toxic Substances Control (DTSC) EnviroStor and State Water Resources Control Board (SWRCB) GeoTracker databases revealed that there are no known active/open hazardous materials sites at the Project site (DTSC, 2019; SWRCB, 2019). The nearest open hazardous materials sites are listed below:

- **Former Norge Cleaners.** This site is at 2114 MacArthur Boulevard in Oakland, approximately 0.3-mile northeast and upgradient[2] from the Project site, and is under investigation and remediation for potential contamination of the air, soil, and groundwater by tetrachloroethylene (PCE), and its degradation products trichloroethylene (TCE), cis-1,2-dichloroethylene, and vinyl chloride (APEX, 2017a, 2017b). Previous remedial actions have reduced contaminant concentrations, and the site is under verification monitoring as of April 1, 2017. Depths to groundwater beneath this site ranged from 6.64 to 12.56 feet per data dated August 28, 2017, with the groundwater flow direction to the southwest, toward the Project site. However, chemical concentrations in groundwater are largely limited to the Norge Cleaners site, and PCE and TCE above screening levels do not extend to beneath the Project site. Dichloroethylene and vinyl chloride in groundwater extend a little farther than the PCE and TCE but are not anticipated to extend to as far as the Project site.

- **Ed's Liquor.** This site is at 2700 23rd Avenue in Oakland, approximately 950 feet south of the Project site. This site is a Leaking Underground Storage Tank Cleanup Site, open for site assessment as of August 12, 2012. The site is under investigation for potential groundwater contamination of diesel, gasoline, naphthalene, and waste oils (i.e., motor, hydraulic, and lubricating oils) (ACDEH, 2018). However, based on the groundwater flow directions of the above-described Norge Cleaners site, the Ed's Liquor site is downgradient[3] of the Project site and would not be anticipated to extend to the Project site.

The DTSC is responsible for maintaining and updating the Hazardous Waste and Substances Site List (Cortese List). The Cortese List is a planning document used by several agencies and developers to comply with California Environmental Quality Act (CEQA) requirements. The Cortese List was consulted on September 21, 2018, and the Project site is not included (DTSC, 2018).

Schools Within One-quarter Mile of Project Site

Table 3.8-1 identifies all of the schools that are within one-quarter mile of the Project site. Four schools are in proximity to the Project site; the closest is Redwood Day School, which is adjacent to the northeast boundary of the site, less than 100 feet from reservoir.

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2 Upgradient refers to the direction that groundwater flows from.

3 Downgradient refers to the direction that groundwater flows toward.

TABLE 3.8-1
SCHOOLS WITHIN ONE-QUARTER MILE FROM PROJECT SITE

School Name	Address	Distance from Project Site
Redwood Day School	3245 Sheffield Avenue Oakland, CA 94602	Adjacent to northeast boundary
Storybrook Oakland	2370 Grande Vista Place Oakland, CA 94601	0.15 mile to the south
Tiny Tot Co-Operative Nursery School	Grande Vista Place Oakland, CA 94601	0.15 mile to the south
Manzanita Community School	2409 E. 27th Street Oakland, CA 94601	0.25 mile to the south

SOURCE: Google Earth

Airports

No airports or airstrips are within 2-miles of the Project site. The closest airport is Oakland International Airport, approximately 4-miles to the south of the Project site.

Wildfire Hazards

Based on the Very High Fire Hazard Severity Zone (VHFHSZ) maps, for both state (California Department of Forestry and Fire Protection [CAL FIRE], 2007) and Local Responsibility Areas (CAL FIRE, 2008), the Project area is not within any VHFHSZs. The closest VHFHSZ is 1.9 miles to the northeast of the Project site.

3.8.2 Regulatory Framework

Federal Regulations

The primary federal agencies with responsibility for hazardous materials management include the U.S. EPA, U.S. Department of Labor Occupational Safety and Health Administration (Fed/OSHA), and the U.S. Department of Transportation (USDOT). Federal laws, regulations, and responsible agencies are summarized in Table 3.8-2.

State and local agencies often have either parallel or more stringent rules than federal agencies. In most cases, state law mirrors or overlaps federal law, and enforcement of these laws is the responsibility of the state or of a local agency to which enforcement powers are delegated. For these reasons, the requirements of the law and its enforcement are described under either the state or local agency section.

TABLE 3.8-2
FEDERAL LAWS AND REGULATIONS RELATED TO HAZARDOUS MATERIALS MANAGEMENT

Classification	Law or Responsible Federal Agency	Description
Hazardous Materials Management	Community Right-to-Know Act of 1986 (also known as Title III of the Superfund Amendments and Reauthorization Act)	Imposes requirements to ensure that hazardous materials are properly handled, used, stored, and disposed of, and to prevent or mitigate injury to human health or the environment in the event that such materials are accidentally released.
Hazardous Waste Handling	Resource Conservation and Recovery Act of 1976 (RCRA)	Under RCRA, the U.S. EPA regulates the generation, transportation, treatment, storage, and disposal of hazardous waste from "cradle to grave."[a]
	Hazardous and Solid Waste Act	Amended RCRA in 1984, affirming and extending the "cradle to grave" system of regulating hazardous wastes. The amendments specifically prohibit the use of certain techniques for the disposal of some hazardous wastes.
Hazardous Materials Transportation	U.S. Department of Transportation (USDOT)	USDOT has the regulatory responsibility for the safe transportation of hazardous materials. The USDOT regulations govern all means of transportation except packages shipped by mail (49 Code of Federal Regulations [CFR]).
	U.S. Postal Service	U.S. Postal Service regulations govern the transportation of hazardous materials shipped by mail.
Occupational Safety	Occupational Safety and Health Act of 1970	Fed/OSHA sets standards for safe workplaces and work practices, including the reporting of accidents and occupational injuries (29 CFR 1910).
Structural and Building Components (Lead-based paint, polychlorinated biphenyls, and asbestos)	Toxic Substances Control Act (TSCA)	Regulates the use and management of polychlorinated biphenyls in electrical equipment, and sets forth detailed safeguards to follow during the disposal of such items.
	U.S. EPA	The U.S. EPA monitors and regulates hazardous materials used in structural and building components and their effects on human health.

NOTES:
[a] "cradle-to-grave" is used by the U.S. EPA in this context to mean that it (the U.S. EPA) regulates hazardous waste from its generation to its disposal (U.S. EPA, 2017).

State Regulations

The primary state agencies with responsibility for the management of hazardous materials in the region include the DTSC and the SFBRWQCB within the California Environmental Protection Agency (Cal EPA), California Division of Occupational Safety and Health (Cal/OSHA), California Department of Health Services, California Highway Patrol, and the California Department of Transportation (Caltrans). State laws, regulations, and responsible agencies are summarized in Table 3.8-3.

TABLE 3.8-3
STATE LAWS AND REGULATIONS RELATED TO HAZARDOUS MATERIALS MANAGEMENT

Classification	Law or Responsible State Agency	Description
Hazardous Materials Management	Unified Hazardous Waste and Hazardous Materials Management Regulatory Program (Unified Program); CUPA (Health and Safety Code Sections 25404 et seq.)	In January 1996, Cal EPA adopted regulations that implemented a Unified Program at the local level. The agency responsible for implementation of the Unified Program is called the Certified Unified Program Agency (CUPA), which for the City of Oakland, is the Alameda County Department of Environmental Health (ACDEH). The following programs are consolidated under the Unified Program: • Hazardous Materials Release Response Plans, and Inventory (also referred to as Hazardous Materials Business Plans) • California Accidental Release Program • Underground Storage Tanks • Aboveground Petroleum Storage Spill Prevention Control and Countermeasures • Hazardous Waste Generation and On-site Treatment • Uniform Fire Code Plan and Inventory Requirements
	State Hazardous Waste and Substances List (Cortese List); DTSC, SFBRWQCB, ACDEH.	The oversight of hazardous materials sites often involves several different agencies that may have overlapping authority and jurisdiction. For the on-site hazardous materials cases and issues, the SFBRWQCB is the lead agency. Other cases may be overseen by the DTSC, ACDEH, or other agencies.
Hazardous Waste Handling	California Hazardous Materials Release Response Plan and Inventory Law of 1985; CUPA	The California Hazardous Materials Release Response Plan and Inventory Law of 1985 (Business Plan Act) requires that businesses that store hazardous materials on site prepare a Hazardous Materials Business Plan and submit it to the local CUPA, which in this case is the ACDEH.
	California Hazardous Waste Control Act; DTSC	Under the California Hazardous Waste Control Act, California Health and Safety Code, Division 20, Chapter 6.5, Article 2, Section 25100, et seq., DTSC regulates the generation, transportation, treatment, storage, and disposal of hazardous waste in California. The hazardous waste regulations establish criteria for identifying, packaging, and labeling hazardous wastes; dictate the management of hazardous waste; establish permit requirements for hazardous waste treatment, storage, disposal, and transportation; and identify hazardous wastes that cannot be disposed of in landfills. DTSC is also the administering agency for the California Hazardous Substance Account Act. California Health and Safety Code, Division 20, Chapter 6.8, Sections 25300 et seq., also known as the state Superfund law, providing for the investigation and remediation of hazardous substances pursuant to state law.
	California Fire Code	The California Fire Code regulates the storage and handling of hazardous materials, including the requirement for secondary containment, separation of incompatible materials, and preparation of spill response procedures.
Hazardous Materials Transportation	Titles 13, 22, and 26 of the California Code of Regulations	Regulates the transportation of hazardous waste originating in and passing through the state, including requirements for shipping, containers, and labeling.
	California Highway Patrol and Caltrans	These two state agencies have primary responsibility for enforcing federal and state regulations and responding to hazardous materials transportation emergencies.

TABLE 3.8-3 (CONTINUED)
STATE LAWS AND REGULATIONS RELATED TO HAZARDOUS MATERIALS MANAGEMENT

Classification	Law or Responsible State Agency	Description
Workplace Safety	Cal/OSHA	Cal/OSHA has primary responsibility for developing and enforcing workplace safety regulations in California. Because California has a federally approved OSHA program, it is required to adopt regulations that are at least as stringent as those found in Title 29 of the CFR. Cal/OSHA standards are generally more stringent than federal regulations.
	Cal/OSHA Regulations (Title 8 CCR)	Concern the use of hazardous materials in the workplace and require employee safety training, safety equipment, accident and illness prevention programs, hazardous substance exposure warnings, and emergency action and fire prevention plan preparation.
Construction Storm Water General Permit (Construction General Permit; Order 2009-0009-DWQ, NPDES No. CAS000002; as amended by Orders 2010-0014-DWQ and 2012-006-DWQ)	SFBRWQCB	Dischargers whose project disturbs 1 or more acres of soil or where projects disturb less than 1 acre but are part of a larger common plan of development that in total disturbs 1 or more acres, are required to obtain coverage under the *NPDES General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities* (Construction General Permit; Order 2009-0009-DWQ, NPDES No. CAS000002; as amended by Orders 2010-0014-DWQ and 2012-006-DWQ). Construction activity subject to this permit includes clearing, grading, grubbing, and other disturbances to the ground such as excavation and stockpiling, but does not include regular maintenance activities performed to restore the original line, grade, or capacity of a facility. The Construction General Permit requires the development and implementation of a Stormwater Pollution Prevention Plan (SWPPP) that includes specific best management practices (BMPs) designed to prevent sediment and pollutants from contacting stormwater from moving off site into receiving waters. The BMPs fall into several categories, including erosion control, sediment control, waste management, and good housekeeping, and are intended to protect surface water quality by preventing the off-site migration of eroded soil and construction-related pollutants from the construction area.
Underground Infrastructure	California Code of Regulations Section 4216-4216.9	Section 4216-4216.9 “Protection of Underground Infrastructure” requires an excavator to contact a regional notification center (e.g., Underground Services Alert or Dig Alert) at least 2 days prior to excavation of any subsurface installations. Any utility provider seeking to begin a project that could damage underground infrastructure can call USA North 811, the regional notification center for northern California. Underground Service Alert will notify the utilities that may have buried lines within 1,000 feet of the project. Representatives of the utilities are then notified and are required to mark the specific location of their facilities within the work area prior to the start of project activities in the area.

Hazardous Building Materials Regulations

Numerous existing regulations require that demolition and renovation activities that may disturb or require the removal of materials that consist of, contain, or are coated with ACM, LBP, PCBs, or other hazardous materials must be inspected and/or tested for the presence of hazardous materials. If present, the hazardous materials must be managed and disposed of in accordance with applicable laws and regulations.

The identification, removal, and disposal of ACM are regulated under CCR Title 8, Division 1, Chapter 4, Article 4, Section 1529 and 5208. The identification, removal, and disposal of LBP are regulated under CCR Title 8, Division 1, Chapter 4, Article 4, Section 1532.1. All work must be conducted by a state-certified professional, which would ensure compliance with applicable regulations. If ACM and/or LBP are determined to exist on site, a site-specific Hazard Control Plan must be prepared detailing removal methods and specific instructions for providing protective clothing and equipment for abatement personnel. A state-certified LBP and/or an ACM removal contractor would be retained to conduct the appropriate abatement measures as required by the plan. Wastes from abatement and demolition activities would be transported and disposed of at a landfill permitted to accept such waste and in compliance with applicable local, state, and federal laws and regulations. Once abatement measures have been implemented, the contractor would conduct a clearance examination and provide written documentation to the local Bay Area Air Quality Management District (BAAQMD) that testing and abatement have been completed in accordance with federal, state, and local laws and regulations.

In the case of PCBs, the identification, removal, and disposal are regulated under RCRA (4 CFR 7610), Toxic Substances Control Act (TSCA) (15 U.S.C. 2695), and California regulations (CCR Title 22, Division 4.5, Chapter 11, Article 3, Section 66261.24). Electrical transformers and older fluorescent light ballasts not previously tested and verified to not contain PCBs must be tested. If PCBs are detected above action levels, the materials must be transported to and disposed of at a licensed facility permitted to accept the materials in compliance with applicable local, state, and federal laws and regulations.

Local Regulations

Under Section 53091 of the California Government Code, EBMUD, as a local agency and utility district, is not subject to building and land use zoning ordinances (such as tree ordinances) for projects involving facilities for the production, generation, storage, treatment, or transmission of water. However, EBMUD's practice is to work with local jurisdictions and neighboring communities during Project planning and to consider local environmental protection policies for guidance.

Alameda County Department of Environmental Health

The State Secretary for Environmental Protection designated the ACDEH as the local Certified Unified Program Agency (CUPA). The CUPA is charged with the responsibility of conducting compliance inspections of hazardous materials facilities in Alameda County, including the City of Oakland. These facilities handle hazardous materials, generate or treat hazardous waste, and/or operate underground storage tanks. The CUPA uses education and enforcement to minimize the risk of chemical exposure to human health and the environment. The CUPA forwards important facility information to local fire prevention agencies that enables them to take appropriate protective action in the event of an emergency at regulated facilities. To legally store and use hazardous materials above the trigger quantities, users must apply for permits and demonstrate satisfactory compliance with regulations. The quantities that trigger disclosure are based on the maximum quantity on site at any time:

- 55 gallons, 500 pounds, or 200 cubic feet for 30 days or more at any time in the course of a year
- Any amount of hazardous waste
- Category I or II pesticides
- Explosives
- Extremely hazardous substances above the threshold planning quantity

City of Oakland General Plan

The City of Oakland General Plan, Safety Element (City of Oakland, 2004) identifies the following policies related to hazardous materials:

Safety Element

***Policy HM-1*:** Minimize the potential risks to human and environmental health and safety associated with the past and present use, handling, storage, and disposal of hazardous materials.

***Policy HM-*2:** Reduce the public's exposure to toxic air contaminants through appropriate land use and transportation strategies.

***Policy HM-*3:** Seek to prevent industrial and transportation accidents involving hazardous materials, and enhance the City's capacity to respond to such incidents.

EBMUD Standard Construction Specifications

The following EBMUD's Standard Construction Specifications and Procedures include practices and procedures applicable to hazards and hazardous materials and are further described below:

- EBMUD Standard Construction Specification 01 35 24 (Project Safety Requirements) (EBMUD, 2017b)
- EBMUD Standard Construction Specification 01 35 44 (Environmental Requirements) (EBMUD, 2018a)
- EBMUD Standard Construction Specification 01 55 26 (Traffic Regulation) (EBMUD, 2017a)
- EBMUD Standard Construction Specification Section 02 82 13 (Asbestos Control Activities)
- EBMUD Standard Construction Specification 02 83 13 (Lead Hazard Control Activities) (EBMUD, 2016)
- EBMUD Procedure 711 (Hazardous Waste Removal)

Project Safety and Health Plan. EBMUD Standard Construction Specification 01 35 24 Section 1.3(B) requires that, 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).

Environmental Requirements. The EBMUD Standard Construction Specification 01 35 44 stipulates 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.

Controls on Site Activities. EBMUD Standard Construction Specification 01 35 44 Section 1.1(B) 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 SWRCB, 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 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). EBMUD Standard Construction Specification 01 35 44 Section 1.3(A) requires that, before the start of construction, the contractor must submit a SWPPP that describes measures that shall be implemented to prevent the discharge of contaminated stormwater 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. EBMUD Standard Construction Specification 01 35 44 Section 1.3(B) requires that the Contractor shall submit a detailed Water Control and Disposal Plan for 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. EBMUD Standard Construction Specification 01 35 44 Section 1.3(C) requires that prior to construction, the contractor must 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 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. EBMUD Standard Construction Specification 01 35 44 Section 1.3(D) requires that, 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.

Traffic Regulation. EBMUD Standard Construction Specification 01 55 26 stipulates that the contractor shall comply with requirements pertaining to traffic regulation during Project construction activities. 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.

Asbestos Control Activities. EBMUD Standard Construction Specification 02 82 13 requires that the contractor submit a detailed plan of the procedures to address ACM. The plan shall include the location and layout of decontamination areas, the sequencing of asbestos work, the interface of trades involved in the performance of work, disposal plan including location of approved disposal site, a detailed description of the methods to be employed to control pollution, description of use of portable HEPA ventilation system, method of removal to prohibit visible emissions in work area (including suppressing air-borne particulates using a minimum of two misting units operated simultaneously), and packaging of removed asbestos debris. All workers performing work shall meet the requirements of the Asbestos Certification issued by the California Contractors State License Board. During demolition procedures, the contractor shall protect against contamination of soils, water, adjacent residences and properties, and the airborne release of hazardous materials and dusts. Asbestos materials uncovered during the demolition activities shall be disposed of in an approved manner complying with all applicable federal, state, and local regulations. Transportation equipment for removal of ACM shall be suitable for loading, temporary storage, transit and unloading of waste without exposure to persons or property. Contractor shall removal all evidence of ACM materials from the jobsite that are related to Project demolition.

Lead Hazard Control Activities. EBMUD Standard Construction Specification 02 83 13 requires that, 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. 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. 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.

Hazardous Waste Removal. Procedure 711, Hazardous Waste Removal, defines hazardous waste and establishes responsibilities for removal of hazardous wastes from EBMUD facilities. Procedure 711 outlines specific steps and responsibilities for: characterizing the 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.

EBMUD Environmental Compliance Manual

EBMUD's Environmental Compliance Manual requires implementation of procedures during construction to protect workers and the environment (EBMUD, 2010). The Trench Spoil Best Management Practices Program is applicable to the Project and would require the proper disposal of spoil, which is excess material removed from the pipeline trench. The program requires site investigation and the 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.

3.8.3 Impact Analysis

Methodology for Analysis

Information for the assessment of impacts relative to hazards and hazardous materials is based on a review of literature research (i.e., fire severity zone maps provided by CAL FIRE), the DTSC EnviroStor database and Cortese List, SWRCB's GeoTracker database, and the City of Oakland General Plan. The information was used to identify potential impacts on workers, the public, or the environment.

The Project is regulated by the various laws, regulations, and policies summarized in the *Regulatory Framework* section. Compliance by the Project with applicable federal, state, and local laws and regulations is assumed in this analysis, and local and state agencies would be expected to continue to enforce applicable requirements to the extent that they do so now.

The analysis of hazards and hazardous materials impacts in this section takes into account that EBMUD would incorporate its Standard Construction Specifications and Procedures into all Project activities. The requirements include preparation of plans that outline procedures to follow 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.

A significant impact would occur if, after considering the features described in the Project Description and the required compliance with regulatory requirements, an impact would still occur. For those impacts considered to be significant, mitigation measures are proposed to reduce the identified impacts.

Significance Criteria

Consistent with Appendix G of the *CEQA Guidelines,* a hazards and hazardous materials impact would be considered significant if the Project would:

1. Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials.
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.
3. Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school.
4. Be located on a site that is included on a list of hazardous materials sites complied pursuant to Government Code Section 65962.5 and, as a result, would create a significant hazard to the public or the environment.
5. For a project within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, the Project would result in a safety hazard or excessive noise for people residing or working in the Project area.
6. Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.
7. Expose people or structures, either directly or indirectly, to the risk of loss, injury, or death involving wildland fires.
8. Relating to wildfire, if the Project were located in or near state responsibility areas or lands classified as very high fire hazard severity zone and it were to:

a. Substantially impair an adopted emergency response plan or emergency evacuation plan.

b. Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose Project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire.

c. Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts on the environment.

d. Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of run-off, post-fire slope instability, or drainage changes.

Criteria Requiring No Further Evaluation

Criteria listed above that are not applicable to actions associated with the Project are identified below, along with the supporting rationale as to why further consideration is unnecessary and a no-impact determination is appropriate.

- ***Criterion 4: Be located on a site that is included on a list of hazardous materials sites complied pursuant to Government Code Section 65962.5 and as a result, would create a significant hazard to the public or the environment.*** The Project site is not included on a list of hazardous materials sites (Cortese List) pursuant to Government Code Section 65962.5; therefore, there is no impact.

- ***Criterion 5: For a project located within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, would the Project result in a safety hazard or excessive noise for people residing or working in the Project area.*** The closest airport is Oakland International Airport, approximately 4-miles south of the Project site. The Project would not use any aeronautical equipment and would therefore not interfere with the airspace for any airport. None of the Project activities would create any significant hazards for people residing or working in or near an airport. Therefore, there would be no impact associated with creating hazards near a public airport.

- ***Criterion 7 and 8: Expose people or structures, either directly or indirectly, to the risk of loss, injury, or death involving wildland fires; and for a project located in or near state responsibility areas or land classified as very high fire hazard severity zone, substantially impair an adopted emergency response plan or emergency evacuation plan, exacerbate wildfire risks and expose Project occupants to pollutant concentrations from a wildfire, require the installation or maintenance of associated infrastructure that may exacerbate fire risk or that may result in temporary or ongoing impacts on the environment, and/or expose people or structures to significant risk as a result of runoff, post-fire slope instability, or other drainage changes.*** The Project is located completely in an urban/suburban area and would not include work in wildlands. The Project site is not within a state responsibility area or very high fire hazard severity zone, as delineated by regulatory maps provided by CAL FIRE (CAL FIRE, 2007, 2008), nor is it identified in the City of Oakland General Plan as a fire hazard area (City of Oakland, 2004). The Project would not expose people or structures to a potential wildfire. Therefore, there would be no impact on the public from wildfires.

Impacts and Mitigation Measures

Impacts HAZ-1 and HAZ-2: 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 likely release of hazardous materials into the environment. (Criterion 1 and 2)

Construction

During the Project demolition and new construction phases, construction equipment and building materials may include the following substances: fuels, oils and lubricants, solvents and cleaners, cements and adhesives, paints and thinners, degreasers, cement and concrete, and asphalt mixtures. Relatively small amounts of the previously listed substances, which are not considered acutely hazardous, would be transported, used, and disposed of during construction. The routine use or an accidental spill of hazardous materials could result in inadvertent releases, which could adversely affect construction workers, the public, and the environment. 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 Project area in accordance with RCRA and USDOT regulations, managed in accordance with the ACDEH 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 is mandatory, Project construction activities are not expected to create a potentially significant hazard to the public or the environment.

Implementation of the Project would involve the demolition and removal of existing structures, as described in Chapter 2, *Project Description*. As described in Section 3.8.1, Environmental Setting, hazardous building materials are known to be present in the structures and include ACM, LBP, PCBs, and pentachlorophenol. The demolition activities could release hazardous building materials. As described in Section 3.8.2, numerous existing regulations require that demolition and construction activities that may disturb or require the removal of hazardous materials be inspected and/or tested for the presence of hazardous materials. If present, the hazardous materials must be managed and disposed of in accordance with applicable laws and regulations, as further described below.

General Procedures to Address Hazardous Materials during Construction

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 24, Project Safety Requirements, Section 1.3(B), Project Safety and Health Plan, and Standard Construction Specification 01 35 44, Environmental Requirements, Section 1.1(B), Site Activities, Section 1.3(A), Strom Water Management, Section 1.3(C), Construction and Demolition Waste Disposal Plan, and Section 1.3(D), Spill and Prevention Response Plan, and Procedure 711, Hazardous Waste Removal. Standard Construction Specification 01 35 24, Section 1.3(B) requires that 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 plan would also describe 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, dewatering, means of access and egress, storage of materials, and equipment restrictions. The contractor would also prepare an Excavation Safety Plan, approved by EBMUD, that describes measures for worker protection and control of ground movement.

Through implementation of EBMUD Standard Construction Specification 01 35 44, Section 1.1(B), Site Activities, and Section 1.3(A), Storm Water Management, activities on the construction site would be controlled to prevent the discharge of sediment and/or other pollutants in stormwater. Section 1.3(A), Storm Water Management, would require the submittal of a SWPPP, which would describe measures to be implemented to prevent the discharge of contaminated stormwater runoff from the worksite. The Water Control and Disposal 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 applicable regulations of local, state, and federal agencies with jurisdiction over the disposal of removed materials.

Implementation of EBMUD Standard Construction Specification 01 35 44, Section 1.3(B), Water Control and Disposal Plan, would require that the contractor submit a detailed Water Control and Disposal Plan for EBMUD’s acceptance prior to any work at the jobsite. The plan would comply with requirements of all applicable discharge permits, and the contractor would maintain proper control of the discharge point to prevent erosion, scouring of bank, nuisance, contamination, and excess sedimentation into receiving waters.

Implementation of EBMUD Standard Construction Specification 01 35 44, Section 1.3(C), Construction and Demolition Waste Disposal Plan, would require that prior to construction, the contractor must 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 Construction and Demolition Waste Disposal 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.

Implementation of EBMUD Standard Construction Specification 01 35 44, Section 1.3(D), Spill and Prevention Response Plan, would require that prior to construction, the contractor shall submit a Spill and Prevention Response Plan detailing the means and methods for preventing and controlling the spilling of known hazardous substances used on the worksite or staging areas, and shall include a list of the hazardous substances proposed for use or generated by the contractor on site.

Implementation of EBMUD Procedure 711, Hazardous Waste Removal, will define hazardous wastes and establish responsibilities for the removal of hazardous wastes from EBMUD facilities; require the contractor to carry out specific steps and responsibilities for characterizing waste and determining what analyses are needed to classify the waste; coordinate waste disposal with EBMUD's Environmental Compliance Manual; ensure correct labeling, storing, inspecting, and maintaining of inventory records for waste; and require reviewing, signing, and tracking of any hazardous waste handling, disposal requirements, and hazardous waste manifests.

Asbestos Containing Materials

As described in Section 3.8.1, the reservoir roof contains ACM. During demolition, the roof would be dismantled, removed, and discarded. 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 02 82 13, Asbestos Control Activities (described in Section 3.8.2), which requires that the contractor submit a detailed plan of the procedures to address ACM. The plan shall include the location and layout of decontamination areas, the sequencing of asbestos work, the interface of trades involved in the performance of work, disposal plan including location of approved disposal site, a detailed description of the methods to be employed to control pollution, description of the use of portable high efficiency particulate air (HEPA) ventilation system, method of removal to prohibit visible emissions in the work area (including suppressing air-borne particulates using a minimum of two misting units operated simultaneously), and packaging of removed asbestos debris.

Pursuant to state and local regulations, as well as EBMUD Standard Construction Specification 02 82 13, a site-specific Hazard Control Plan would be prepared and a State-Certified ACM removal contractor would be retained. Wastes from abatement and demolition activities would be transported to and disposed of at a Class I or a certified Class II landfill permitted to accept such waste. Once all abatement measures have been implemented, the contractor would conduct a clearance examination and provide documentation that testing and abatement were completed in accordance with federal, state, and local laws and regulations. The required compliance with these regulations, along with implementation of EBMUD Standard Construction Specifications and Procedures during Project construction, would ensure that the Project's impacts related to the release of ACM into the environment would be less than significant.

Lead-Based Paint (LBP)

As described in Section 3.8.1, LBP may be present at the on-site material storage building. 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 02 83 13, Lead Hazard Control

Activities, described in Section 3.8.2 and below. 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 as described in Section 3.8.2.

The contractor shall be responsible for securing the worksite entrances and exits from all unauthorized persons, as well as securing the worksite at the end of each day, as is common practice on all EBMUD construction projects to protect the construction/demolition crew and the public from exposure to lead-based coatings. Any equipment used in the transportation of any hazardous waste shall be properly registered with all applicable controlling agencies to ensure its suitability to handle and transport hazardous waste products.

As described in EBMUD Standard Construction Specification 02 83 13, Lead Hazard Control Activities, a site-specific Hazard Control Plan would be prepared and a state-certified LBP removal contractor would be retained. Wastes from abatement and demolition activities would be transported to and disposed of at a Class I or certified Class II landfill permitted to accept such waste. Once all abatement measures have been implemented, the contractor would conduct a clearance examination and provide documentation that testing and abatement were completed in accordance with federal, state, and local laws and regulations. The required compliance with these regulations, along with implementation of EBMUD Standard Construction Specifications and Procedures during Project construction, would ensure that the Project's impacts related to the release of LBP into the environment would be less than significant.

Polychlorinated Biphenyls (PCBs)

As described in Section 3.8.1, the panel craft lining system contains PCBs. In an agreement with the Alameda County District Attorney's Office, EBMUD agreed to remove PCB contaminants in the existing reservoir liner materials (EBMUD, 2015). The Central Reservoir does not contain construction materials that produce a health risk to water consumers because they have extremely low (undetectable) solubility in water. PCBs in the panel craft lining were found to have concentrations above the TTLCs, which could expose construction workers to hazards materials when they demolish the liner and remove the materials (EBMUD, 2018b). The panel craft liner and possible other sealants would be tested, characterized, and properly handled and disposed of during demolition. 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 EBMUD Standard Construction Specification 01 35 24, Section 1.3(B), Project Safety Requirements, which require any personnel likely to be exposed to hazardous conditions or substances at the site have completed all appropriate training for the hazards they may encounter (as described in Section 3.8.2). The contractor's qualified Project Safety and Health Representative shall be responsible for ensuring that all personnel are in compliance with applicable health and safety requirements. The contractor shall take representative personnel air samples to monitor the exposure to any airborne contaminants.

EBMUD Standard Construction Specification 01 35 44, Section 1.3(C), Construction and Demolition Waste Disposal Plan, shall be submitted for EBMUD's approval, identifying how the contractor will remove, handle, transport, and dispose of all materials that require removal in a manner that complies with local, state, and federal agencies having jurisdiction over the disposal of removed materials. Additionally, EBMUD Procedure 711, Hazardous Waste Removal, defines hazardous wastes and establishes responsibilities for the removal of such wastes from EBMUD facilities. The materials would be transported to and disposed of at a Class I or certified Class II licensed facility permitted to accept the materials in compliance with applicable local, state, and federal laws and regulations. The required compliance with these regulations, along with implementation of EBMUD Standard Construction Specifications and Procedures during Project construction, would ensure that the Project's impacts related to PCBs would be less than significant.

Pentachlorophenol

As described in Section 3.8.1, pentachlorophenol may be present in the reservoir timber girders. Material testing during construction would confirm the presence of pentachlorophenol in the treated timber elements. Should testing confirm the presence of pentachlorophenol, EBMUD standard practices and procedures will be followed to ensure public and workers safety. EBMUD Standard Construction Specification 01 35 24, Section 1.3(B), Project Safety Requirements; Standard Construction Specification 01 35 44, Section 1.3(C), Construction and Demolition Waste Disposal Plan; and EBMUD Procedure 711, Hazardous Waste Removal, would all be applicable and enforced if pentachlorophenol is present. As stated above, these specifications would ensure that any hazardous substance or material would be properly handled and stored during demolition, as well as properly transported and disposed of upon completion of demolition. The materials would be transported and disposed of at a Class I or certified Class II licensed facility permitted to accept the materials in compliance with applicable local, state, and federal laws and regulations.

The required compliance with the numerous laws and regulations described above, along with 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 pentachlorophenol into the environment would be less than significant.

Operation

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 three 17-million-gallon water tanks and a drainage basin. Once constructed, operation of the water storage facilities would not require the use of hazardous materials and would not generate hazardous waste. Therefore, the impact from operation of the Project is less than significant, and no mitigation is required.

Significance Determination Before Mitigation

Less than significant.

Mitigation Measures

None 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. (Criterion 3)

Construction

Four schools are within one-quarter mile of the Project site (refer to Table 3.8-1, above), and as previously described, construction activities would involve handling hazardous materials, substances, and waste. As described 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, Environmental Requirements, Section 1.3(C) and Section 1.3(D), and Standard Construction Specification 01 35 24, Project Safety Requirements, Section 1.3(B), which stipulate that the construction crew shall be responsible for complying with applicable federal, state, and local requirements. The requirements include preparation of the plans that are summarized in Section 3.8.2, which outline procedures to follow 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 documents and specified laws and regulations. Construction in accordance with these requirements would ensure that impacts associated with handling hazardous materials within one-quarter mile of a school would be less than significant.

Operation

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. Once constructed, operation of the water storage facilities would not require the use of hazardous materials and would not generate hazardous waste. Therefore, there would be less-than-significant impacts associated with the use of hazardous materials within one-quarter mile of a school.

Significance Determination Before Mitigation

Less than significant.

Mitigation Measure

None required.

Impact HAZ-4: Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan. (Criterion 6)

Construction

The Alameda County Office of Homeland Security and Emergency Services developed the Alameda County Emergency Operations Plan (2012); The plan does not provide any specific evacuation routes, as these are anticipated to be coordinated by local law enforcement and emergency services. Project construction activities would not require any full roadway closures. There would be partial road closures associated with the installation of pipeline work, which would take place in East 29th Street over a period of approximately 1 week, including approximately 2 nights.

As described in the Project Description, a number of EBMUD standard practices and procedures, applicable to all EBMUD projects, have been incorporated into the Project, including, including Standard Construction Specification 01 55 26, Traffic Regulation, Section 1.2, which requires a Traffic Control Plan, including a description of emergency response vehicle access. The Traffic Control Plan would include flaggers to control traffic where alternating one-way traffic is necessary and provide guidance to motorists as to when and how to safely move around the Project site entrances and along East 29th Street during construction. Warning signs used for nighttime conditions would also be posted. Access to driveways would be maintained at all times, and open trenches would be covered (plated) at the end of the day on a daily basis to provide access. Impacts on emergency access would be less than significant because the Traffic Control Plan would include a description of emergency response vehicle access to ensure that emergency responders have access during the construction period. Additionally, as described in Section 3.8.2, Regulatory Framework, EBMUD Standard Construction Specification 01 35 24, Section 1.3(B), requires that, before the start of construction, the contractor shall prepare a Project Safety and Health Plan approved by EBMUD. The Project Safety and Health Plan would 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, rescue teams) resulting in a less-than-significant impact.

Operation

Vehicle trips generated by Project operations would remain the same as the existing conditions, with 4 monthly vehicle trips for operation and maintenance activities. The existing street network currently accommodates access by emergency vehicles that travel to and around the Project site. Once the pipeline work is completed for the rate control station, the pipeline alignment along East 29th Street would be repaved and would be essentially unchanged from existing conditions. The Project would not include any permanent physical changes in the roadways surrounding the Project site that would impede emergency vehicle access. Emergency vehicles would be able to access the roadways surrounding the Project site in the same way as under existing conditions. Therefore, the Project operational impacts on emergency vehicle access would be less than significant.

Significance Determination Before Mitigation

Less than significant.

Mitigation Measure

None required.

Cumulative Impact Analysis

The geographic scope of the analysis for cumulative hazards and hazardous materials impacts is limited to the Project site and its immediately adjacent area that would experience construction activity by cumulative projects at the same time as the Project. Impacts relative to hazards and hazardous materials are generally site-specific and depend on the nature and extent of the hazards and hazardous materials released, and existing and future soil and groundwater conditions. For example, hazardous materials incidents tend to be limited to small, localized areas surrounding the immediate spill location and extent of the release, and could only be cumulative if two or more hazardous materials releases spatially and temporally overlapped.

A significant cumulative impact related to hazards and hazardous material would occur if the incremental impacts of the Project combined in space and time with that of a cumulative project to substantially increase risk that people or the environment would be exposed to hazards and hazardous materials. As described above, the Project would have no impact with respect to being located on a site that is included on a list of hazardous materials sites, within 2 miles of a public or private airstrip, or wildland fire hazards. Accordingly, the Project could not contribute to cumulative impacts related to these topics, which are not described further.

Cumulative Impacts during Project Construction

Ten projects in the cumulative scenario are near or adjacent to the Project that could be constructed at the same time. Each project would be subject to the same regulatory requirements, including the implementation of health and safety plans and soil and groundwater management plans, as needed. That is, cumulative projects involving releases of or encountering hazardous materials would all be required to remediate their respective sites to the same established regulatory standards. This would be the case regardless of the number, frequency, or size of the release(s), or the residual amount of chemicals present in the soil from previous spills. While it is possible that the Project and cumulative projects could result in releases of hazardous materials at the same location and time, the responsible party associated with each spill would be required to remediate site conditions to the same established regulatory standards. The potential residual effects of the Project that would remain after compliance with regulatory requirements would not combine with the potential residual effects of cumulative projects to cause a significant cumulative impact because residual impacts would be highly site-specific and would have been cleaned up to the same regulatory standard. Accordingly, no substantial cumulative impact with respect to the use of hazardous materials would result. For these reasons, the Project would have a less-than-significant contribution to a cumulative impact with respect to hazards and hazardous materials during construction.

As with the Project, cumulative projects could also require temporary lane closures that could interfere with emergency plans or routes, which would be a significant cumulative impact. However, similar to the Project, cumulative projects that require temporary lane closures would also be required by the local agency with jurisdiction to implement traffic control plans to enable flow around construction zones. Therefore, the Project would have a less-than-significant contribution to a cumulative impact with respect to emergency plans or routes.

Cumulative Impacts during Project Operations

Operation of the Project would not result in the routine use or transport of hazardous materials within the Project area, nor would it generate hazardous waste or release hazardous materials into the environment and, therefore, would not contribute to cumulative impacts related to hazardous materials.

Vehicle trips generated by Project operations would remain the same as the existing conditions. With approximately 4 monthly vehicle trips for operation and maintenance activities, the Project's contribution to the existing street network would be negligible and would, therefore, could not cumulatively interfere with an adopted emergency response plan or emergency evacuation plan.

3.8.4 References

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3.9 Hydrology and Water Quality

This section describes existing hydrology and water quality in the Project area, including stormwater management, groundwater conditions, and the existing regulatory framework governing these topics. Potential impacts that could result from construction and operation of the Project and mitigation measures to avoid or reduce significant adverse impacts are described. The impact assessment includes an evaluation of water quality issues related to construction activities as well as operation of the Project. This section is based on a Hydrology Report that was prepared for the Project (Appendix I; ESA, 2018).

3.9.1 Environmental Setting

Regional and Local Hydrology

EBMUD's Central Reservoir is located in the city of Oakland within the 4.2-square-mile Sausal Creek watershed. Topography in the watershed ranges in elevation from 1,500 feet above sea level in the Oakland-Berkeley Hills to near sea level at the lower San Francisco Bay (Alameda FCWCD, 2017). The estimated average annual precipitation in Oakland is approximately 21 inches. Seventy-three percent of the watershed is classified as developed/urban, of which 21 percent is impervious surface. Upstream of the Project site, Sausal Creek is fed by ephemeral tributaries draining the western slope of the Oakland-Berkeley Hills before reaching the main channel, which flows through Diamond Canyon as an open channel, and then through a culverted reach under Interstate 580 (I-580), which flows in a southeast direction approximately 800 feet east of the Central Reservoir (Figure 3.9-1). Downstream of the Project site, Sausal Creek is a mixture of natural and engineered urban channel reaches that flow into the Oakland Tidal Canal.

The area of the Sausal Creek watershed upstream of the point of connection at the Central Reservoir site encompasses approximately 3.9 square miles (2,500 acres). Run-off from the Project site currently discharges to Sausal Creek via the East 27th Street storm drain outfall. Sausal Creek has been identified by the San Francisco Bay Regional Water Quality Control Board (SFBRWQCB) as an impaired waterway, meaning the creek does not meet one or more water quality standards established by the state (SFBRWQCB, 2017). The impairment status (for the pollutant, trash) is currently being addressed by a Total Maximum Daily Load (TMDL),[1] as described in Section 3.9.2, Regulatory Framework.

Groundwater

The Project site overlies the East Bay Plain sub-basin as part of the larger Santa Clara Valley groundwater basin, which is identified by the California Department of Water Resources (DWR) as a medium priority groundwater basin (DWR, 2014). Beneficial uses of this groundwater basin include municipal and domestic water supply, industrial

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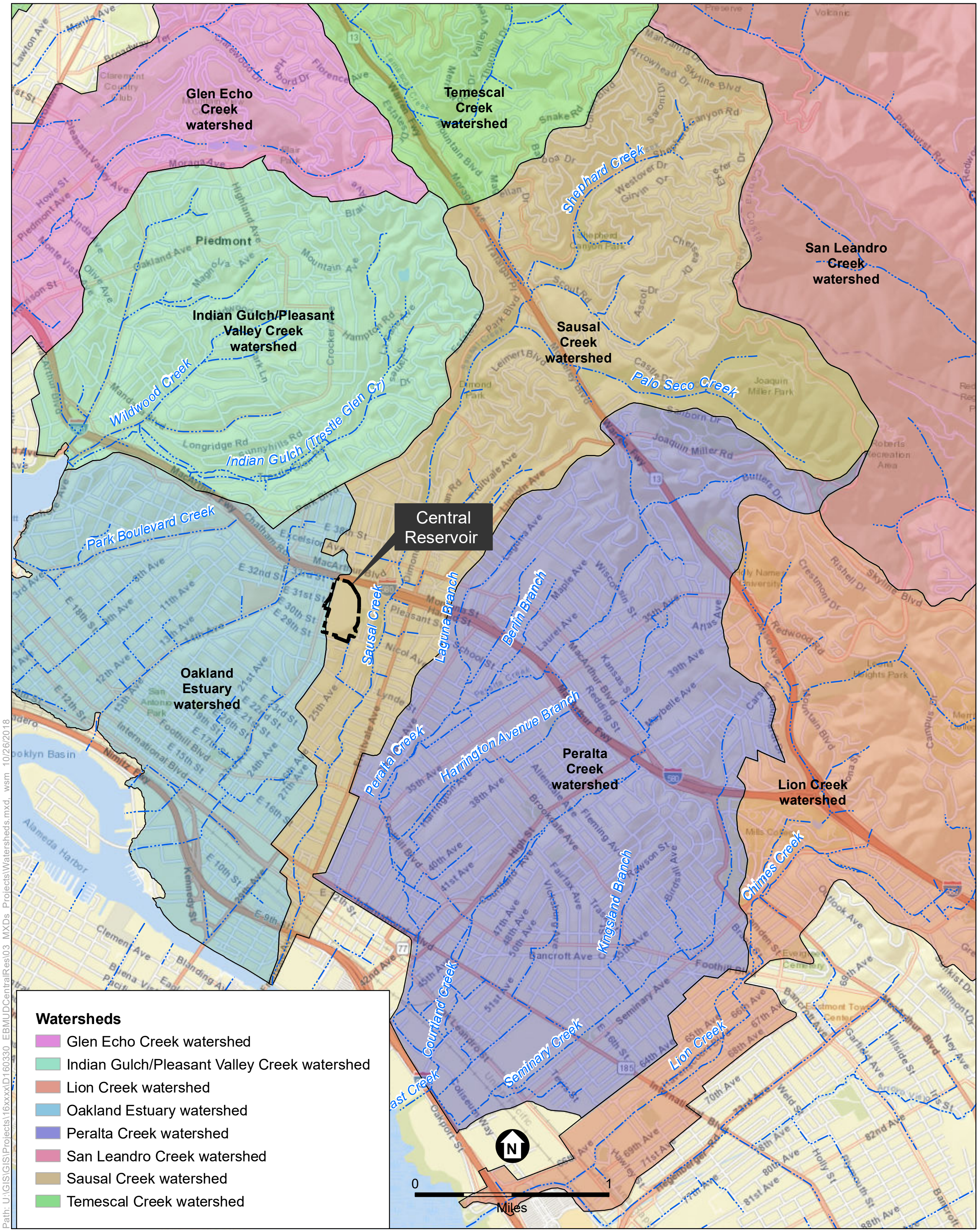
1 Clean Water Act Section 303(d) List of Impaired Water Bodies triggers development of a Total Maximum Daily Load (TMDL) for that water body and a plan to control the associated pollutant/stressor on the list. The TMDL is the maximum amount of a pollutant/stressor that a water body can assimilate and still meet the water quality standards.



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SOURCE: ESRI World Imagery; EBMUD, 2017; ESA, 2017; Oakland Museum, 2011

EBMUD Central Reservoir Replacement Project

Figure 3.9-1
Watersheds in the Project Vicinity

process water supply, and agricultural water supply (SFBRWQCB Groundwater Committee, 1999). The Central Reservoir Seismic Stability Evaluation Report determined that, based on a review of historical piezometer data, the depth to groundwater at the Central Reservoir main dam site was estimated to be approximately 150-feet above mean sea level at the toe of the existing main embankment (EBMUD, 2008). For comparison, the groundwater elevation of the EBMUD property line at the corner of 25th Avenue/East 29th Street is at an elevation of approximately 155-feet. Groundwater quality in the San Francisco Bay region has been noted as being suitable for most urban and agricultural uses, with only local impairments. Primary constituents of concern are high total dissolved solids, nitrate, boron, and organic compounds (DWR, 2003).

Site Drainage

The Central Reservoir is a covered facility with approximately 19 acres of impervious roof covering the existing reservoir, as shown on Figure 2-2. The total impervious surface area on the site is approximately 20.4 acres, which includes the roof and site paving. During rain events, stormwater is conveyed from the roof and site paving through a storm drain system on site. An existing storm drain catch basin on the south portion of the Project site conveys stormwater through the storm drain system from the corner of 25th Avenue and East 29th Street for discharge at the 27th Street outfall into Sausal Creek.

Reservoir Underdrain and Creek Flow

The Central Reservoir's existing underdrain system runs down the central axis of the reservoir, just beneath the reservoir lining, and conveys the collected water to the storm drain system at the corner of 25th Avenue and East 29th Street. Under existing conditions, the underdrain captures a combination of two potential sources of water: treated water that leaks through the reservoir lining, and groundwater that enters the reservoir underdrain through weep holes[2] when groundwater levels approach the base of the reservoir. The balance between reservoir leakage and groundwater has not been quantified because the water becomes commingled before it can be captured and measured. The underdrain is gauged, and typically conveys approximately 20 gallons per minute of flow to the 25th Avenue storm drain based on EBMUD's underdrain flow records from 2006 to 2017 (ESA, 2018). During the winter, the flows from the underdrain are negligible compared to the surface water drainage entering the creek from the watershed. During the summer, when surface water drainage declines, the flow from the underdrain may contribute up to 50 percent of the creek flow below East 27th Street.

The survey conducted for the Hydrology Report (see Appendix I) measured streamflow and observed the physical conditions in Sausal Creek to assess the quality of the aquatic and riparian habitat potentially affected by the Project. The Hydrology Report determined conditions downstream of the East 27th Street storm drain outfall to be similar to those in the upstream reach. For example, the number and residual depth of pools (which play an

[2] Weep holes and relief drains are installed to relieve water pressure or drain seepage from behind or beneath concrete structures.

important role as summer refuge for aquatic species) were similar in both reaches, and there were no dry sections of creek upstream of the outfall. Although the upper reach had only half as much flow as the lower reach during the survey, flow was sufficient (upstream of the Project site) to fill all pools to an adequate depth to support and keep the pools filled in the dry season. Similarly, the wetted area of riffles[3] appeared to be similar in both reaches. Because conditions related to habitat quality are similar above and below the point where the underdrain discharges into the creek under existing conditions, habitat quality appears not to be dependent on the flow from the underdrain (ESA, 2018).

Flood Hazards

Flood hazards in the urban environment are influenced by development patterns, as storm events contribute to rapid run-off over impervious surfaces and flood local waterways. Coastal flooding, dam failure, and sea-level rise can also present flood hazards for coastal cities. The City of Oakland General Plan identifies excess stormwater run-off as the flood hazard with the greatest potential to affect Oakland (City of Oakland, 1996). The Federal Emergency Management Agency (FEMA) has developed the Risk Mapping, Assessment, and Planning (Risk MAP) program to identify flood hazard areas, assess flood risks, provide accurate data to support the National Flood Insurance Program, guide floodplain management, and inform planning decisions (FEMA, 2016). The Project site and the surrounding community are not located in a flood-prone area, as identified by FEMA's Risk MAP program (FEMA, 2009).

Dam Failure

The Central Reservoir is a 154-million-gallon open-cut reservoir, currently under the jurisdiction of the California Division of Safety of Dams (DSOD). The Central Reservoir is impounded by two earthen embankment dams: the main embankment dam constructed in 1910 and the auxiliary embankment dam constructed in 1961. In the unlikely event of a dam failure, the southeast portion of the site and downstream community would be located in a dam failure inundation area (City of Oakland, 2004).

Tsunami and Seiche

A tsunami is a series of large ocean waves generated either by large submarine earthquakes generating significant upward movement of the sea floor, or landslides within or falling into the ocean. Tsunamis affecting the San Francisco Bay region would originate west of San Francisco Bay in the Pacific Ocean. Historically, the San Francisco Bay Area has been affected by tsunamis generated by earthquakes originating as far north as Alaska, and as far south as central Chile (CDC, 2015). Because of the shape of the San Francisco Bay, a mostly enclosed body of water, energy from seismic events would likely dissipate, making severe damage from tsunamis in Oakland unlikely. The Project is not in a tsunami inundation area, as mapped by the California Department of Conservation (CDC, 2009).

3 A riffle is a shallow, rocky part of a waterway where water becomes oxygenated.

Seiches are waves in body of water resulting from seismic activity. The Project site is not in an area susceptible to seiches (City of Oakland, 2004).

3.9.2 Regulatory Framework

Federal Regulations

Clean Water Act

Under the Clean Water Act (CWA) of 1977, the United States Environmental Protection Agency (U.S. EPA) seeks to restore and maintain the chemical, physical, and biological integrity of the nation’s waters by implementing water quality regulations. Multiple sections of the CWA apply to activities near or within surface or groundwater.

Section 402(p) of the CWA regulates discharges to surface waters through the National Pollutant Discharge Elimination System (NPDES) program, a nationwide surface water discharge permit program for municipal and industrial point sources, further described below. In California, NPDES permitting authority is delegated to and administered by the nine Regional Water Quality Control Boards (RWQCBs). Under Section 402, the San Francisco Bay RWQCB has set standard conditions for each permittee in the San Francisco Bay Area, including effluent limitation and monitoring programs. In addition to their responsibility to issue and enforce compliance with NPDES permits, the RWQCBs are responsible for the preparation and revision of the relevant regional Water Quality Control Plan, also known as the Basin Plan (described further under *State Regulations*).

Section 303(d) of the CWA requires that each state identify water bodies or segments of water bodies that are “impaired” (i.e., do not meet one or more of the water quality standards established by the state, even after point sources of pollution have been equipped with the minimum required levels of pollution control technology). The U.S. EPA must approve the 303(d) List of Impaired Water Bodies before it is considered final. Inclusion of a water body on the Section 303(d) List of Impaired Water Bodies triggers development of a TMDL for that water body and a plan to control the associated pollutant/stressor on the list. The TMDL is the maximum amount of a pollutant/stressor that a water body can assimilate and still meet the water quality standards. Typically, a TMDL is the sum of the allowable loads of a single pollutant from all contributing point and nonpoint sources. The Basin Plan is amended to legally establish the TMDL and to specify regulatory compliance, including specification of waste load allocations for entities that have permitted discharges. Table 3.9-1lists the beneficial uses and impairment status of water bodies in the Project area, including the pollutants that cause the impairments.

Once a water body is placed on the 303(d) List of Impaired Water Bodies, it remains on the list until a TMDL is adopted and the water quality standards are attained, or sufficient data demonstrate that water quality standards have been met and delisting should take place.

TABLE 3.9-1
BENEFICIAL USES AND IMPAIRMENT STATUS

Water Body	Beneficial Use(s)[a]	Impairment Status	Pollutants
San Leandro Bay (part of San Francisco Bay Lower)	COMM, EST, IND, MIGR, NAV, RARE, REC1, REC2, SHELL, WILD	At least one beneficial use is not supported and a TMDL is required; Mercury is being addressed with a U.S. EPA-approved TMDL	Chlordane, DDT, Dieldrin, Dioxin compounds, Furan Compounds, Invasive Species, Lead (sediment), Mercury, Polycyclic Aromatic Hydrocarbons (sediment), Pesticides (sediment), Zinc
Sausal Creek	COLD, RARE, SPWN, WARM, WILD, REC1, REC2	Being addressed with U.S. EPA-approved TMDL	Trash
East Bay Plain groundwater sub-basin	MUN, IND, AGR		

NOTES:
[a] Beneficial Use Codes: AGR: agricultural water supply; COLD: cold freshwater habitat; COMM: ocean commercial and sport fishing; EST: estuarine habitat; IND: industrial process water supply; MIGR: fish migration; MUN: municipal and domestic water supply; NAV: navigation; RARE: preservation of rare and endangered species; REC1: contact water recreation; REC2: non-contact water recreation; SHELL: shellfish harvesting; SPWN: fish spawning; WARM: warm freshwater habitat; WILD: wildlife habitat.

SOURCE: SFBRWQCB, 2017.

National Pollutant Discharge and Elimination System (NPDES) Program

The NPDES permit program is administered in California by the State Water Resources Control Board (SWRCB) and RWQCBs under the authority of the U.S. EPA to control water pollution by regulating point sources that discharge pollutants into Waters of the U.S.[4] If discharges from industrial, municipal, and other facilities go directly to surface waters, those project applicants must obtain permits. An individual NPDES permit is tailored to a specific discharge to Waters of the U.S. A general NPDES permit covers multiple facilities within a specific activity category, such as construction activities and applies with the same or similar conditions to all dischargers covered under the general NPDES permit. The Project would be covered under the general permits implemented by the state, as described further below.

Federal Antidegradation Policy

The federal Antidegradation Policy, established in 1968 under Section 303 of the CWA, is designed to protect existing uses, water quality, and national water resources. Implementation of antidegradation by the states is based on a set of procedures to be followed when evaluating activities that may impact the quality of the Waters of the U.S. Antidegradation implementation is an integral component of a comprehensive approach to protecting and enhancing water quality of both surface water and groundwater.

[4] The term “waters of the U.S.” generally refers to navigable waterways (including tidal waters), interstate waters, lakes, rivers, streams, and their tributaries, wetlands, wetland features, and territorial seas (per 40 CFR 230.3).

National Flood Insurance Program

FEMA determines flood elevations and floodplain boundaries based on U.S. Army Corps of Engineers studies. FEMA also distributes the Flood Insurance Rate Maps (FIRM) used in the National Flood Insurance Program. FIRMs identify the locations of special flood hazard areas, including 100-year floodplains. The Project is not located in a floodway or in an identified FIRM flood hazard area (FEMA, 2009).

Federal regulations governing development in a floodplain are set forth in Title 44, Part 60 of the Code of Federal Regulations (CFR). Those regulations enable FEMA to require municipalities participating in the National Flood Insurance Program to adopt certain flood hazard reduction standards for construction and development in 100-year floodplains. These standards are described below in *Local Regulations*.

State Regulations

Porter-Cologne Water Quality Control Act

The state of California's Porter-Cologne Water Quality Control Act (Porter-Cologne Act) provides the basis for water quality regulation within California and assigns primary responsibility for the protection and enhancement of water quality to the SWRCB and the nine RWQCBs. Under the Porter-Cologne Act, the SWRCB and RWQCBs also have the responsibility of granting CWA NPDES permits and Waste Discharge Requirements (WDRs) for certain point-source and nonpoint discharges to waters. The Porter-Cologne Act allows the California SWRCB to adopt statewide Water Quality Control Plans and Basin Plans, which serve as the legal, technical, and programmatic basis of water quality regulation statewide or for a particular region. The Water Quality Control Plans limit impacts on water quality from a variety of sources. The Basin Plan for the San Francisco Bay and the relevant permits are described below.

San Francisco Bay Water Quality Control Plan (Basin Plan)

San Francisco Bay waters are under the jurisdiction of the San Francisco Bay RWQCB, which established regulatory standards and objectives for water quality in the San Francisco Bay in the Water Quality Control Plan for the San Francisco Bay Basin, commonly referred to as the Basin Plan (SFBRWQCB, 2017). The Basin Plan identifies existing and potential beneficial uses for surface and groundwaters, and provides numerical and narrative water quality objectives designed to protect those uses. The preparation and adoption of Water Quality Control Plans are required by the California Water Code (Section 13240) and supported by the federal CWA. Because beneficial uses, together with their corresponding water quality objectives, can be defined pursuant to federal regulations as water quality standards, the Basin Plan is a regulatory reference for meeting the state and federal requirements for water quality control. Adoption or revision of surface water standards is subject to the approval of the U.S. EPA. Existing beneficial uses for water bodies in the Project area are listed above in Once a water body is placed on the 303(d) List of Impaired Water Bodies, it remains on the list until a TMDL is adopted and the water quality standards are attained, or sufficient data demonstrate that water quality standards have been met and delisting should take place.

Table 3.9-1.

Dewatering General Permit

The SWRCB has issued General WDRs under Order No. R8-2003-0061, NPDES No. CAG 998001 (Dewatering General Permit) governing non-stormwater construction-related discharges from activities such as dewatering, water line testing, and sprinkler system testing. The discharge requirements include provisions mandating notification, testing, and reporting of dewatering and testing-related discharges. The General WDRs authorize such construction-related discharges so long as all conditions of the permit are fulfilled. The Dewatering General Permit would apply to the Project for the testing of pipelines and in the event that groundwater is encountered during construction that requires dewatering.

Construction General Permit

The Construction General Permit *NPDES General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities* (Order 2009-0009-DWQ, NPDES No. CAS000002, Construction General Permit) regulates discharges of pollutants in stormwater associated with construction activity to Waters of the U.S. from construction sites that disturb 1 or more acres of land surface, or that are part of a common plan of development or sale that disturbs more than 1 acre of land surface. The Construction General Permit regulates stormwater discharges associated with construction or demolition activities, such as clearing and excavation; construction of buildings; and linear underground projects, including the installation of water pipelines and other utility lines.

The Construction General Permit requires the development and implementation of a Stormwater Pollution Prevention Plan (SWPPP) that includes specific best management practices (BMPs) designed to prevent pollutants from contacting stormwater and keep all products of erosion from moving off site into receiving waters. The SWPPP BMPs are intended to protect surface water quality by preventing the off-site migration of eroded soil and construction-related pollutants from the construction area. Routine inspection of all BMPs is required under the provisions of the Construction General Permit. In addition, the SWPPP is required to contain a visual monitoring program, a chemical monitoring program for non-visible pollutants, and a sediment monitoring plan if the site discharges directly to a water body listed on the 303(d) list for sediment. EBMUD's General Construction Specifications include specific provisions for the development of a SWPPP, described further below under *Local Regulations.*

Water Conservation Act of 2009/Senate Bill X7-7

The Water Conservation Act of 2009, also referred to as Senate Bill (SB) X7-7, requires water suppliers to increase their water use efficiency (DWR, 2018). Consistent with the Water Conservation Act, EBMUD has developed a comprehensive approach to water conservation through its Water Conservation Master Plan, which identifies a range of strategies to address water demand reduction targets, implement water savings measures, including distribution loss accounting, and plan for future conservation and drought response in an urban environment (EBMUD, 2011).

Local Regulations

Under Section 53091 of the California Government Code, EBMUD, as a local agency and utility district, is not subject to building and land use zoning ordinances (such as tree ordinances) for projects involving facilities for the production, generation, storage, treatment, or transmission of water. However, EBMUD's practice is to work with local jurisdictions and neighboring communities during project planning and to consider local environmental protection policies for guidance.

City of Oakland General Plan

The Open Space, Conservation, and Recreation Element of the City of Oakland General Plan contains the following objectives and policies pertaining to water resources (City of Oakland, 1996).

> **Objective CO-4: Water Supply.** To maintain a water supply sufficient to meet local needs while minimizing the need to develop new water supply facilities.
>
> > ***Policy CO-4.1:*** **Water Conservation.** Emphasize water conservation and recycling strategies in efforts to meet future demand.
> >
> > > *Action CO-4.1.1:* Implementation of the Urban Water Management Plan: Issue Administrative Instructions to implement the water conservation strategies and programs outlined in the 1991 East Bay Municipal Utility District Urban Water Management Plan at the local level. Develop a strategy to reduce the city's water consumption by 20 percent by 2005.
> >
> > ***Policy CO-4.2:*** **Drought-Tolerant Landscaping.** Require the use of drought-tolerant plants to the greatest extent possible and encourage the use of irrigation systems that minimize water consumption.
> >
> > > *Action CO-4.2.1:* Adoption of Water-Efficient Landscape Ordinance.
>
> **Objective CO-5: Water Quality.** To minimize the adverse effects of urbanization on Oakland's groundwater, creeks, lakes, and nearshore waters.
>
> > ***Policy CO-5.1:*** **Protection of Groundwater Recharge.** Encourage groundwater recharge by protecting large open space areas, maintaining setbacks along creeks and other recharge features, limiting impervious surfaces where appropriate, and retaining natural drainage patterns within newly developing areas.
> >
> > > *Action CO-5.1.2:* Stormwater Dispersion Methods. Consider adopting stormwater dispersion provisions for development projects on soils with high percolation rates. Among these provisions, include omission of curbs, gutters, and paved sidewalks, and use of run-off-absorbing rock drains and dry wells on appropriate sites.

Policy CO-5.2: **Improvements to Groundwater Quality.** Support efforts to improve groundwater quality, including the use of nontoxic herbicides and fertilizers, the enforcement of anti-litter laws, the clean-up of sites contaminated by toxics, and ongoing monitoring by the Alameda County Flood Control and Water Conservation District.

Policy CO-5.3: **Control of Urban Run-off.** Employ a broad range of strategies, compatible with the Alameda Countywide Clean Water Program, to: (a) reduce water pollution associated with stormwater run-off; (b) reduce water pollution associated with hazardous spills, run-off from hazardous material areas, improper disposal of household hazardous waters, illicit dumping, and marina "live-aboards"; and (c) improve water quality in Lake Merritt to enhance the lake's aesthetic, recreational, and ecological functions.

Action CO-5.3.1: Pretreatment of Run-off: In accordance with the Countywide Clean Water Program, study the feasibility of enacting stormwater retention and pretreatment requirements for developments meeting certain criteria.

Objective CO-6: Surface Waters. To protect the ecology and promote the beneficial uses of Oakland's creeks, lakes, and nearshore waters.

Policy CO-6.1: **Creek Management.** Protect Oakland's remaining natural creek segments by retaining creek vegetation, maintaining creek setbacks, and controlling bank erosion. Design future flood control projects to preserve the natural character of creeks, and incorporate provisions for public access including trails where feasible. Strongly discourage projects that bury creeks or divert them into concrete channels.

Policy CO-6.5: **Protection of Bay and Estuary Waters.** Protect the surface waters of the San Francisco Estuary system, including San Francisco Bay, San Leandro Bay, and the Oakland Estuary. Discourage shoreline activities which negatively impact marine life in the water and marshland areas.

Municipal Regional Stormwater Permit C.3 Provisions for New Development and Redevelopment

The CWA regulates stormwater run-off pollution through the NPDES stormwater program. Under rules promulgated by the U.S. EPA, Municipal Separate Storm Sewer Systems (MS4) operators permitted under NPDES are required to have stormwater management programs. In November 2015, the San Francisco Bay and Central Valley RWQCBs included the C.3 provision in their Municipal Separate Storm Sewer System NPDES permits. To comply with the federal CWA regulations, Alameda County, 13 cities, the Alameda County Flood Control and Water Conservation District, and the Zone 7 Water Agency have joined together to form the Alameda County Clean Water Program (ACCWP). The ACCWP is responsible for ensuring that Alameda County complies with its municipal stormwater NPDES permit. Provision C.3 of the municipal stormwater permit governs both new development and redevelopment of existing facilities (ACCWP, 2018; SFBRWQCB, 2015).

The ACCWP C.3 Stormwater Technical Guidance Manual provides site design recommendations to prevent increases in run-off flows and to address run-off pollutant discharges (ACCWP, 2018). Projects on previously developed sites need to retrofit drainage to provide treatment of run-off 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 an existing facility, and the existing facility were not subject to stormwater treatment measures. The Project would implement low impact design elements consistent with the ACCWP C.3 guidance.

EBMUD Standard Construction Specifications

EBMUD Standard Construction Specification 01 35 44 (Environmental Requirements) sets forth the contract requirements for environmental compliance to which construction crews must adhere, including provisions for protection of water quality during construction (EBMUD, 2018).

The General Requirements of EBMUD 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 Standard Construction Specification 01 35 44 Section 1.1(B) 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 run off 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 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.** EBMUD Standard Construction Specification 01 35 44 Section 1.3(A) requires that 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 stormwater 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.** EBMUD Standard Construction Specification 01 35 44 Section 1.3(B) requires that the Contractor shall submit a detailed Water Control and Disposal Plan for 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. The 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.** EBMUD Standard Construction Specification 01 35 44 Section 1.3(D) requires that 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 EBMUD and appropriate agencies including phone numbers; spill-related worker, public health, and safety issues; spill control, and spill cleanup.

EBMUD Environmental Compliance Manual

EBMUD's Environmental Compliance Manual requires implementation of procedures during construction to protect workers and the environment (EBMUD, 2010). 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 Trench Spoil Best Management Practices 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.

3.9.3 Impact Analysis

Methodology for Analysis

The impact analysis assesses the potential for the Project to result in adverse impacts related to hydrology and water quality using pre-Project (existing) site conditions as a baseline for impact comparison. The potential for adverse impacts is analyzed using available data from site-specific investigations, including the Hydrology Report prepared for the Project, water quality protection measures outlined in the SFBRWQCB Basin Plan, and additional guidance provided in local plans and regulations related to hydrology and water quality.

The Project would be regulated by and be expected to comply with the various laws, regulations, and policies summarized in Section 3.9.2, Regulatory Framework. Note that compliance with many of the regulations is a condition of permit approval. This analysis also assumes that the Project would include implementation of EBMUD's Standard Construction Specifications, which contain explicit guidance regarding site activities, spill prevention, discharge provisions, and stormwater management, among other requirements pertaining to hydrology and water quality.

A significant impact would occur if, after considering the design features described in the Project Description and the required compliance with regulatory requirements, an impact would still occur. For those impacts considered to be significant, mitigation measures are proposed to avoid or reduce the severity of identified impacts.

Significance Criteria

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

1. Violate any water quality standards or waste discharge requirements, or otherwise substantially degrade surface or groundwater quality.
2. Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the Project may impede sustainable groundwater management of the basin.
3. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or through the addition of impervious surfaces, in a manner which would:
   a. Result in a substantial erosion or siltation on or off site;
   b. Substantially increase the rate or amount of surface run-off in a manner that would result in flooding on or off site;
   c. Create or contribute run-off water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted run-off; or
   d. Impede or redirect flood flows.
4. In flood hazard, tsunami, or seiche zones, risk release of pollutants due to Project inundation.
5. Conflict with or obstruct implementation of a Water Quality Control Plan or Sustainable Groundwater Management Plan.

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.

- ***Criteria 4: In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation.*** The Project is not located in an area susceptible to seiches or tsunamis (City of Oakland, 2004); therefore, there would be no impact.

Impacts and Mitigation Measures

Impact HYD-1: Violate water quality standards or waste discharge requirements, or otherwise substantially degrade water quality. (Criterion 1)

Construction

Construction of the Project would require grading, excavation, and other soil-disturbing activities on the Project site, potentially delivering sediment and other pollutants to receiving waters. These general construction activities could result in pollutants being mobilized and transported off site by stormwater run-off (nonpoint-source pollution), potentially degrading the water quality of receiving waters. Soil-disturbing activities, such as excavation and site clearing, could result in soil erosion and the migration of soil and sediment in stormwater run-off to downstream water bodies and storm drains. If not properly managed, stockpiled spoils could migrate off site during precipitation events and increase sedimentation in downstream receiving water bodies. Fuels, lubricants, and other hazardous materials associated with construction equipment could adversely affect water quality if spilled or stored improperly. Because the Project's construction would disturb more than 1 acre, coverage under the General Construction Permit and development of a SWPPP would be required. 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, Environmental Requirements. Pursuant to EBMUD Standard Construction Specification 01 35 44, Section 1.3(A), EBMUD requires qualified professionals as described in the permit to prepare and certify all permit-required documents/submittals, 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 requires the contractor to control discharge of soil, sediment, and concrete residue and control pH and chlorine residual of any discharges.

During Project site preparation, the existing reservoir water would be drained by gravity or pumped to the distribution system. The reservoir would first be drained into the distribution system to supply customer 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 dechlorinated and discharged 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, so if water is discharged to the storm drain, discharge would be done in a manner that meets EBMUD's requirements for potable discharge. Water at the bottom of the reservoir may have high turbidity and therefore may require pretreatment prior to discharge through the existing stormwater system. 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, Environmental Requirements. Pursuant to EBMUD Standard Construction Specification 01 35 44, Section 1.3(B), a Water Control and Disposal Plan would be prepared for the Project to specify management actions to minimize the degradation of surface and groundwater quality. As stated above, pursuant to EBMUD Standard Construction Specification 01 35 44, Section 1.3(A), an EBMUD-approved SWPPP would be prepared for the Project that would describe measures that shall be implemented to prevent the release or discharge of contaminated stormwater run-off from the worksite. Contaminants to be addressed include, but are not limited to, soil, sediment, concrete residue, pH less than 6.5 or greater than 8.5, chlorine residual, and all other contaminants known to exist at the worksite location.

The Project would include the excavation of approximately 400,000 cubic yards (CY) of soil, which would be re-contoured/reused on site. Because the Project would disturb more than 1 acre, coverage under the General Construction Permit and development of a SWPPP would be required. EBMUD Standard Construction Specification 01 35 44 Section 1.3(A) requires that the contractor comply with the requirements of the Construction General Permit, which would include development and implementation of a SWPPP, to ensure that Project construction activities would comply with discharge permit conditions and not lead to violations of water quality standards. The SWPPP must be reviewed and approved by EBMUD before the start of construction and requires the contractor to control the discharge of soil, sediment, and concrete residue and control pH and chlorine residual of any discharges. The EBMUD Practices and Procedures Monitoring and Reporting Plan (Appendix E) lists the applicable standard specifications language.

The demolition and removal of the existing Central Reservoir structures, such as the asphalt panel roof, concrete liner, material storage building, treated wood, and other existing materials, would generate construction debris, some of which contains toxic substances that could violate water quality standards or waste discharge requirements and adversely impact water quality during construction. However, as detailed in the Project Description, a number of EBMUD standards practices and procedures, applicable to all EBMUD projects, have been incorporated into the Project, including Standard Construction Specification 01 35 44, Section 1.1(B), which requires that activities on the construction site be controlled to prevent the discharge of contaminated stormwater. Controls on site activities outlined in the EBMUD Standard Construction Specification 01 35 44, Section 1.1(B), would be implemented to ensure that hazardous materials are not released through stormwater, violate discharge requirements, or otherwise degrade water quality. The EBMUD Practices and Procedures Monitoring and Reporting Plan (Appendix E) lists the applicable standard specifications. The management of specific hazardous materials is described further in Section 3.8, Hazards and Hazardous Materials.

Implementation of EBMUD Standard Construction Specification 01 35 44 would control erosion and planned discharges from the reservoir to ensure that no water quality standards are exceeded and no additional sources of polluted run-off 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 on water quality during construction would be less than significant.

Operation

The Project would meet multiple objectives related to improving water quality, as identified in Table 2-1, in Chapter 2, Project Description. The Hydrology Report (Appendix I) identified three main design goals for the management of stormwater and groundwater infiltration on site. The Project would include and implement appropriate design and pretreatment source control measures to slow and reduce the flow of run-off using low impact development techniques, with the objective of reducing stormwater pollutant discharges from the site; the Project would be designed to manage groundwater percolation to avoid increasing groundwater levels; and the Project would manage stormwater to minimize hydrologic changes in Sausal Creek (ESA, 2018).

As described in Section 2.5.6 of the Project Description, the Project would reduce the amount of existing impervious areas. Stomwater run-off from new impervious areas would be directed through a bioretention area before entering the City of Oakland's stormwater system. The bioretention area would remove pollutants from stormwater run-off and reduce peak discharge to the stormwater system, consistent with the goals of the CWA and the ACCWP.

As described in Section 2.5.2 of the Project Description, a new underdrain system would be constructed immediately beneath the new tanks to collect any leaked water. If leaking occurs, water would be conveyed to the bioretention area where it would be treated through soil filtration and phytoremediation[5] in the bioretention area prior to entering the storm drain system, by way of the bioretention drain.

Once constructed, the Project's water system would operate in the same way as existing facilities. The new tanks would be remotely operated and monitored; the reservoir site would be routinely inspected by EBMUD's operations and maintenance staff. The site would be maintained in a manner that keeps the site clean and free of trash and other debris. Operation and maintenance would also include vegetation management in compliance with city and county fire prevention vegetation management standards. As under existing conditions, maintenance of the Project would include periodic flushing of the pipeline structures, anode replacement, leak detection, valve maintenance, routine inspection, and vegetation maintenance of the Project right-of way, as described in the Project Description.

Because of the Project's source control measures (e.g., phytoremediation, soil filtration, and pretreatment through the reduction of peak discharges via the bioretention area), once operational, the Project would improve water quality in Sausal Creek compared to existing conditions. Therefore, impacts on water quality during operation would be less than significant.

Significance Determination Before Mitigation

Less than significant.

[5] Phytoremediation is a means of treating pollutants or waste using green plants that remove, degrade, or stabilize the undesirable substance.

Mitigation Measures

None required.

Impact HYD-2: Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the Project may impede sustainable groundwater management of the basin. (Criterion 2)

Hydrologic modeling was conducted to assess potential effects related to surface and groundwater conditions, which evaluated several scenarios: with and without the Project's proposed bioretention drain, and under conditions of average and wet years. The modeling showed that without the Project's bioretention drain, there would be a potential slight rise in the groundwater table beneath the site. The Project's bioretention drain would be designed to balance groundwater conditions on site by capturing interflow[6] and groundwater flow, preventing groundwater buildup beneath the foundation of the Project site.

Construction

For pipeline installation, dewatering would not be required to remove excess groundwater from excavations; pipeline trenches would be less than 15 feet deep and would not be close to any stream channels, and are thus not expected to intercept significant volumes of groundwater. Substructure construction would involve penetration through the foundation soils up to an approximate depth of 30 feet, which would encounter groundwater. Therefore, tank substructure construction would require dewatering to temporarily reduce groundwater levels in the immediate vicinity around the tank foundation during installation of Cement Deep Soil Mixing (CDSM) columns. Such construction dewatering would temporarily result in a decrease in groundwater levels in the immediate vicinity of the site. However, such decreases would be localized and limited in duration to the approximately 19-month time frame for substructure construction. Thus, construction of the Project would not substantially decrease groundwater supplies or interfere with ongoing recharge capability on site or in the surrounding area, nor would the Project interfere with sustainable management of groundwater resources in the basin. Impacts would be less than significant.

Operation

The existing Central Reservoir site contains approximately 20.4 acres of impervious surface area on the 27-acre site. Under existing conditions, rainfall or water running off the existing reservoir's (19-acre) roof and surrounding impervious pavement on the site is conveyed to the storm drain. An estimated average of 0.6 inch of annual precipitation (in the form of site run-off on pervious areas) is contributed to groundwater. The Project would reconfigure the site and provide an on-site bioretention area.

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[6] In hydrology, the term "interflow" refers to the lateral movement of water in the unsaturated zone that returns to the surface or enters a stream prior to becoming groundwater.

The Project would alter existing hydrological conditions on the site by dismantling and removing the existing covered reservoir roof, with a net effect of removing approximately 12.4 acres of impervious surface area from the approximately 27-acre site. The Project would include a bioretention area that would capture and temporarily store stormwater run-off, which would reduce peak stormwater flows to Sausal Creek. The bioretention area would be underlain with a bioretention drain. Without the Project's bioretention drain, the increase in perviousness of the site would increase the site's groundwater recharge capability. To mimic the existing groundwater recharge rates through the pervious surface at the site, the bioretention drain would intercept percolated stormwater from the larger pervious areas. The potential loss of an average of 0.6 inch of run-off from pervious areas (estimated as being contributed to groundwater under existing conditions) might result in a localized slight reduction in on-site groundwater levels (under conditions with the Project), but would not significantly impact the water table for the surrounding urban area. The potential loss of this source of groundwater is less than what would ordinarily occur due to seasonal fluctuations (1.4 inches in the wettest year) and would not be a significant depletion. Moreover, the local area does not generally rely on groundwater wells as the community uses municipal sources for drinking water.

The Project could result in hydrologic alteration such that a localized reduction in groundwater recharge could occur, but this local effect would not substantially interfere with groundwater or recharge of the aquifer. Impacts related to the alteration of groundwater would be reduced by the design and performance of the Project's bioretention area, which would include a bioretention drain to capture and redirect stormwater, and flows from the underdrain. The Project's impacts related to groundwater would be less than significant.

Significance Determination Before Mitigation

Less than significant.

Mitigation Measures

None required.

Impact HYD-3a: Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner that would result in substantial erosion or siltation on or off site. (Criterion 3a)

Construction

Construction of the Project would involve major alterations to the drainage patterns of the existing site, as the site would be reconfigured to accommodate new tanks and a drainage basin. Approximately 400,000 CY of soil would be excavated and re-contoured on the Project site, which in the absence of appropriate design measures and practices, could result in substantial erosion and siltation on and off site. 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 EBMUD's Standard Construction Specification 01 35 44, Section 1.3(B), which requires that the contractor submit a detailed Water Control and Disposal Plan for EBMUD's acceptance prior to any work at the worksite. The Water Control and Disposal Plan must comply with requirements of all applicable discharge permits, and contain provisions to prevent erosion, scouring of bank, nuisance, contamination, and excess sedimentation into receiving waters. The EBMUD Practices and Procedures Monitoring and Reporting Plan (Appendix E) lists the applicable standard specifications language.

As described under Impact HYD-2, the Project would reduce the amount of impervious surface on site, which could expose erodible soils during construction, prior to the establishment of ground cover. EBMUD Standard Construction Specification 01 35 44 Section 1.3(A), requires that the contractor develop and implement a SWPPP, which would limit delivery of silt and sediment by providing erosion control measures. The EBMUD Practices and Procedures Monitoring and Reporting Plan (Appendix E) lists the applicable standard specifications language. Implementation of EBMUD Standard Construction Specification 01 35 44 would ensure that the construction site is managed to minimize erosion and siltation. With implementation of EBMUD Standard Construction Specification 01 35 44, impacts related to alteration of drainage patterns resulting in substantial erosion or siltation on or off site during construction would be less than significant.

Operation

As described under Impact HYD-1, operation of the Project would include similar routine maintenance measures as the existing facilities, such as site and facility inspection, and vegetation management. Routine site maintenance and vegetation management, as specified in the Project's *Planning Phase Architectural Design Report*, would ensure that the integrity of the structures and landscaping would be in functional order to reduce the likelihood of erosion or siltation on and off site (Dillingham and Associates, 2019). The Project's bioretention area would limit delivery of sediment (and other pollutants) to Sausal Creek because replacement trees and shrubs would be planted on the perimeter of the bioretention area, and unpaved areas would be planted with groundcover or mulched to capture silt that could otherwise be delivered to the waterway. The bioretention area would also slow the rate of run-off, which would further reduce the potential for erosion on or off site by implementing Alameda County C.3 Stormwater Technical Guidance along with regular site maintenance and monitoring. Impacts related to alteration of drainage patterns resulting in substantial erosion or siltation on or off site during operation would be less than significant.

Significance Determination Before Mitigation

Less than significant.

Mitigation Measures

None required.

Impact HYD-3b: Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or through the addition of impervious surfaces, in a manner that would substantially increase the rate or amount of surface run-off and result in flooding on or off site. (Criterion 3b)

Construction

As described above in Impact HYD-3a, Project construction would alter the existing drainage patterns of the site as the existing Central Reservoir would be demolished, and the site would be reconfigured to accommodate three new storage tanks and a bioretention area. Soil-disturbing activities, such as excavation and site clearing, could increase stormwater run-off to downstream water bodies and storm drains. 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 EBMUD Standard Construction Specification 01 35 44 Section 1.1(B), which requires control of site activities to manage surface water flows, including containing surface run-off. Trenched areas of roadways would be repaved, and disturbed areas on the reservoir site would be repaved or revegetated. The Project would be constructed in a manner consistent with the EBMUD Environmental Compliance Manual's Trench Spoil BMPs, which would require proper storage and disposal of excess material removed from the pipeline trench. The EBMUD Practices and Procedures Monitoring and Reporting Plan (Appendix E) lists the applicable standard specifications language. With implementation of EBMUD Trench Spoils BMPs, construction-related alteration of local drainage patterns would be managed in a manner that would not substantially increase the rate or amount of surface run-off or result in flooding on or off site resulting in a less-than-significant impact.

Operation

The Project site is not in a flood-prone area. The Project would alter existing hydrological conditions on the site by dismantling and removing the existing covered reservoir, with a net effect of removing approximately 12.4 acres of impervious surface area from the approximately 27-acre site. EBMUD Standard Construction Specification 01 35 44 Section 1.1(B) specifies that ground alterations made by the contractor shall be removed and ground surfaces restored to their former condition at the completion of construction activities. As described under Impact HYD-2 above, the Project's proposed reduction in impervious area would effectively reduce peak stormwater run-off during rain events, and provide additional opportunities for rainfall to percolate and evaporate within the landscaped bioretention area. The Project's water tanks would be placed at an elevation that would not become inundated, nor cause inundation of surrounding off-site areas. Therefore, operation-related alteration of local drainage patterns would not result in flooding, and impacts would be less than significant.

Significance Determination Before Mitigation

Less than significant.

Mitigation Measures

None required.

Impact HYD-3c: Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or through the addition of impervious surfaces, in a manner that would create or contribute run-off water that exceeds the capacity of existing or planned stormwater drainage systems, or provide substantial additional sources of polluted run-off. (Criterion 3c)

Construction

As described above in Impact HYD-1, although erosion or siltation could potentially occur during construction, the contractor would be required to implement erosion control measures in accordance with EBMUD Standard Construction Specification 01 35 44. Section 1.1(B) requires controls on site activities to prevent discharge of contaminated stormwater, including control of construction materials, control of surface water flows, restoration of ground surfaces, and maintenance of construction sites to prevent erosion. Section 1.3(A) requires stormwater management procedures to prevent the generation of polluted run-off from the site; Section 1.3(B) requires that the contractor submit a detailed Water Control and Disposal Plan prior to construction that complies with all discharge permit requirements, and specifically requires that the contractor maintain proper control of the discharge at the discharge point to prevent erosion, scouring of bank, nuisance, contamination, and excess sedimentation into receiving waters. 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, Environmental Requirements, Section 1.3(D), which includes measures to prevent and control spills of hazardous substances. The EBMUD Practices and Procedures Monitoring and Reporting Plan (Appendix E) lists the applicable standard specifications language.

EBMUD Standard Construction Specification 01 35 44 stipulates that the contractor is responsible for preparation of a SWPPP, Water Control and Disposal Plan, Spill Prevention and Response Plan, and Discharge Plans, as applicable, 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 the protection of water quality that are required by EBMUD for construction are described in Section 3.9.2. Because construction sites would be managed to prevent capacity exceedances related to stormwater and include specific measures contained in EBMUD's Standard Construction Specification 01 35 44, implemented to limit or control run-off, this impact would be less than significant.

Operation

The Project's bioretention area would be landscaped with trees and shrubs (above the frequently inundated base) and areas of bare ground would be mulched, which would slow and regulate the rate of run-off, and provide pretreatment and source control/filtration for stormwater. Therefore, the storm drains would receive a slower rate of flow compared to existing conditions, and the capacity of storm drains would not be exceeded. Project facilities, structures, surfaces, and landscapes would be regularly maintained and inspected, which would ensure that the integrity of the structures and landscaping would be in functional order to reduce the likelihood of polluted run-off on and off site.

As described in the Hydrology Report, the Project may decrease dry season base flows to Sausal Creek by as much as 20 gallons per minute (0.04 cubic feet per second) by replacing the existing Central Reservoir underdrain system. The Project has the potential to impact water volume in Sausal Creek during the dry season such that existing flow levels in the creek could be reduced by as much as 50 percent. However, during a field survey conducted for the Project, it was observed that there was sufficient flow (upstream of the Project site) to fill all pools to an adequate depth to support and keep the pools filled in the dry season. The Hydrology Report concluded that the base level of water in the various pools within the creek appear not to depend on the discharge from the underdrain.

Because the Project would be designed to slow and regulate the rate of run-off and provide pretreatment, the Project would not exceed the capacity of existing or planned stormwater drainage systems, or provide substantial additional sources of polluted run-off; impacts would be less than significant.

Significance Determination Before Mitigation

Less than significant.

Mitigation Measures

None required.

Impact HYD-3d: Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or through the addition of impervious surfaces, in a manner that would impede or redirect flood flows. (Criterion 3d)

Construction

As described in Impact HYD-3a, construction of the Project would involve major alterations to the drainage patterns of the existing site as the site would be reconfigured to accommodate new tanks and a drainage basin. However, potential downstream flooding from stormwater will be reduced because construction will remove approximately 12.4 acres of impervious surfaces on the 27-acre site. Also, the site will continue to drain to the same storm drain system as the existing site. Furthermore, 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, which stipulates that the contractor is responsible for preparation of a SWPPP, Water Control and Disposal Plan, Spill Prevention and Response Plan, and Discharge Plans, as applicable, 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 stormwater management required by EBMUD for construction are described in Section 3.9.2. Because construction sites would be managed in a way that would neither impede or redirect flood flows from stormwater runoff, and would include specific measures contained in EBMUD's Standard Construction Specification 01 35 44 that would be implemented to limit or control run-off, this impact would be less than significant.

Operation

As described under Impact HYD-3b, following construction, the site would be reconfigured resulting in a net reduction of approximately 12.4 acres of impervious surfaces on the 27-acre site. The Project would not alter the course of Sausal Creek. Although the Project would substantially alter the existing drainage patterns on site, the Project would not add impervious surfaces over and above existing conditions. In the unlikely event of a flood, a portion of the stormwater would be allowed to percolate before being conveyed through the storm drains which would reduce flood risks. The Project would be designed to function such that floodwater would not be impeded in a fashion that would result in deleterious consequences for neighboring parcels. Impacts would be less than significant.

Significance Determination Before Mitigation

Less than significant.

Mitigation Measures

None required.

Impact HYD-4: Conflict with or obstruct implementation of a Water Quality Control Plan or Sustainable Groundwater Management Plan. (Criterion 5)

Construction

Construction-related activities involving soil disturbance, such as grading, excavation, cut and fill, stockpiling of soils, and dewatering, could result in erosion, siltation, and/or delivery of sediments to surface waters. If precautions are not taken to contain contaminants, construction could contribute to water quality degradation including stormwater run-off, a form of nonpoint-source pollution. In addition, as construction equipment would require the use of fuels, lubricants, and other hazardous materials, if these materials are stored improperly during Project construction, water quality violations could occur. However, as the Project would disturb more than 1 acre, coverage under the General Construction Permit and development of a SWPPP would be required. The requirements of the General Construction Permit are enhanced and made more specific by EBMUD Standard Construction Specification 01 35 44 (described in the Regulatory Framework section). Pursuant to EBMUD Standard Construction Specification 01 35 44, Section 1.3(A), EBMUD requires qualified professionals (as described in the terms of the permit) to prepare and certify all permit-required document submittals, to implement effective stormwater and 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 requires the contractor to control discharge of soil, sediment, and concrete residue and control pH and chlorine residual of any discharges. Therefore, construction of the Project would not conflict with or obstruct surface or groundwater objectives identified in the Basin Plan.

As described in the *Environmental Setting* section, the Project is in the East Bay Plain groundwater sub-basin of the Santa Clara Valley groundwater basin, which is identified under the Sustainable Groundwater Management Act as one of medium priority. The Project would not alter or otherwise conflict with the goals set for beneficial uses of the groundwater in this basin. As described under Impact HYD-2, the Project would include dewatering and other construction activities that would temporarily decrease groundwater levels on site. However, EBMUD would treat as appropriate and return some of the water through the stormwater system, effectively contributing to recharge during construction. As construction would not persist and would recharge the groundwater, impacts would be less than significant.

Operation

As described under Impact HYD-1, once operational, the Project would incorporate source control measures and improve water quality. Thus, the Project would be consistent with the San Francisco region's Water Quality Control Plan objectives. As described under Impact HYD-2, impacts related to groundwater recharge would be reduced by the design and performance of the Project's bioretention area; impacts related to the Project's alteration of local hydrology would not result in effects that would be out of range from what would be observed with seasonal fluctuation. Therefore, the Project would not impact or obstruct implementation of the Sustainable Groundwater Management Plan. Impacts would be less than significant.

Significance Determination Before Mitigation

Less than significant.

Mitigation Measures

None required.

Cumulative Impact Analysis

This section presents an analysis of the cumulative effects of the Project in combination with other present and reasonably foreseeable future projects that could cause cumulatively considerable impacts. For the purposes of the cumulative analysis, projects that could present cumulatively considerable impacts related to hydrology and water quality are those that involve soil and water disturbance during construction in close proximity to, and in a similar time frame as construction of the Project.

As previously described, the Project would have no impact with respect to being located in a floodplain, or be subject to seiches or tsunamis. The Project would not contribute to cumulative impacts related to these topics and are not addressed further.

The geographic area affected by the Project and its potential to contribute to cumulative impacts varies based on the environmental resource under consideration. The geographic scope of the analysis for cumulative impacts on hydrology and water quality encompasses and is limited to the Project site and the local watershed. The time frame during which Project could contribute to cumulative hydrology and water quality impacts includes the construction and operations phases. For the Project, the operations phase is considered to be permanent.

Several water infrastructure projects are planned to occur within 1-mile of the Project site, including EBMUD pipeline replacement projects and City of Oakland sanitary sewer upgrades. Additionally, operational improvements are planned to occur to reconstruct the I-880 overcrossings along with on- and off-ramps approximately 1.5 miles south of the Project. These projects would in most cases include excavation and trench construction that could impact water quality in ways similar to those identified for construction of the Project. Possible impacts could include the delivery of nonpoint source pollutants such as silt and sediments into storm drains, and changes in the local groundwater table through temporary dewatering measures. The pipeline replacement projects under the control of EBMUD could potentially overlap with the Project's proposed time frame. However, as with the Project, these projects would be required to implement site-specific discharge controls, or otherwise implement a SWPPP and EBMUD Standard Construction Specification 01 35 44 (referenced in this section) such that impacts would not be at a level that would significantly impact receiving waters. Therefore, the Project (even if it occurred concurrently with the cumulative projects) would not contribute impacts related to hydrology that would be cumulatively considerable. Moreover, possible temporary changes in the groundwater conditions related to dewatering activity would not persist beyond the duration of construction. Operation of the Project would not present significant impacts or accumulate additional impacts that, when combined with impacts of other projects constructed close to the Project, would be cumulatively considerable.

3.9.4 References

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3.10 Noise and Vibration

This section describes the physical and regulatory setting and identifies and evaluates the potential impacts for noise and vibration that could occur as a result of construction and operation of the Project. The analysis focuses on impacts on humans and structures; potential effects on wildlife are addressed in Section 3.3, Biological Resources. Supporting modeling output and calculations for the noise impact analysis are provided in Appendix J.

3.10.1 Environmental Setting

Fundamentals of Sound and Vibration

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 is 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. Because 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, 2013).

Noise Descriptors and Metrics

Noise is generally defined as sound that is loud, unpleasant, unexpected, or undesired (Caltrans, 2013). 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}, respectively). $L_{eq(24)}$ 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; these levels add a dBA penalty increment to evening and nighttime noise levels to account for the 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, the 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, 2013).

Table 3.10-1 presents representative noise sources and their corresponding noise levels in dBA at varying distances from the noise sources.

TABLE 3.10-1
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
Noisy 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	

NOTES:
dBA = A-weighted decibel; mph = miles per hour.

SOURCE: Caltrans, 2013

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.[1] 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 (U.S. EPA) national average, closed windows reduce noise levels by approximately 25-dBA, while open windows reduce noise levels by about 15-dBA (U.S. EPA, 1974).

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 sheet pile 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 cause 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, 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 for single-event sources (FTA, 2018).

Another useful vibration descriptor is known as vibration decibels (VdBs). VdBs are generally used when evaluating human response to vibration, as opposed to structural damage (for which PPV is the more commonly used descriptor). Vibration decibels are established relative to a reference quantity, typically 1×10^{-6} inches per second (FTA, 2018).

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[1] 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. hard ground such as pavement or very hard-packed earth (6-dBA rate) (U.S. Department of Housing and Urban Development, 2009).

Existing Noise Environment

The Project site is bordered by Interstate 580 (I-580) to the north, Ardley Avenue and 23rd Avenue to the west, the intersection of 25th Avenue and East 29th Street to the south, and Sheffield Avenue to the east. The site is surrounded to the west and south by single- and multi-family residential homes. The Central Reservoir Recreation Area and Redwood Day School are adjacent to the eastern boundary of the site. The Oakland Heights Nursing and Rehabilitation facility and the intersection of 25th Avenue and East 29th Street are located south of the site.

While the land around the Project site is primarily residential, I-580 is the predominant source of noise in the Project vicinity. The nearest traffic lanes of I-580 are approximately 75-feet north of the Project site's northern boundary and about 1,800-feet north of the southern boundary. Noise levels on the Project site and vicinity vary with their distance relative to the freeway. An existing sound wall and the Central Reservoir auxiliary embankment attenuate freeway noise at the residences to the south. Additionally, the elevation drops approximately 20-feet from the north end of the Project site to the south end.

To characterize the existing noise environment in the Project vicinity, long-term (24-hour) noise measurements were taken in September 2018 at three locations at the boundary of the Central Reservoir adjacent to residential and school uses. Figure 3.10-1 shows the long-term noise measurement locations, while Table 3.10-2 summarizes the results of the long-term noise measurements. Location LT-1 represents the existing noise environment of the adjacent Redwood Day School. Location LT-2 represents the existing noise environment of residential uses to the south of the reservoir. Location LT-3 represents the existing noise environment of residences along Ardley Avenue and 23rd Avenue.

In general, existing day-night noise levels in the Project vicinity ranged from 54- to 65-dBA (L_{dn}) with higher noise levels occurring within close proximity to I-580. Noise levels at the Project site also varied with elevation, distance, and the presence of topographic barriers such as hillsides and berms. In general, hourly average noise levels ranged from 45- to 70-dBA (L_{eq}) during the daytime hours (7:00 a.m. to 7:00 p.m.), 47- to 63-dBA (L_{eq}) during the evening hours (7:00 p.m. to 10:00 p.m.), and 45- to 60-dBA (L_{eq}) during the nighttime hours (10:00 p.m. to 7:00 a.m.).

Additionally, short-term noise levels were monitored along roadways proposed as inbound and outbound truck routes (see Figures 3.12-2 and 3.12-3 in Section 3.12, Transportation). These short-term measurements were 15-minutes in duration and establish existing daytime noise levels along the haul routes. Figure 3.10-2 shows the short-term noise measurement locations, while Table 3.10-3 summarizes the results of the short-term noise measurements.

SOURCE: ESRI; ESA, 2018.

EBMUD Central Reservoir

Figure 3.10-1
Long-Term Noise Monitoring Locations and Sensitive Receptors

ESA

TABLE 3.10-2
LONG-TERM NOISE LEVELS

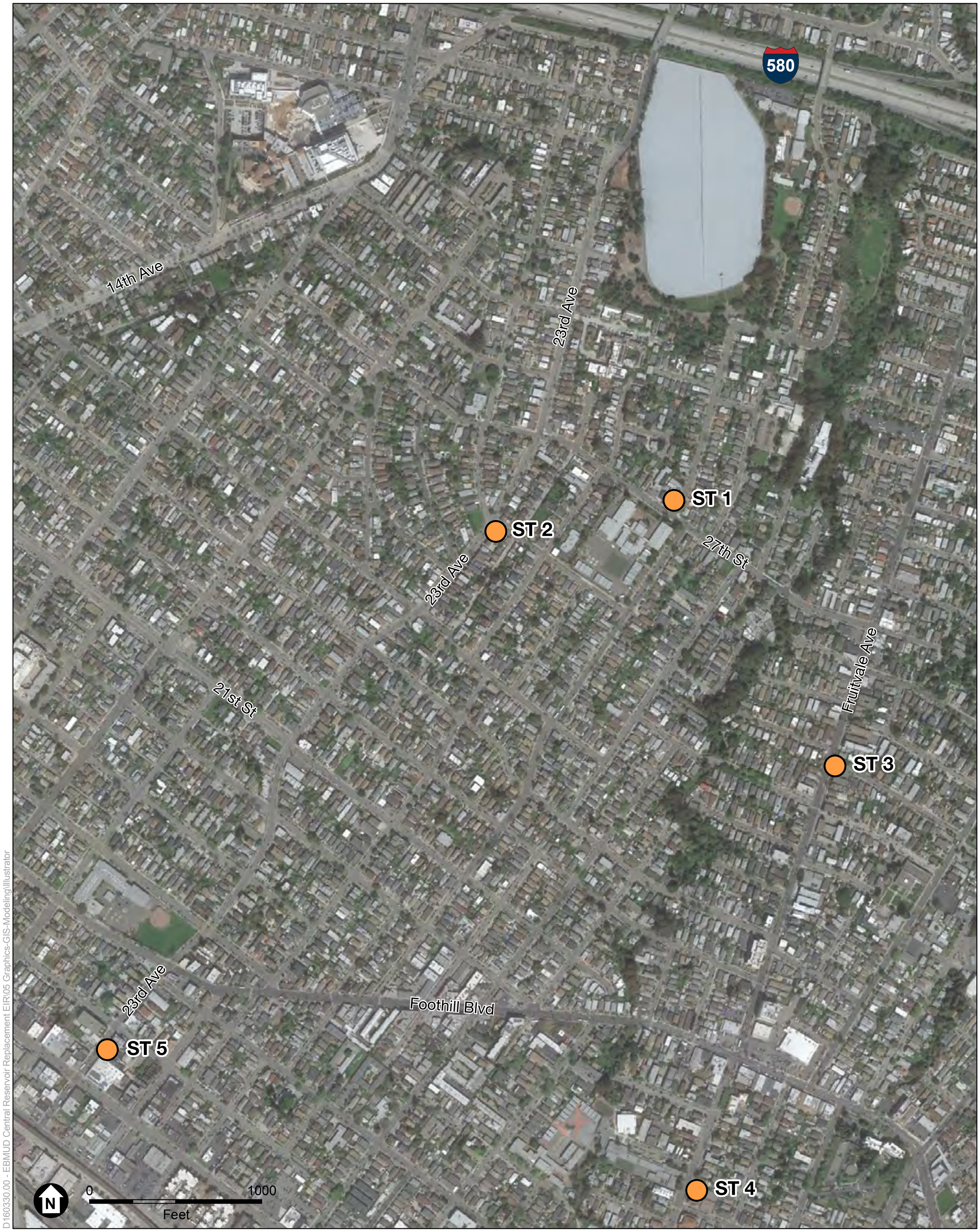
Noise Measurement Locations, Hourly Noise Levels, dBA (L_{eq})			
Time	**Location LT-1 (East)**	**Location LT-2 (South)**	**Location LT-3 (West)**
12:00 a.m. to 1:00 a.m.	52.2	45.6	50.4
1:00 a.m. to 2:00 a.m.	52.6	45.7	48.3
2:00 a.m. to 3:00 a.m.	53.6	45.5	49.2
3:00 a.m. to 4:00 a.m.	57.2	46.2	50.9
4:00 a.m. to 5:00 a.m.	59.6	49.0	53.8
5:00 a.m. to 6:00 a.m.	60.0	44.5	55.5
6:00 a.m. to 7:00 a.m.	60.4	46.2	55.7
7:00 a.m. to 8:00 a.m.	57.5	46.6	55.3
8:00 a.m. to 9:00 a.m.	60.9	47.5	52.5
9:00 a.m. to 10:00 a.m.	70.1	49.8	51.4
10:00 a.m. to 11:00 a.m.	58.5	44.7	49.2
11:00 a.m. to 12:00 p.m.	57.9	45.7	49.2
12:00 p.m. to 1:00 p.m.	57.1	47.0	50.1
1:00 a.m. to 2:00 p.m.	59.1	45.1	50.2
2:00 p.m. to 3:00 p.m.	59.0	46.9	51.7
3:00 p.m. to 4:00 p.m.	60.3	49.4	52.4
4:00 p.m. to 5:00 p.m.	60.8	56.2	57.4
5:00 p.m. to 6:00 p.m.	61.6	51.2	57.0
6:00 p.m. to 7:00 p.m.	62.7	53.3	57.9
7:00 p.m. to 8:00 p.m.	61.9	53.1	58.8
8:00 p.m. to 9:00 p.m.	59.3	49.7	57.4
9:00 p.m. to 10:00 p.m.	57.3	46.6	53.8
10:00 p.m. to 11:00 p.m.	55.6	47.5	51.3
11:00 p.m. to 12:00 a.m.	54.3	44.8	50.0
Daytime L_{eq} (7:00 a.m. to 10:00 p.m.)	62	50	55
Nighttime L_{eq} (10:00 p.m. to 7:00 a.m.)	57	46	52
L_{dn}[a]	65	54	59
L_{33}[b]	59.8	47.8	54.1

NOTES: See Figure 3.10-1 for noise measurement locations. Measurements were taken September 26–27, 2018, using a Larson Davis LxT2 sound level meter.

a L_{dn} is a 24-hour noise level with 10-dBA penalty between 10:00 p.m. and 7:00 a.m.

b L_{33} is the noise level exceeded 33 percent of the time. This metric is used in application of portions of the City of Oakland Noise Ordinance.

SOURCE: ESA, 2018



SOURCE: ESRI; ESA, 2018.

EBMUD Central Reservoir

Figure 3.10-2
Short-Term Noise Monitoring Locations
Near Proposed Haul Routes

ESA

TABLE 3.10-3
SHORT-TERM AMBIENT NOISE LEVEL DATA ALONG PROPOSED HAUL ROUTES

Measurement Location	Time	Noise Levels in dBA	
		Hourly L_{eq}	L_{max}
ST-1 25th Avenue north of East 27th Street	11:30 a.m.	57.5	87.1
ST-2 23rd Avenue south of East 27th Street	11:51 a.m.	63.7	93.2
ST-3 Fruitvale Avenue south of East 27th Street	11:10 a.m.	62.0	91.7
ST-4 Fruitvale Avenue south of Foothill Boulevard	12:38 p.m.	64.8	94.3
ST-5 23rd Avenue south of Foothill Boulevard	12:15 p.m.	63.5	93.0

NOTE: See Figure 3.10-2 for noise measurement locations. L_{eq} represents the constant sound level averaged over an hour; L_{max} is the maximum instantaneous noise level. Time of day of short-term monitoring reflects daytime hours during which construction-related truck hauling activities could occur.

SOURCE: ESA, 2018

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 Oakland General Plan Noise Element (City of Oakland, 2005), sensitive land uses generally include residences, schools, churches, hospitals, elderly care facilities, hotels, and libraries, as well as certain types of passive recreational open space. Although active recreational areas such as the sports fields at Redwood Day School are usually not considered noise-sensitive land uses, because the City of Oakland Noise Ordinance establishes construction noise standards that apply to residential, commercial, and industrial land uses, and because the recreational areas would be considered at least as sensitive to noise as commercial and industrial land uses based on noise exposure standards of the City's Noise Element (refer to Section 3.10.2, Regulatory Framework, below), this analysis considers sports fields as a marginally sensitive receptor akin to a commercial land use.

Figure 3.10-1 shows the locations of existing sensitive receptors, some of which are located as close as 50-feet to the Central Reservoir site, which include the following:

- Residences across Ardley Avenue adjacent to the western site boundary and directly adjacent to the western site boundary on 23rd Street.
- Residences directly adjacent to the southern site boundary on East 28th Street, East 29th Street, and 25th Avenue.
- The Redwood Day School.
- Residences along Sheffield Avenue to the east.
- Residences on the west side of Ardley Avenue.
- Residences on the east side of 23rd Avenue.

3.10.2 Regulatory Framework

Federal Regulation

No federal 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 (e.g., air conditioning and swimming pool equipment) and determining the levels of noise to be permitted in their environment (U.S. EPA, 1974).

State Regulations

State regulations include requirements for the construction of new hotels, motels, apartment houses, and dwellings other than detached single-family dwellings that are intended to limit the extent of noise transmitted into habitable spaces. These requirements are collectively known as the California Noise Insulation Standards and are found in Title 24 of the California Code of Regulations.

The State of California updated its Building Code requirements with respect to sound transmission, effective January 2014. Section 1207 of the California Building Code (Title 24 of the California Code of Regulations) establishes material requirements in terms of a sound transmission class (STC)[2] rating of 50 for all common interior walls and floor/ ceiling assemblies between adjacent dwelling units or between dwelling units and adjacent public area. It also sets an interior performance standard of 45-dBA from exterior noise sources.

Local Regulations

Under Section 53091 of the California Government Code, EBMUD, as a local agency and utility district, is not subject to building and land use zoning ordinances (such as tree ordinances) for projects involving facilities for the production, generation, storage, treatment, or transmission of water. However, EBMUD's practice is to work with local jurisdictions and neighboring communities during project planning and to consider local environmental protection policies for guidance.

City of Oakland – Local Plans, Policies, and Regulations

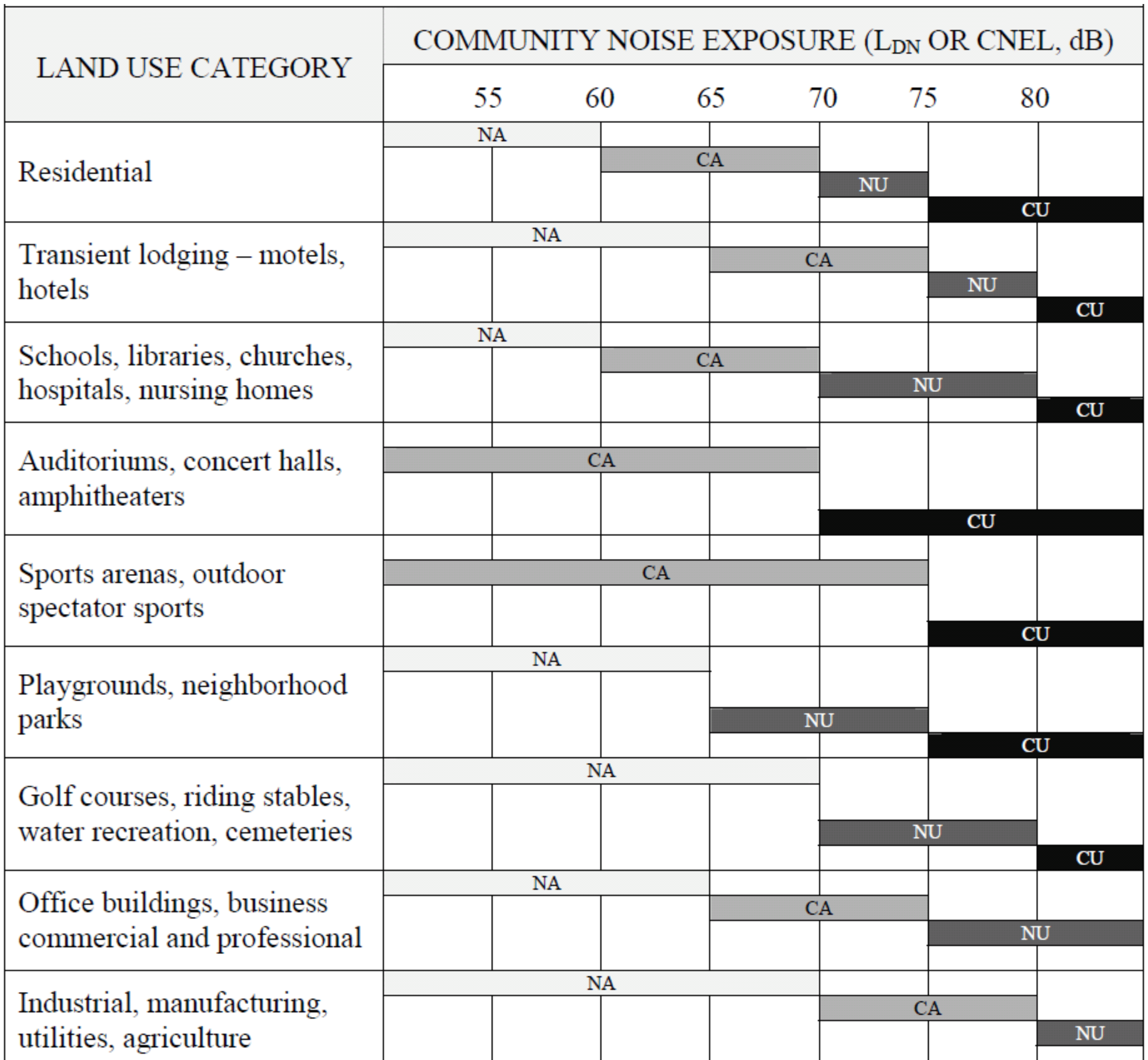
General Plan Noise Element

The Oakland General Plan contains guidelines for determining the compatibility of various land uses with different outdoor noise environments (City of Oakland, 2005). The Noise Element of the Oakland General Plan recognizes that some land uses are more sensitive to ambient noise levels than others, due to the amount of noise exposure (in

2 The STC is used as a measure of a material's ability to reduce sound. The STC is equal to the number of decibels a sound is reduced as it passes through a material.

terms of both exposure duration and insulation from noise) and the types of typical activities. The City of Oakland uses state noise guidelines for judging the compatibility between various land uses and their noise environments, which are summarized in Table 3.10-4 (reproduced Figure 1 of the City of Oakland California Environmental Quality Act [CEQA] Thresholds/Criteria of Significance Guidelines).

TABLE 3.10-4
LAND USE NOISE COMPATIBILITY GUIDELINES – CITY OF OAKLAND



NA	NORMALLY ACCEPTABLE: Development may occur without an analysis of potential noise impacts *to the proposed development* (though it might still be necessary to analyze noise impacts that the project might have *on its surroundings*).
CA	CONDITIONALLY ACCEPTABLE: Development should be undertaken only after an analysis of noise-reduction requirements is conducted and if necessary noise-mitigating features are included.
NU	NORMALLY UNACCEPTABLE: Development should generally be discouraged; it may be undertaken only if a detailed analysis of the noise-reduction requirements is conducted, and if highly effective noise mitigation features are included.
CU	CLEARLY UNACCEPTABLE: Development should not be undertaken.

SOURCE: Reproduced Figure 1 from City of Oakland, 2016

In this context, “normally acceptable” is defined as satisfactory for the specific land use, assuming that normal conventional construction is used in buildings. “Conditionally acceptable” means that new construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design. Conventional construction, but with closed windows and fresh-air supply systems or air conditioning, will normally suffice. “Normally unacceptable” means that new construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.

The Oakland Noise Element of the General Plan identifies the maximum interior noise levels generally considered acceptable for various common land uses (with windows closed). The Noise Element uses a 45-dB maximum interior level acceptable for residential or classroom uses to establish its normally acceptable exterior land use compatibility threshold of 60-dBA L_{dn} or CNEL for siting these uses. The Noise Element includes two goals for the City:

- To protect Oakland’s quality of life and the physical and mental well-being of residents and others in the City by reducing the community’s exposure to noise.
- To safeguard Oakland’s economic welfare by mitigating noise incompatibilities among commercial, industrial and residential land uses.

The Noise Element also contains the following applicable policies and actions:

Policy 1: Ensure the compatibility of existing and, especially, of proposed development projects not only with neighboring land uses but also with their surrounding noise environment.

Action 1.1: Use the noise-land use compatibility matrix in conjunction with the noise contour maps (especially for roadway traffic) to evaluate the acceptability of residential and other proposed land uses and also the need for any mitigation or abatement measures to achieve the desired degree of acceptability.

Action 1.2: Continue using the City’s zoning regulations and permit processes to limit the hours of operation of noise-producing activities which create conflicts with residential uses and to attach noise-abatement requirements to such activities.

Policy 2: Protect the noise environment by controlling the generation of noise by both stationary and mobile noise sources.

Action 2.1: Review the various noise prohibitions and restrictions under the City’s nuisance noise ordinance and revise the ordinance if necessary.

Action 2.2: As resources permit, increase enforcement of noise-related complaints and also of vehicle speed limits and of operational noise from cars, trucks, and motorcycles.

Policy 3: Reduce the community's exposure to noise by minimizing the noise levels that are received by Oakland residents and others in the city. (This policy addresses the reception of noise whereas Policy 2 addresses the generation of noise.)

Action 3.1: Continue to use the building-permit application process to enforce the California Noise Insulation Standards regulating the maximum allowable interior noise level in new multi-unit buildings.

Action 3.2: Review the City's noise performance standards and revise them as appropriate to be consistent with City Council policy.

City of Oakland Noise Ordinance

The City of Oakland also regulates noise through enforcement of its noise ordinance, which is found in Section 17.120 of the Oakland Planning Code. The noise ordinance regulates operational noise from stationary sources (e.g., air conditioning units) with performance standards in Section 17.120 Subsections A, B, and C which do not apply to construction noise during daytime hours (7:00 a.m. to 10:00 p.m.). Performance noise standards applicable to daytime construction activities are established in Subsection D and are discussed below. Cities and counties do not have regulatory authority to establish noise level limits over noise from mobile on-road sources (transportation noise), which does not include on-site construction. Transportation noise is regulated at the state and federal level by noise limits placed on vehicle manufacturers. Table 3.10-5 presents maximum allowable receiving noise standards applicable to long-term exposure for residential and civic land uses, for noise from stationary noise sources (not transportation noise). Subsection F of Section 17.120.050 further indicates that noise measurement procedures shall be conducted at a position or positions at any point on the receiver's property.

Once a structure or facility is constructed, noise from a stationary source would be limited by the standards in Table 3.10-5 (for example, between 10:00 p.m. and 7:00 a.m., residential uses may only be exposed to noises up to 45-dBA for a period of cumulative 20-minutes in a 1-hour time period). The noise ordinance states that if the measured ambient noise level exceeds the applicable standard in any category, then the stated applicable noise standard shall be adjusted so as to equal the ambient noise level. In other words, if existing noise is measured to be louder than the maximum allowed (i.e., the "applicable noise level standard"), the existing ambient noise level shall be considered the maximum allowed.

Table 3.10-6 presents noise level standards from the noise ordinance that apply to temporary exposure to short- and long-term construction or demolition noise; short-term refers to activities lasting less than 10-days at a time, while long-term refers to activities lasting greater than 10-days at a time. Given the Project's multi-year construction schedule, the latter noise level standards would apply for daytime (7:00 a.m. to 7:00 p.m.) construction and demolition activities. Per Section 17.120.050 (G) of the Planning Code, the limits in Table 3.10-6 apply to residential and industrial/commercial land uses. For the noise impact analysis conducted for the Project, residential standards are conservatively applied to the adjacent Redwood Day School because classrooms require an interior noise environment suitable for reading and communicating and, as indicated in Table 3.10-5, the City of Oakland includes schools in the same category with residential land uses for the application of its operational noise standards. In addition, active recreational areas are considered marginally sensitive to noise, with the standards for commercial and industrial land uses applied.

TABLE 3.10-5
MAXIMUM ALLOWABLE RECEIVING NOISE STANDARDS FOR SPECIFIED LAND USES, DBA[a]
(FROM STATIONARY SOURCES)

Receiving Land Use	Cumulative Number of Minutes in 1-Hour Time Period[b]	Maximum Allowable Noise Level Standards (dBA)	
		Daytime 7:00 a.m. to 10:00 p.m.	Nighttime 10:00 p.m. to 7:00 a.m.
Residential, School, Child Care, Health Care, or Nursing Home, and Public Open Space	20 (L_{33}) 10 ($L_{16.7}$) 5 ($L_{8.3}$) 1 ($L_{1.7}$) 0 (L_{max})	60 65 70 75 80	45 50 55 60 65
		Anytime	
Commercial	20 (L_{33}) 10 ($L_{16.7}$) 5 ($L_{8.3}$) 1 ($L_{1.7}$) 0 (L_{max})	65 70 75 80 85	
		Anytime	
Manufacturing, Mining, and Quarrying	20 (L_{33}) 10 ($L_{16.7}$) 5 ($L_{8.3}$) 1 ($L_{1.7}$) 0 (L_{max})	70 75 80 85 90	

NOTES:
[a] These standards are to be further reduced by 5-dBA for simple tone noise, noise consisting primarily of speech or music, or recurring impact noise. If the ambient noise level exceeds these standards, the standard shall be adjusted to equal the ambient noise level.
[b] L_x represents the noise level that is exceeded X percent of a given period. L_{max} is the maximum instantaneous noise level.

SOURCE: Oakland Noise Ordinance No. 11895, 1996

TABLE 3.10-6
MAXIMUM ALLOWABLE RECEIVING NOISE STANDARDS FOR TEMPORARY CONSTRUCTION OR DEMOLITION ACTIVITIES, DBA

Operation/Receiving Land Use	Daily (Weekday) 7:00 a.m. to 7:00 p.m.	Weekends 9:00 a.m. to 8:00 p.m.
Short-Term Operation (less than 10-days)		
Residential	80	65
Commercial, Industrial	85	70
Long-Term Operation (more than 10-days)		
Residential	65	55
Commercial, Industrial	70	60

NOTES: During the hours of 7:00 p.m. to 7:00 a.m. on weekdays and 8:00 p.m. to 9:00 a.m. on weekends and federal holidays, noise levels received by any land use from construction or demolition shall not exceed the applicable nighttime operational noise level standard (see Table 3.10-5). If the ambient noise level exceeds these standards, the standard shall be adjusted to equal the ambient noise level. Maximum allowable receiving standards are applied in this analysis as the maximum L_{eq}.

SOURCE: Oakland Noise Ordinance No. 11895, 1996

For evening and nighttime construction and demolition activities during the hours of 7:00 p.m. to 7:00 a.m. on weekdays and 8:00 p.m. to 9:00 a.m. on weekends and federal holidays, noise level limits received by any land use from construction or demolition are not addressed by standards in Table 3.10-6 but, rather, according to the City of Oakland Noise Ordinance Section 17.120.050 (G)(2); these evening and nighttime construction and demolition noise levels shall not exceed the applicable nighttime operational noise level standards in Table 3.10-5, which for residential uses would be 45-dBA (L_{33}) (see Table 3.10-5). The ordinance further states that if the ambient noise level exceeds these standards, the standard shall be adjusted to equal the ambient noise level. However, as shown in Table 3.10-7, existing noise levels surrounding the Project site already exceed the applicable 45-dBA standard at the western (52-dBA), southern (46-dBA), and eastern (57-dBA) site boundaries. Consequently, as required by the ordinance, the existing ambient level at each respective boundary would be the applicable nighttime construction standard.

City of Oakland Standard Conditions of Approval and Uniformly Applied Development Standards Imposed as Standard Conditions of Approval

The City of Oakland has adopted Standard Conditions of Approval (SCAs) relevant to a project's noise and vibration impacts. Noise and vibration-related SCAs are summarized below (City of Oakland, 2018).

- **SCA NOI-1: Construction Days/Hours.** *During construction.* The project applicant shall comply with the restrictions concerning construction days and hours.
- **SCA NOI-2: Construction Noise.** *During construction.* The project applicant shall implement noise reduction measures to reduce noise impacts due to construction.
- **SCA NOI-3: Extreme Construction Noise.** *Construction Noise Management Plan Required.* Prior to any extreme noise-generating construction activities (e.g., pier drilling, pile driving, and other activities generating greater than 90-dBA), the project applicant shall submit a Construction Noise Management Plan for City review and approval that contains a set of site-specific noise attenuation measures to further reduce construction impacts associated with extreme noise-generating activities.
- **SCA NOI-4: Project-Specific Construction Noise Reduction Measures.** The project applicant shall submit a Construction Noise Management Plan prepared by a qualified acoustical consultant for City review and approval that contains a set of site-specific noise attenuation measures to further reduce construction noise impacts. The project applicant shall implement the approved Plan during construction.
- **SCA NOI-5: Construction Noise Complaints.** The project applicant shall submit to the City for review and approval a set of procedures for responding to and tracking complaints received pertaining to construction noise, and shall implement the procedures during construction.
- **SCA NOI-6: Exposure to Community Noise.** The project applicant shall submit a Noise Reduction Plan for City review and approval that contains noise reduction measures (e.g., sound-rated window, wall, and door assemblies) to achieve an acceptable interior noise level in accordance with the land use compatibility

guidelines of the Noise Element of the Oakland General Plan. The applicant shall implement the approved Plan during construction.

- **SCA NOI-7: Operational Noise.** Noise levels from the Project site after completion of the Project (i.e., during Project operation) shall comply with the performance standards of Chapter 17.120 of the Oakland Planning Code and Chapter 8.18 of the Oakland Municipal Code. If noise levels exceed these standards, the activity causing the noise shall be abated until appropriate noise reduction measures have been installed and compliance verified by the City.
- **SCA NOI-8: Exposure to Vibration.** The project applicant shall submit a Vibration Reduction Plan prepared by a qualified acoustical consultant for City review and approval that contains measures to reduce groundborne vibration to acceptable levels per Federal Transit Administration (FTA) standards. The applicant shall implement the approved Plan during construction.
- **SCA NOI-9: Vibration Impacts on Adjacent Historic Structures or Vibration-Sensitive Activities.** The project applicant shall submit a Vibration Analysis prepared by an acoustical and/or structural engineer or other appropriate qualified professional for City review and approval that establishes preconstruction baseline conditions and threshold levels of vibration that could substantially interfere with activities located at the Project site. The Vibration Analysis shall identify design means and methods of construction that shall be utilized in order to not exceed the thresholds. The applicant shall implement the recommendations during construction.

When the City of Oakland is the lead agency under CEQA, all applicable SCAs are adopted as conditions of approval and required, as applicable, to be implemented during project construction and operation to address noise impacts While the Project does not require approval from the City of Oakland, the SCAs provide guidance for the types of best management practices that EBMUD can incorporate into the Project to address noise impacts.

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, while Specification 01 14 00, Section 1.8(A) restricts construction hours, as described below (EBMUD, 2018, 2017).

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 Standard Construction Specification 01 35 44, Section 1.3(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 Standard Construction Specification 01 35 44, Section 3.6 requires noise controls on site activities and describes 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.
- 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.

- 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.

- 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 Standard S1.4, Specification for Sound Level Meters. Monitoring results shall be submitted weekly to the Engineer.

Vibration Control and Monitoring Plan. EBMUD Standard Construction Specification 01 35 44, Section 1.3(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 Standard Construction Specification 01 35 44, 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, EBMUD 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, EBMUD will have the damage repaired to the preexisting condition.

3.10.3 Impact Analysis

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 construction would result in temporary noise increases in in the vicinity of the reservoir site. The noise impact assessment evaluates temporary impacts associated with the demolition and replacement of the existing reservoir. For Criterion 1 below, the determination of impact significance for noise takes into account the combined construction noise from the 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.

The City of Oakland Noise Ordinance establishes distinct noise level limits for construction activity occurring between the less noise-sensitive daytime hours of 7:00 a.m. and 7:00 p.m. Outside of that time frame, construction noise is expected to fall below the otherwise applicable, more stringent stationary source noise limits presented in Table 3.10-5. The City of Oakland Noise Ordinance imposes differing noise level limits depending on the time of day when construction occurs as well as the overall duration of construction, which are also considered in assessing noise impacts. The ordinance has separate standards for short-term construction activity, defined as 10-days or less, and long-term construction activity, defined as more than 10-days. Given that Project construction would occur over multiple years, the long-term standards are applied here in assessing noise impacts.

Additionally, the ordinance establishes that construction noise during nighttime hours shall not exceed the nighttime standards that are established for stationary sources in Table 3.10-5. However, these standards recognize a different increment of nighttime hours (10:00 p.m. to 7:00 a.m.). Consequently, during the nighttime hours established for construction (7:00 p.m. to 7:00 a.m.), two separate standards would be applicable. Table 3.10-7 below summarizes the construction noise standards for daytime and the two nighttime periods, hereafter referred to as evening (7:00 p.m. to 10:00 p.m.) and nighttime (10:00 p.m. to 7:00 a.m.).

To assess potential construction noise impacts, sensitive receptors and their relative exposure (considering structural barriers and distance) were identified. Combined intermittent noise levels from the simultaneous operation of on-site equipment expected to be used in Project construction were estimated based on equipment noise data published by the Federal Highway Administration (FHWA). The FHWA Roadway Construction Noise Model (RCNM) was used to assess whether site preparation and demolition activities could exceed noise ordinance limits (FHWA, 2006). RCNM was used for the construction noise impact analysis because it contains a robust inventory of off-road equipment and reference noise levels common to large-scale construction and demolition projects.

Noise levels were estimated for the four phases of construction: (1) site preparation and demolition, (2) substructure construction, (3) tank and valve structure construction, and (4) site restoration. The distances of noise sources from receptors varies among each phase as some phases such as demolition could occur as close as 50 feet from the property line, while other phases such as Cement Deep Soil Mixing (CDSM) would occur in the middle of the site. For the site preparation and demolition phase and the site restoration phase, noise levels were estimated using two-dimensional propagation modeling, which is conservative in that it does not account for noise attenuation that may result from intervening structures and topography. Because the substructure construction phase (which involves CDSM) and the tank and valve structure construction phase would occur entirely within the existing reservoir basin (i.e., below the existing grade of the site perimeter access road), three-dimensional modeling was conducted using the CadnaA program to determine the noise attenuation provided by the reservoir basin. The CadnaA model accounts for local topographical conditions, including the attenuation provided by the sides of the reservoir pit, and provides a more accurate estimate of noise levels for these two phases of construction. The CadnaA program was also used to estimate reductions in noise associated with noise barriers identified to mitigate noise impacts.

TABLE 3.10-7
MAXIMUM ALLOWABLE RECEIVING NOISE THRESHOLDS OF SIGNIFICANCE APPLICABLE TO PROJECT CONSTRUCTION

	Maximum Allowable Noise Level (L_{eq}[1]) at the Property Line of Nearest Sensitive Receptor				
Noise Measurement Location/ Nearest Sensitive Receptors	**Central Reservoir Recreation Area**	**Redwood Day School**	**Southern Residences[3]**	**Ardley Avenue Residences**	**23rd Avenue Residences**
Daytime Construction Noise Limit for Work of 10 Workdays or Less 7:00 a.m.–7:00 p.m. Weekdays	85-dBA	80-dBA	80-dBA	80-dBA	80-dBA
Daytime Construction Noise Limit for Work Exceeding 10 Workdays 7:00 a.m.–7:00 p.m. Weekdays	70-dBA	65-dBA	65-dBA	65-dBA	65-dBA
Daytime Construction Noise Limit 7:00 a.m.–7:00 p.m. Weekends	55-dBA				
Evening Noise Limit (All Sources)[2] 7:00 p.m.–10:00 p.m. Weekdays and Weekends	60-dBA				
Nighttime Noise Limit (All Sources)[2] 10:00 p.m.–7:00 a.m. Weekdays and Weekends	57-dBA	57-dBA	46-dBA	52-dBA	52-dBA

NOTES:
1 During nighttime hours, the construction noise limits revert to applicable nighttime operational noise level standards, which are presented in terms of the L_{33} metric, the most stringent limit identified which is applied to the hourly L_{eq} as calculated by the Roadway Construction Noise Model (RCNM) using equipment usage factors.
2 The City of Oakland Noise Ordinance identifies different time periods applicable to nighttime hours. Consequently, this analysis applies separate appropriate standards for the 7:00 p.m. to 10:00 p.m. period (evening hours) and the 10:00 p.m. to 7:00 a.m. period (nighttime hours). Noise levels in this row are based on the "Nighttime Leq (10:00 p.m. to 7:00 a.m.)" readings in Table 3.10-2.
3 Southern Residences include the Oakland Heights Nursing and Rehabilitation facility and residences near East 29th Street/25th Avenue.

SOURCE: ESA; adapted from Section 17.120 of the Oakland Planning Code.

To assess the impact of haul trucks using local roadways, the FHWA Traffic Noise Model was used to estimate the contribution of haul truck noise (FHWA, 2004). Haul truck noise was then added to the existing daytime (7:00 a.m. to 7:00 p.m.) ambient noise levels monitored along the haul routes to determine the resultant increase in roadway noise. The City of Oakland does not regulate noise from transportation sources through either its General Plan or its Noise Ordinance. Consequently, increases in roadway noise are considered significant if the incremental increase in noise from traffic is greater than the existing ambient (monitored) noise level by 5-dBA L_{eq}, per the City of Oakland CEQA Thresholds/Criteria of Significance Guidelines (City of Oakland, 2016).

Vibration

The impact significance for vibration (Criterion 2 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 (e.g., pavement cutting, drilling, excavation, and paving) that generate airborne noise and surface vibration. Groundborne noise is generally associated with underground railway operations and with unique construction activities such as blasting, neither of which would result from Project implementation. Groundborne noise is not described further since any potential groundborne noise from construction activities would be imperceptible because environmental vibration is rarely of sufficient magnitude to be perceptible or cause audible groundborne noise unless there is a specific vibration source close by, such as rail transit line (FTA, 2018); therefore, no impacts 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 potential significant impacts on nearby sensitive receptors, and providing mitigation where applicable.

Construction vibration impacts are considered significant if vibration levels would damage nearby structures or buildings (as indicated in Table 3.10-8), or if vibration levels exceed FTA's groundborne vibration impact criteria for human annoyance (presented in Table 3.10-9). Construction vibration impacts would also be considered significant if vibrations cause sleep disturbance during nighttime hours (Category II receptor uses where people sleep; refer to Table 3.10-9).

TABLE 3.10-8
FTA GROUNDBORNE VIBRATION IMPACT CRITERIA FOR BUILDING DAMAGE

Building Category	PPV (in/sec)	VdB
I. Reinforced concrete, steel, or timber (no plaster)	0.5	102
II. Engineered concrete and masonry (no plaster)	0.3	98
III. Non-engineered timber and masonry	0.2	94
IV. Buildings extremely susceptible to vibration damage	0.12	90

NOTES:
in/sec = inches per second; PPV = peak particle velocity; VdB = vibration decibels (referenced to 1-microinch per second).

SOURCE: FTA, 2018

TABLE 3.10-9
FTA GROUNDBORNE VIBRATION IMPACT CRITERIA FOR HUMAN INTERFERENCE

Land Use Category	Frequent Events[1]	Occasional Events[2]	Infrequent Events[3]
Category I: Buildings where vibration would interfere with interior operations	65 VdB[4]	65 VdB[4]	65 VdB[4]
Category II: Residences and buildings where people normally sleep	72 VdB	75 VdB	80 VdB
Category III: Institutional land uses with primarily daytime use	75 VdB	78 VdB	83 VdB

NOTES:
1 More than 70 vibration events of the same source per day.
2 Between 30 and 70 vibration events of the same source per day.
3 Less than 30 vibration events of the same source per day.
4 This criterion is based on levels that are acceptable for most moderately sensitive equipment such as optical microscopes. Vibration-sensitive manufacturing or research should always require detailed evaluation to define the acceptable vibration levels. Ensuring low vibration levels in a building requires special design of heating, ventilation, and air conditioning (HVAC) systems and stiffened floors.

SOURCE: FTA, 2018

Significance Criteria

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

1. Generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the Project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.
2. Generate excessive groundborne vibration or groundborne noise levels.
3. For a project in the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within 2-miles of a public airport or public use airport, expose people residing or working in the Project area to excessive noise levels.

Criteria Requiring No Further Evaluation

The criteria listed above that are not applicable to actions associated with the Project are identified below, along with the supporting rationale as to why further consideration is unnecessary and a no-impact determination is appropriate.

- ***Criterion 3: For a project in the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within 2-miles of a public airport or public use airport, expose people residing or working in the project area to excessive noise levels.*** The closest airport is the Oakland International Airport, located approximately 6-miles south of the Project site. The Project site is not located within an airport influence area of either Oakland International Airport or San Francisco International Airport (ACCDA, 2012; C/CAG, 2012). The Project would not expose people residing or working near an 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. The Project site is not in the vicinity of a private airstrip. The Project would not expose people residing or working near a private airstrip to excessive noise levels; therefore, there would be no impact associated with exposing people near a private airstrip to excessive noise levels.

Impacts and Mitigation Measures

Impact NOI-1: Result in the generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the Project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies. (Criterion 1)

Construction

Operation of construction equipment would result in temporary noise increases in the Project vicinity. Table 3.10-7 presents the maximum allowable receiving noise thresholds applicable to Project construction for daytime (7:00 a.m. to 7:00 p.m.), evening (7:00 p.m. to 10 p.m.), and nighttime hours (10 p.m. to 7:00 a.m.). Some proposed construction activities could expose nearby residents to noise levels that exceed ordinance noise limits. The following describes the major construction activities by phase and the associated noise analysis for each phase.

Site Preparation and Demolition Phase

The Project includes site preparation and demolition of the existing reservoir, roof, lining, columns, and material storage building over several months during daytime hours (7:00 a.m. to 7:00 p.m.). Site preparation and demolition activities involve tree clearing and would involve the use of multiple pieces of off-road equipment and trucks, including a backhoe mounted with an impact hammer (hoe ram). 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 14 00, Section 1.8(A), which 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.

The FHWA RCNM was used to assess whether site preparation and demolition activities could exceed noise ordinance limits (FHWA, 2006). Table 3.10-10 presents the reference noise level (L_{max} in dBA) at 50-feet and the typical usage factor to reflect equipment use from RCNM. Table 3.10-10 (Adjusted L_{eq} Level) also presents the estimated daytime (7:00 a.m. to 7:00 p.m.) Project-related construction noise levels in terms of the L_{eq} at each of the five closest sensitive receptor areas surrounding the Project site, based on distance, equipment type, and duration of equipment use, as predicted by RCNM. The predicted noise levels in Table 3.10-10 are conservative in that they assume activity at the closest point to each sensitive receptor, which would occur for only a fraction of the entire duration of demolition activity. As demolition progresses away from the receptor location, noise levels experienced by the closest receptor would be less. The noise levels in Table 3.10-10 reflect demolition activity as a worst-case analysis.

TABLE 3.10-10
NOISE LEVELS FROM SITE PREPARATION AND DEMOLITION ACTIVITIES AT SENSITIVE RECEPTORS ADJACENT TO THE PROJECT SITE

Receptor	Principal Noise Sources	Reference Noise Level (dBA)[1]	Distance to Receptor[2] (feet)	Usage Factor	Adjusted L_{eq} Level (dBA)[3]	L_{eq} Level (dBA) with Mitigation	Threshold dBA	Exceeds Noise Ordinance[5]	
								No MM	With MM
Redwood Day School	Backhoe	78	50	40%	74	57	65	Yes	No
Redwood Day School	Front End Loader	79	50	40%	75	58	65	Yes	No
Redwood Day School	Hoe Ram	90	50	20%	83	66	65	Yes	Yes
Redwood Day School	Excavator	81	50	40%	77	60	65	Yes	No
Redwood Day School	Concrete Crusher	90	150[7]	20%	73	56	65	Yes	No
Redwood Day School	Trucks	77	50	17 per hour	60	43	65	No	No
Redwood Day School	**Combined Total**	**NA**	50	**NA**	**85**	**68**	65	**Yes**	**Yes**
Ardley Avenue Residences	Backhoe	77.6	75	40%	70	NA	65	Yes	NA
Ardley Avenue Residences	Front End Loader	79.1	75	40%	72	NA	65	Yes	NA
Ardley Avenue Residences	Hoe Ram	90.3	75	20%	80	NA	65	Yes	NA
Ardley Avenue Residences	Excavator	80.7	75	40%	73	NA	65	Yes	NA
Ardley Avenue Residences	Concrete Crusher	89.6	150[7]	20%	73	NA	65	Yes	NA
Ardley Avenue Residences	Trucks	77	75	17 per hour	58	NA	65	No	NA
Ardley Avenue Residences	**Combined Total**	**NA**	**75**	**NA**	**82**	NA	65	**Yes**	NA
23rd Avenue Residences	Backhoe	78	100	40%	68	NA	65	Yes	NA
23rd Avenue Residences	Front End Loader	79	100	40%	69	NA	65	Yes	NA
23rd Avenue Residences	Hoe Ram	90	100	20%	77	NA	65	Yes	NA
23rd Avenue Residences	Excavator	81	100	40%	71	NA	65	Yes	NA
23rd Avenue Residences	Concrete Crusher	90	150[7]	20%	73	NA	65	Yes	NA
23rd Avenue Residences	Trucks	77	100	17 per hour	56	NA	65	No	NA
23rd Avenue Residences	**Combined Total**	**NA**	100	**NA**	**80**	NA	65	**Yes**	NA
Southern Residences[6]	Backhoe	78	160	40%	64	NA	65	No	NA
Southern Residences[6]	Front End Loader	79	160	40%	65	NA	65	No	NA
Southern Residences[6]	Hoe Ram	90	160	20%	73	NA	65	Yes	NA
Southern Residences[6]	Excavator	81	160	40%	67	NA	65	Yes	NA

TABLE 3.10-10 (CONTINUED)
NOISE LEVELS FROM SITE PREPARATION AND DEMOLITION ACTIVITIES AT SENSITIVE RECEPTORS ADJACENT TO THE PROJECT SITE

Receptor	Principal Noise Sources	Reference Noise Level (dBA)[1]	Distance to Receptor[2] (feet)	Usage Factor	Adjusted L_{eq} Level (dBA)[3]	L_{eq} Level (dBA) with Mitigation	Threshold dBA	Exceeds Noise Ordinance[5]	
Southern Residences[6]	Concrete Crusher	90	160	20%	73	NA	65	Yes	NA
Southern Residences[6]	Trucks	77	160	17 per hour	54	NA	65	No	NA
Southern Residences[6]	**Combined Total**	**NA**	**160**	**NA**	**77**	NA	65	**Yes**	NA
Central Reservoir Recreation Area	Backhoe	78	65	40%	71	NA	70	Yes	NA
Central Reservoir Recreation Area	Front End Loader	79	65	40%	73	NA	70	Yes	NA
Central Reservoir Recreation Area	Hoe Ram	90	65	20%	81	NA	70	Yes	NA
Central Reservoir Recreation Area	Excavator	81	65	40%	75	NA	70	Yes	NA
Central Reservoir Recreation Area	Concrete Crusher	90	150[7]	20%	73	NA	70	Yes	NA
Central Reservoir Recreation Area	Trucks	77	65	17 per hour	58	NA	70	No	NA
Central Reservoir Recreation Area	**Combined Total**	**NA**	65	**NA**	**83**	NA	70	**Yes**	NA

NOTES:
1 L_{max} at 50-feet.
2 Distance between approximate location of equipment and property line of receptor.
3 The L_{eq} level is adjusted for distance and percentage of usage.
4 A Modeled noise reduction based on a 16-foot high temporary noise barrier is applied with Mitigation Measure NOI-1. Mitigated values are reported at the 2nd story because the resultant noise reduction at the school will depend on the height of the receptor.
5 Noise exceeding 65-dBA for more than 10-days near residences is considered exceeding the noise ordinance. For the Central Reservoir Recreation Area, a 70-dBA standard applies. MM= Mitigation Measure.
6 Southern Residences include the Oakland Heights Nursing and Rehabilitation facility and Residences near East 29th Street/25th Avenue.
7 Assumed distance of the concrete crusher, which is assumed to be at a centralized location and not near the Project boundary. Per EBMUD Standard Practice 3.6(F): Stationary noise sources (e.g., chippers, grinders, compressors) shall be located as far from sensitive receptors as possible.

See Figure 3.10-1 for noise measurement locations. L_{eq} represents the hourly constant sound level.

SOURCE: ESA, 2019

Table 3.10-10 shows the noise levels at sensitive receptors adjacent to the Project site from individual pieces of equipment and haul trucks as well as from their combined operation. Noise levels from haul trucks are calculated using the FHWA Traffic Noise Model and assuming peak activity of approximately 197 daily truck trips or approximately 17 trips per hour at 15-miles per hour on the site, which would be the maximum speed allowed by EBMUD Standard Construction Specification 01 35 44, Section 3.3(B) for dust control (refer to Section 3.2, Air Quality).

As shown on Table 3.10-10, the combined operation of all equipment without implementation of EBMUD standard practices (Adjusted L_{eq} Level) would exceed the 65-dBA long-term construction noise standard at the property lines of Redwood Day School, Southern Residences, Ardley Avenue Residences, and 23rd Avenue Residences and the 70-dBA long-term construction noise standard at the property lines of the Central Reservoir Recreation Area, resulting in a potential significant noise impact for these sensitive receptors.

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 1.3(G) and Section 3.6, which include a range of noise control measures such as developing a Noise Control and Monitoring Plan and requiring the contractor to implement noise control measures (e.g., mufflers or noise-attenuating shields) on all equipment. Additionally, as stated above, 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. Even with the incorporation of EBMUD's standard practices and procedures for noise control measures, construction equipment during demolition would still generate noise levels that exceed the construction noise ordinance limits as shown in Table 3.10-10 and the impact would potentially be significant.

To further reduce noise levels at sensitive receptors where demolition noise levels would exceed the construction noise ordinance limits, the feasibility of using temporary noise barriers was explored. Temporary noise barriers were determined feasible where there is sufficient space to install a temporary noise barrier outside of the Project construction area and where the topography between the temporary noise barrier and sensitive receptors was conducive to practical and effective noise reduction. Noise levels were evaluated using the CadnaA model for a 16-foot tall noise barrier, which is the tallest temporary, moveable sound wall typically used for construction[3]. A moveable sound wall is necessary to accommodate the various construction phases of the Project. A noise barrier of this size requires substantial foundation material, typically three-feet or more in width to support the wall in high winds. Sufficient space is also needed for vehicles and personnel to access and install the sound barrier. Additionally, where there is a

[3] Based on input from a leading industry vendor, Environmental Noise Control, 16-feet is the tallest modular single k-rail system available. A larger sound wall would require a more substantial foundation system (i.e., wider than the k-rail system) for which there is insufficient room and/or permanently drilled piers which would not be moveable and are therefore not feasible for the Project.

substantial difference in elevation between the barrier and a receptor, the attenuation provided can be rendered non-consequential.

A barrier was considered at all sensitive receptors around the Project site. There is insufficient space along Ardley Avenue and at the East 29th Street/25th Avenue intersection because of the proximity of the property line to the Project construction area.[4] A noise barrier on the border with the Southern Residences and the 23rd Avenue Residences would be ineffective because the ground elevation outside of the Project construction area where the noise barrier can be located is too low relative to construction and construction noise would travel over the approximately 16-foot tall sound barrier. Therefore, a sound barrier between Project construction and the Southern Residences and the 23rd Avenue Residences would not be feasible. A barrier along the border with Central Reservoir Recreation Area was considered, but found not to be effective because of the constrained space between the Project construction area and the property line. A moveable temporary noise barrier was found to be feasible and effective only for the eastern portion of the Project site adjacent to Redwood Day School because there is sufficient space and because the sound wall can reduce noise levels at the school. Therefore, Mitigation Measure NOI-1 was developed which includes installation of a 16-foot tall temporary noise barrier adjacent to Redwood Day School as shown in Figure 3.10-3. Mitigated noise levels are presented in Table 3.10-10.

Even with the noise barrier, there will be times when demolition noise exceeds the daytime ordinance levels at the nearest 2nd story classroom at the Redwood Day School. Mitigation Measure NOI-1 also includes a provision that EBMUD will schedule construction activities outside of normal school hours when it is feasible to do so if heavy construction equipment, including but not limited to impact equipment, is operated within approximately 100 feet[5] of the closest classroom or if the noise barrier needs to be temporarily removed to accommodate construction.

Even after considering EBMUD standard practices and procedures which includes a range of noise control measures and after incorporation of Mitigation Measure NOI-1, which includes a temporary noise barrier adjacent to the Redwood Day School, noise from demolition activities would exceed the ordinance levels for all receptors. Therefore, noise increases associated with demolition activities are considered to be significant and unavoidable because, after implementation of feasible mitigation, noise levels would still exceed the daytime (7:00 a.m. to 7:00 p.m.) thresholds established by Section 17.120 of the Oakland Planning Code. Noise would exceed the ordinance levels intermittently, when demolition activities are closest to receptors.

[4] Other options for installing a noise barrier at this location considered by EBMUD but determined to be infeasible included installing the barrier along existing fencing and offsite (i.e., within sidewalks).

[5] At 100-feet or more, noise levels during the nosiest construction phase (demolition) are attenuated to 65 dBA or less relative to the nearest 2nd story classroom.

SOURCE: ESRI; ESA, 2018.

EBMUD Central Reservoir

Figure 3.10-3
Extent of Noise Barrier Required by Mitigation Measure NOI-1

ESA

Overall, demolition activities would take place over a period of approximately 290 work days. Based on the duration and location of construction activities, including demolition, as they progress around the perimeter of the reservoir, no location (or receptor) would experience noise levels in excess of ordinance levels for more than a total of about 30 work days over the entire 6-year construction period.

Substructure Construction Phase

The substructure construction phase would include site grading, excavation, and building the reinforced substructure (i.e., foundation) for the tanks within the existing reservoir basin during daytime hours (7:00 a.m. to 7:00 p.m.). The substructure design would include CDSM strengthening of the existing soil and installation of a new 30-foot thick fill pad constructed out of reinforced soil (the CDSM process is described in Section 2.6.1 of Chapter 2, *Project Description*). Before beginning CDSM construction, site grading would create a level surface in the basin for the CDSM rig. Up to two CDSM soil mixing rigs would be in operation for up to one 12-hour shift per day (from 7:00 a.m. – 7:00 p.m.) over several months.

Reference noise levels from a CDSM mixing rig are published by FHWA to be 80-dBA at 50-feet (FHWA, 2006) and 83-dBA at 50-feet with two mixing rigs operating simultaneously and presented in Table 3.10-11. Noise levels from the simultaneous operation of the two CDSM soil mixing rigs were simulated as a point source in the CadnaA model on top of the CDSM construction pad that takes into account changes in elevation across the project site. Table 3.10-11 presents the noise levels at sensitive receptors adjacent to the Project site from substructure construction for individual pieces of equipment, as well as for their combined operation and also includes a component for noise from the haul trucks.

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 1.3(G) and Section 3.6, which include a range of noise control measures such as developing a Noise Control and Monitoring Plan and requiring the contractor to implement noise control measures (e.g., mufflers or noise-attenuating shields) on all equipment. Even with the incorporation of EBMUD's standard practices and procedures for noise control measures, operation of soil mixing rigs and combined operation of all equipment (Adjusted L_{eq} Level) would exceed the City's 65-dBA long-term construction noise standard at the Redwood Day School receptor along the east property line of the Project site without a noise barrier, resulting in a potential significant noise impact for the Redwood Day School during the substructure construction phase. The noise levels at the other sensitive receptors would not exceed the City's long-term construction noise standard resulting in a less than significant impact.

Mitigation Measure NOI-1, which includes installation of a 16-foot tall temporary noise barrier adjacent to Redwood Day School, would reduce noise impacts as shown in Table 3.10-11. The 16-foot tall noise barrier required by Mitigation Measure NOI-1 would reduce noise levels below 65-dBA at Redwood Day School during daytime hours (7:00 p.m. to 7:00 p.m.). Consequently, with implementation of Mitigation Measure NOI-1, noise increases from the substructure construction phase would be less than significant.

TABLE 3.10-11
NOISE LEVELS FROM SUBSTRUCTURE CONSTRUCTION ACTIVITIES AT SENSITIVE RECEPTORS ADJACENT TO THE PROJECT SITE

Receptor	Principal Noise Sources	Reference Noise Level (dBA)[1]	Distance to Receptor (feet)	Usage Factor	Predicted Topographic Attenuation (dBA)[2]	Adjusted L_{eq} Level (dBA)[3]	L_{eq} Level (dBA) with Mitigation[4]	Threshold dBA	Exceeds Noise Ordinance[5]	
									No MM	With MM
Redwood Day School	Compressor	78	140	40%	- 5	60	52	65	No	No
Redwood Day School	Front End Loader	79	140	40%	- 5	61	53	65	No	No
Redwood Day School	Generator	81	140	20%	- 5	64	56	65	No	No
Redwood Day School	CDSM Drill Rig (2)	83	140	50%	- 5	66	58	65	Yes	No
Redwood Day School	Haul and Water Trucks	77	140	1 per hour	- 5	37	29	65	No	No
Redwood Day School	**Combined Total**	**NA**	140	**NA**	- 5	**69**	**61**	65	**Yes**	**No**
Ardley Avenue Residences	Compressor	78	170	40%	-31	32	NA	65	No	NA
Ardley Avenue Residences	Front End Loader	79	170	40%	-31	34	NA	65	No	NA
Ardley Avenue Residences	Generator	81	170	20%	-31	36	NA	65	No	NA
Ardley Avenue Residences	CDSM Drill Rig (2)	83	170	40%	-31	39	NA	65	No	NA
Ardley Avenue Residences	Haul and Water Trucks	77	170	1 per hour	-31	11	NA	65	No	NA
Ardley Avenue Residences	**Combined Total**	**NA**	**170**	**NA**	-31	**42**	NA	65	**No**	NA
23rd Avenue Residences	Compressor	78	420	40%	-28	27	NA	65	No	NA
23rd Avenue Residences	Front End Loader	79	420	40%	-28	29	NA	65	No	NA
23rd Avenue Residences	Generator	81	420	20%	-28	31	NA	65	No	NA
23rd Avenue Residences	CDSM Drill Rig (2)	83	420	40%	-28	34	NA	65	No	NA
23rd Avenue Residences	Haul and Water Trucks	77	420	20%	-28	10	NA	65	No	NA
23rd Avenue Residences	**Combined Total**	**NA**	420	**NA**	-28	**37**	NA	65	**No**	NA
Southern Residences[6]	Compressor	78	980	40%	-28	20	NA	65	No	NA
Southern Residences[6]	Front End Loader	79	980	40%	-28	21	NA	65	No	NA
Southern Residences[6]	Generator	81	980	20%	-28	24	NA	65	No	NA
Southern Residences[6]	CDSM Drill Rig (2)	83	980	40%	-28	26	NA	65	No	NA
Southern Residences[6]	Haul and Water Trucks	77	980	20%	-28	5	NA	65	No	NA
Southern **Residences**[6]	**Combined Total**	**NA**	980	**NA**	-28	**30**	NA	65	**No**	NA
Central Reservoir Recreation Area	Compressor	78	140	40%	- 5	60	NA	70	No	NA

TABLE 3.10-11 (CONTINUED)
NOISE LEVELS FROM SUBSTRUCTURE CONSTRUCTION ACTIVITIES AT SENSITIVE RECEPTORS ADJACENT TO THE PROJECT SITE

Receptor	Principal Noise Sources	Reference Noise Level (dBA)[1]	Distance to Receptor (feet)	Usage Factor	Predicted Topographic Attenuation (dBA)[2]	Adjusted L_{eq} Level (dBA)[3]	L_{eq} Level (dBA) with Mitigation[4]	Threshold dBA	Exceeds Noise Ordinance[5]	
									No MM	With MM
Central Reservoir Recreation Area	Front End Loader	79	140	40%	- 5	61	NA	70	No	NA
Central Reservoir Recreation Area	Generator	81	140	20%	- 5	64	NA	70	No	NA
Central Reservoir Recreation Area	CDSM Drill Rig (2)	83	140	50%	- 5	66	NA	70	No	NA
Central Reservoir Recreation Area	Haul and Water Trucks	77	140	1 per hour	- 5	37	NA	70	No	NA
Central Reservoir Recreation Area	**Combined Total**	**NA**	140	**NA**	- 5	**69**	NA	70	**No**	NA

NOTES:
1 L_{max} at 50-feet.
2 Topographic attenuation is the reduction in sound from the site's land features and was determined by three-dimensional modeling of CDSM drill rigs.
3 The L_{eq} level is adjusted for distance, topographic attenuation, and percentage of usage.
4 Mitigated values are reported at the 2nd story because the resultant noise reduction at the school will depend on the height of the receptor. Mitigation Measure NOI-1.
5 Noise exceeding 65-dBA for more than 10-days near residences is considered exceeding the noise ordinance. For the Central Reservoir Recreation Area, a 70-dBA standard applies; MM = mitigation measures.
6 Southern Residences include the Oakland Heights Nursing and Rehabilitation facility and Residences near East 29th Street/25th Avenue.

See Figure 3.10-1 for noise measurement locations. L_{eq} represents the hourly constant sound level.

SOURCE: ESA, 2019

Tank and Valve Structure Construction Phase

The tank and valve structure construction phase involves the following:

- *Tank and valve structure construction activities*: construct the tank foundation, wall, and roofs; prestressing and shotcrete application; and tank and valve structure construction;
- *Central Rate Control Station (RCS) construction activities*: demolish the existing Central RCS and construct a new RCS;
- *Pipeline construction activities*: construct the pipelines between the tanks and the valve structure and between the RCS and the valve structure; and replace an approximate 80-foot section of 24-inch pipeline in the sidewalk and road on East 29th Street with a 30-inch pipeline.

Tank and Valve Structure Construction Activities

Tank and valve structure construction activities which would occur during the Tank and Valve Structure Construction Phase would involve daytime (7:00 a.m. to 7:00 p.m.) construction with the exception for concrete work. Concrete work would require a 6:00 a.m. start time (6:00 a.m. to 7:00 a.m. is considered to be a nighttime hour by Section 17.120.050 of the City of Oakland Planning Code) due to the need for setup in the morning to mobilize a pump truck prior to the first delivery of concrete. Pump trucks would 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.

Table 3.10-12 presents the noise levels at sensitive receptors adjacent to the Project site from tank and valve construction activities for individual pieces of equipment, as well as for their combined operation and also includes a component for noise from the haul trucks.

Differences in elevation caused by natural and man-made topography (such as the reservoir basin) are important considerations to accurately predict construction noise levels. Similar to the above analysis of the substructure construction phase, CadnaA three-dimensional modeling was conducted with equipment around the fill pad locations that considered the elevation of the work with respect to the elevations of the closest sensitive receptors.

As described 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 1.3(G) and Section 3.6, which include a range of noise control measures such as developing a Noise Control and Monitoring Plan and requiring the contractor to implement noise control measures (e.g., mufflers or noise-attenuating shields) on all equipment. Even with the incorporation of EBMUD's standard practices and procedures for noise control measures, the combined

TABLE 3.10-12
DAYTIME (7:00 A.M. TO 7:00 P.M.) NOISE LEVELS FROM TANK AND VALVE STRUCTURE CONSTRUCTION ACTIVITIES AT SENSITIVE RECEPTORS ADJACENT TO THE PROJECT SITE

Receptor	Principal Noise Sources	Reference Noise Level (dBA)[1]	Distance to Receptor (feet)	Usage Factor	Predicted Topographic Attenuation (dBA)[2]	Adjusted L_{eq} Level (dBA)[3]	L_{eq} Level (dBA) with Mitigation[4]	Threshold dBA	Exceeds Noise Ordinance[5]	
									No MM	With MM
Redwood Day School	Compressor (2)	78	65	40%	- 17	57	43	65	No	No
Redwood Day School	Crane	85	65	16%	- 17	53	39	65	No	No
Redwood Day School	Generator (2)	81	65	50%	- 17	61	47	65	No	No
Redwood Day School	Telehandler (2)	83	65	40%	- 17	63	49	65	No	No
Redwood Day School	Concrete Mixer Truck	79	65	40%	-17	56	42	57	No	No
Redwood Day School	Haul and Water Trucks	77	65	1 per hour	- 17	29	15	65	No	No
Redwood Day School	**Combined Total**	**NA**	65	**NA**	- 17	**67**	**53**	65	**Yes**	**No**
Ardley Avenue Residences	Compressor (2)	78	140	40%	-20	48	NA	65	No	NA
Ardley Avenue Residences	Crane	85	140	16%	-20	44	NA	65	No	NA
Ardley Avenue Residences	Generator (2)	81	140	50%	-20	52	NA	65	No	NA
Ardley Avenue Residences	Telehandler (2)	83	140	40%	-20	54	NA	65	No	NA
Ardley Avenue Residences	Haul and Water Trucks	77	140	1 per hour	-20	23	NA	65	No	NA
Ardley Avenue Residences	Concrete Mixer Truck	79	140	40%	-20	46	NA	52	No	NA
Ardley Avenue Residences	**Combined Total**	**NA**	**140**	**NA**	-20	**57**	NA	65	**No**	NA
23rd Avenue Residences	Compressor (2)	78	225	40%	-9	55	NA	65	No	NA
23rd Avenue Residences	Crane	85	225	16%	-9	51	NA	65	No	NA
23rd Avenue Residences	Generator (2)	81	225	50%	-9	59	NA	65	No	NA
23rd Avenue Residences	Telehandler (2)	83	225	40%	-9	60	NA	65	No	NA
23rd Avenue Residences	Haul and Water Trucks	77	225	1 per hour	-9	32	NA	65	No	NA
23rd Avenue Residences	Concrete Mixer Truck	79	225	40%	-9	53	NA	54	No	NA
23rd Avenue Residences	**Combined Total**	**NA**	225	**NA**	-9	**64**	NA	65	**No**	NA
Southern Residences[6]	Compressor (2)	78	675	40%	-26	28	NA	65	No	NA
Southern Residences[6]	Crane	85	675	16%	-26	24	NA	65	No	NA
Southern Residences[6]	Generator (2)	81	675	50%	-26	32	NA	65	No	NA
Southern Residences[6]	Telehandler (2)	83	675	40%	-26	34	NA	65	No	NA

TABLE 3.10-12 (CONTINUED)
DAYTIME (7:00 A.M. TO 7:00 P.M.) NOISE LEVELS FROM TANK AND VALVE STRUCTURE CONSTRUCTION ACTIVITIES AT SENSITIVE RECEPTORS ADJACENT TO THE PROJECT SITE

Receptor	Principal Noise Sources	Reference Noise Level (dBA)[1]	Distance to Receptor (feet)	Usage Factor	Predicted Topographic Attenuation (dBA)[2]	Adjusted L_{eq} Level (dBA)[3]	L_{eq} Level (dBA) with Mitigation[4]	Threshold dBA	Exceeds Noise Ordinance[5]	
									No MM	With MM
Southern Residences[6]	Haul and Water Trucks	77	675	1 per hour	-26	9	NA	65	No	NA
Southern Residences	Concrete Mixer Truck	79	675	40%	-26	26	NA	46	No	NA
Southern Residences[6]	**Combined Total**	**NA**	675	**NA**	-26	**37**	NA	65	**No**	NA
Central Reservoir Recreation Area	Compressor (2)	78	250	40%	-17	45	NA	70	No	NA
Central Reservoir Recreation Area	Crane	85	250	16%	-17	42	NA	70	No	NA
Central Reservoir Recreation Area	Generator (2)	81	250	50%	-17	50	NA	70	No	NA
Central Reservoir Recreation Area	Telehandler (2)	83	250	40%	-17	51	NA	70	No	NA
Central Reservoir Recreation Area	Haul and Water Trucks	77	250	1 per hour	-17	35	NA	70	No	NA
Central Reservoir Recreation Area	Concrete Mixer Truck	79	250	40%	-17	44	NA	46	No	NA
Central Reservoir Recreation Area	**Combined Total**	**NA**	250	**NA**	-17	**55**	NA	70	**No**	NA

NOTES:

dBA = A-weighted decibel; MM = Mitigation Measure; NA = Not Applicable

1 L_{max} at 50-feet.
2 Topographic attenuation is the reduction in sound from the site's land features and was determined by three-dimensional modeling.
3 The L_{eq} level is adjusted for distance, topographic attenuation, and percentage of usage.
4 Implementation of Mitigation Measure NOI-1 assumes a 16-foot temporary noise barrier along Redwood Day School. Mitigated values are reported at the 2nd story because the resultant noise reduction at the school will depend on the height of the receptor) along the boundary with Redwood Day School.
5 Noise exceeding 65-dBA for more than 10-days near residences is considered exceeding the noise ordinance during daytime hours (7:00 a.m. to 7:00 p.m.). For the Central Reservoir Recreation Area, a 70-dBA standard applies. Concrete trucks would operate starting at 6:00 a.m., which would include 1-hour of nighttime operations and the nighttime standards are applied.
6 Southern Residences include the Oakland Heights Nursing and Rehabilitation facility and Residences near East 29th Street/25th Avenue.

See Figure 3.10-1 for noise measurement locations. L_{eq} represents the hourly constant sound level.

SOURCE: ESA, 2019

operation of all equipment would exceed the 65-dBA long-term construction noise standard at the Redwood Day School receptor along the east property line of the Project site without mitigation, resulting in a potential significant noise impact for the Redwood Day School. The noise levels at the other sensitive receptors would not exceed the City's applicable long-term construction noise standard during daytime (7:00 a.m. to 7:00 p.m.) activities resulting in a less than significant impact.

Mitigation Measure NOI-1 would provide a temporary 16-foot tall noise barrier along the east property line with Redwood Day School (see Figure 3.10-3). The presence of the noise barrier would be sufficient to maintain noise levels below 65-dBA at Redwood Day School based on the CadnaA model. Consequently, with implementation of Mitigation Measure NOI-1, noise increases from the tank and valve structure construction activities would be less than significant.

Central RCS Construction Activities

Central RCS construction activities which would occur during the Tank and Valve Structure Construction Phase would involve daytime (7:00 a.m. to 7:00 p.m.) construction. The sensitive receptors affected by the RCS construction activities are the Southern Residences and the Central Reservoir Recreation Area because the construction activities will occur at the southeastern section of the Project site. For sensitive receptors affected by RCS construction activities, Table 3.10-13 presents the noise levels for individual pieces of equipment, as well as for their combined operation and also includes a component for noise from the haul trucks. Even with the incorporation of EBMUD's standard practices and procedures for noise control measures, the combined operation of all equipment would exceed the daytime (7:00 a.m. to 7:00 p.m.) 65-dBA long-term construction noise standard at the Southern Residences along the southern property line of the Project site without mitigation and would also exceed the 70-dBA long-term construction noise standard at the Central Reservoir Recreation Area, resulting in a potential significant noise impact. As discussed earlier under the analysis of site preparation and demolition phase, a noise barrier on the border with the Southern Residences would be ineffective because the ground elevation outside of the Project construction area where the noise barrier can be located is too low relative to construction and construction noise would travel over the 16-foot tall sound barrier. Therefore, a sound barrier along the Southern Residences would not be feasible. A barrier along the border with Central Reservoir Recreation Area was considered, but found not to be feasible because of the constrained space between the Project construction area and the property line.

Therefore, noise increases associated with Central RCS construction activities are considered to be significant and unavoidable because feasible mitigation is not available and noise levels would still exceed the daytime (7:00 a.m. to 7:00 p.m.) thresholds established by Section 17.120 of the Oakland Planning Code. Noise would exceed the ordinance levels intermittently, when construction activities are closest to receptors. Therefore, based on the duration, timing and location of Central RCS construction activities, noise impacts would be significant and unavoidable. Overall, tank and valve structure construction activities would take place over a period of approximately 26 months, including RCS construction activities; however, no location (or receptor) would experience noise levels in excess of ordinance levels for more than a total of about 30-days over the entire 6-year construction period, including all phases of construction.

TABLE 3.10-13
NOISE LEVELS FROM CENTRAL RCS CONSTRUCTION ACTIVITIES AT SENSITIVE RECEPTORS ADJACENT TO THE PROJECT SITE

Receptor	Principal Noise Sources	Reference Noise Level (dBA)[1]	Distance to Receptor (feet)	Usage Factor	Adjusted L_{eq} Level (dBA)[2]	L_{eq} Level (dBA) with Mitigation[4]	Threshold dBA[3]	Exceeds Noise Ordinance[4]	
								No MM	With MM
Southern Residences[4]	Compressor (2)	78	100	40%	71	NA	65	Yes	NA
Southern Residences[4]	Crane	85	100	16%	67	NA	65	Yes	NA
Southern Residences[4]	Generator (2)	81	100	50%	75	NA	65	Yes	NA
Southern Residences[4]	Telehandler (2)	83	100	40%	76	NA	65	Yes	NA
Southern Residences[4]	Haul and Water Trucks	77	100	1 per hour	35	NA	65	No	NA
Southern Residences[4]	Concrete Mixer Truck	79	100	40%	26	NA	65	No	NA
Southern Residences[4]	**Combined Total**	**NA**	100	**NA**	80	NA	65	**Yes**	NA
Central Reservoir Recreation Area	Compressor (2)	78	100	40%	71	NA	70	Yes	NA
Central Reservoir Recreation Area	Crane	85	100	16%	67	NA	70	No	NA
Central Reservoir Recreation Area	Generator (2)	81	100	50%	75	NA	70	Yes	NA
Central Reservoir Recreation Area	Telehandler (2)	83	100	40%	76	NA	70	Yes	NA
Central Reservoir Recreation Area	Haul and Water Trucks	77	100	1 per hour	35	NA	70	No	NA
Central Reservoir Recreation Area	Concrete Mixer Truck	79	100	40%	26	NA	70	No	NA
Central Reservoir Recreation Area	**Combined Total**	**NA**	100	**NA**	**80**	NA	70	**Yes**	NA

NOTES:
1 L_{max} at 50-feet.
2 The L_{eq} level is adjusted for distance and percentage of usage.
3 Noise exceeding 65-dBA for more than 10-days near residences is considered exceeding the noise ordinance during daytime hours (7:00 a.m. to 7:00 p.m.). For the Central Reservoir Recreation Area, a 70-dBA standard applies. MM = mitigation measures.
4 Southern Residences include the Oakland Heights Nursing and Rehabilitation facility and Residences near East 29th Street/25th Avenue.

See Figure 3.10-1 for noise measurement locations. L_{eq} represents the hourly constant sound level.

SOURCE: ESA, 2019

Pipeline Connection Activities

Pipeline connection activities which would occur during the Tank and Valve Structure Construction Phase would occur during daytime (7:00 a.m. to 7:00 p.m.) and potentially evening (7:00 p.m. to 10:00 p.m.) and nighttime (10:00 p.m. to 7:00 a.m.) hours. Pipeline connection activities would connect new pipelines to the existing distribution system. The sensitive receptors affected by the pipeline connection activities are the Southern Residences and the Central Reservoir Recreation Area because the pipeline connections would take place at the southeastern section of the Project site.

Trench construction for the pipeline would be performed during daytime hours (7:00 a.m. to 7:00 p.m.) and would not occur at night. Daytime equipment operations for these connections would also include pavement cutting, pipeline cutting, compaction, and use of a backhoe. If the connection cannot be completed within the daytime hours, construction may extend into the evening (7:00 p.m. to 10:00 p.m.) and nighttime (10:00 p.m. to 7:00 a.m.). The connections would be conducted at the corner of 25th Avenue and East 29th Street, approximately 80-feet from the nearest existing residence at 2505 East 29th Street over approximately two consecutive nights. Evening and nighttime equipment operations would include pipeline cutting and welding.

For sensitive receptors affected by pipeline connection activities, Table 3.10-14 presents the noise levels for individual pieces of equipment, as well as for their combined operation. A daytime (7:00 a.m. to 7:00 p.m.) threshold of 65-dBA applies to the Southern Residences affected by pipeline connection activities. As indicated in Table 3.10-14, even with the incorporation of EBMUD's standard practices and procedures for noise control measures, the combined operation of all equipment would exceed the daytime (7:00 a.m. to 7:00 p.m.) 65-dBA long-term construction noise standard at the Southern Residences. Additionally, nighttime activities would be subject to the City's L_{33} standard, which for this area was monitored to be 46-dBA. The nighttime work would exceed 46-dBA and represent a short-term significant noise impact over two consecutive nights. Mitigation Measure NOI-2 states that EBMUD will offer residents within 500-feet[6] of the pipeline connection construction site alternative lodging during this 2-day period. Notwithstanding this mitigation, this 2-day nighttime noise impact is also identified as significant and unavoidable because the noise ordinance would still be exceeded. Therefore, based on the duration, timing and location of Pipeline Connection construction activities, noise impacts would be significant and unavoidable. Overall, tank and valve structure construction activities would take place over a period of approximately 26 months, including Pipeline Connection activities; however, no location (or receptor) would experience noise levels in excess of ordinance levels for more than a total of about 30-days over the entire 6-year construction period, including all phases of construction.

[6] The 500-foot distance applies only to residences within 500 feet of construction activities, and is determined by applying spherical spreading losses (6 dBA per doubling of distance) to a noise level of 80 dBA (Leq) at 50 feet, resulting in a noise level of 60 dBA (Leq) at 500 feet. While an exterior noise level of 60 dBA (Leq) would still exceed the 46-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 (Leq) 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 two nights.

TABLE 3.10-14
NOISE LEVELS FROM PIPELINE CONNECTION ACTIVITIES AT SENSITIVE RECEPTORS ADJACENT TO THE PROJECT SITE

Receptor	Principal Noise Sources	Reference Noise Level (dBA)[1]	Distance to Receptor (feet)	Usage Factor	Adjusted L_{eq} Level (dBA)[2]	L_{eq} Level (dBA) with Mitigation[3]	Threshold dBA		Exceeds Noise Ordinance[4]	
									No MM	With MM
Daytime Work (7:00 a.m. to 7:00 p.m.)										
2505 East 29th Street	Concrete Crusher	90	80	40%	79	NA	65		Yes	NA
2505 East 29th Street	Compactor	83	80	20%	72	NA	65		Yes	NA
2505 East 29th Street	Backhoe	78	80	40%	70	NA	65		Yes	NA
2505 East 29th Street	Pipe Cutter (Saw)[5]	76	80	40%	68	NA	65		Yes	NA
2505 East 29th Street	**Combined Total**	**NA**	**80**	**NA**	**80**	NA	65		Yes	NA
Evening and Nighttime Work (7:00 p.m. to 7:00 a.m.)										
2505 East 29th Street	Pipe Cutter (Saw)	76	80	40%	68	NA	46		Yes	Yes
2505 East 29th Street	Welder	74	80	40%	66	NA	46		Yes	Yes
2505 East 29th Street	**Combined Total**	**NA**	**80**	**NA**	**70**	NA	46		**Yes**	**Yes**

NOTES:
1 L_{max} at 50-feet.
2 The L_{eq} level is adjusted for distance and percentage of usage.
3 It is not practicable to construct a temporary noise barrier as mitigation for two nights of work; therefore, mitigation for this nighttime work consists of offering alternative lodging for nearby residences.
4 Daytime noise exceeding 65-dBA for more than 10-days near residences is considered exceeding the noise ordinance during daytime hours (7:00 a.m. to 7:00 p.m.). Nighttime noise exceeding the existing L_{33} of 46-dBA at the nearest residences at this location is considered exceeding the noise ordinance. MM = mitigation measures.
5 Pipe cutter reference noise levels that of a standard gas powered saw is from FTA (2018) and was selected to be representative of a pipe cutter in lieu of available noise specification specific to pipe cutters.

See Figure 3.10-1 for noise measurement locations. L_{eq} represents the hourly constant sound level.

SOURCE: ESA, 2019

Site Restoration Phase

Once construction is complete, the site would be restored, graded, and landscaped over a period of approximately 5-months, as described in Table 2-2 of Chapter 2, *Project Description*.[7] As an optional component of the Project, if approved, EBMUD may also authorize the Redwood Day School to construct a private driveway along the north end of the existing reservoir property at Ardley Avenue. Site restoration activities would involve the use of off-road equipment and haul trucks. Site restoration activities would involve daytime (7:00 a.m. to 7:00 p.m.) construction.

For the analysis of noise impacts from site restoration activities, RCNM was used to assess whether Project activities could exceed noise ordinance limits similar to how the noise levels were analyzed for the Site Preparation and Demolition Phase. Table 3.10-15 presents the Project-related construction noise levels at each of the five closest sensitive receptor areas surrounding the Project site, based on distance and equipment type and duration of use, as predicted by RCNM. Table 3.10-15 also includes a component for noise from haul trucks, calculated separately using the FHWA Traffic Noise Model and assuming a peak of approximately 64 daily truck trips or approximately 6 trips per hour at 15-miles per hour on the site as on-site truck speeds would be limited by EBMUD Standard Construction Specification 01 35 44, Section 3.3(B) for dust control (refer to Section 3.2, Air Quality). The predicted noise levels are conservative in that they assume activity at the closest point to each sensitive receptor, which would not occur for the entire timeframe of site restoration activities.

As shown on Table 3.10-15, the combined operation of all equipment would exceed the 65-dBA long-term construction noise standard at the property line of the closest residential receptor locations and the 70-dBA standard applicable to the Central Reservoir Recreation Area, resulting in a potential significant noise impact for these sensitive receptors. 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 EBMUD Standard Specification 01 35 44, Section 1.3(G) and Section 3.6, which include a range of noise control measures such as developing a Noise Control and Monitoring Plan and requiring the contractor to implement noise control measures (e.g., mufflers or noise-attenuating shields) on all equipment. Even with the incorporation of EBMUD's standard practices and procedures for noise control measures, operation of most equipment (Adjusted L_{eq} Level) would exceed the City's long-term construction noise ordinance at all sensitive receptors resulting in a potentially significant impact.

Mitigation Measure NOI-1 includes installation of a 16-foot tall temporary noise barrier adjacent to Redwood Day School as shown in Figure 3.10-3, which is the only feasible location for a noise barrier as previously described. Mitigated noise levels are presented in Table 3.10-15. Reduction in noise levels from Mitigation Measure NOI-1 were estimated based on the CadnaA model. Even after considering EBMUD standard practices and procedures which includes a range of noise control measures and after

7 The site restoration phase overlaps with the last approximate 3-months of the tank and valve structure construction phase, during field testing and startup.

TABLE 3.10-15
NOISE LEVELS FROM SITE RESTORATION ACTIVITIES AT SENSITIVE RECEPTORS ADJACENT TO THE PROJECT SITE

Receptor	Principal Noise Sources	Reference Noise Level (dBA)[1]	Distance to Receptor (feet)	Usage Factor	Adjusted L_{eq} Level (dBA)[2]	L_{eq} Level (dBA) with Mitigation[3]	Threshold dBA	Exceeds Noise Ordinance[4]	
								No MM	With MM
Redwood Day School	Backhoe	78	50	40%	74	69	65	Yes	Yes
Redwood Day School	Front End Loader	79	50	40%	75	70	65	Yes	Yes
Redwood Day School	Excavator	81	50	40%	77	72	65	Yes	Yes
Redwood Day School	Compactor	83	50	20%	76	71	65	Yes	Yes
Redwood Day School	Haul and Water Trucks	77	50	1 per hour	48	43	65	No	No
Redwood Day School	**Combined Total**	**NA**	50	**NA**	**82**	**77**	65	**Yes**	**Yes**
Ardley Avenue Residences	Backhoe	78	75	40%	70	NA	65	Yes	NA
Ardley Avenue Residences	Front End Loader	79	75	40%	72	NA	65	Yes	NA
Ardley Avenue Residences	Excavator	81	75	40%	73	NA	65	Yes	NA
Ardley Avenue Residences	Compactor	83	75	20%	73	NA	65	Yes	NA
Ardley Avenue Residences	Haul and Water Trucks	77	75	1 per hour	45	NA	65	No	NA
Ardley Avenue Residences	**Combined Total**	**NA**	**75**	**NA**	**79**	NA	65	**Yes**	NA
23rd Avenue Residences	Backhoe	78	100	40%	68	NA	65	Yes	NA
23rd Avenue Residences	Front End Loader	79	100	40%	69	NA	65	Yes	NA
23rd Avenue Residences	Excavator	81	100	40%	71	NA	65	Yes	NA
23rd Avenue Residences	Compactor	83	100	20%	70	NA	65	Yes	NA
23rd Avenue Residences	Haul and Water Trucks	77	100	1 per hour	44	NA	65	No	NA
23rd Avenue Residences	**Combined Total**	**NA**	100	**NA**	**76**	NA	65	**Yes**	NA
Southern Residences[5]	Backhoe	78	50	40%	74	NA	65	Yes	NA
Southern Residences[5]	Front End Loader	79	50	40%	75	NA	65	Yes	NA
Southern Residences[5]	Excavator	81	50	40%	77	NA	65	Yes	NA
Southern Residences[5]	Compactor	83	50	20%	76	NA	65	Yes	NA
Southern Residences[5]	Haul and Water Trucks	77	50	1 per hour	48	NA	65	No	NA
Southern Residences[5]	**Combined Total**	**NA**	50	**NA**	**82**	NA	65	**Yes**	NA
Central Reservoir Recreation Area	Backhoe	78	65	40%	71	NA	70	Yes	NA

TABLE 3.10-15 (CONTINUED)
NOISE LEVELS FROM SITE RESTORATION ACTIVITIES AT SENSITIVE RECEPTORS ADJACENT TO THE PROJECT SITE

Receptor	Principal Noise Sources	Reference Noise Level (dBA)[1]	Distance to Receptor (feet)	Usage Factor	Adjusted L_{eq} Level (dBA)[2]	L_{eq} Level (dBA) with Mitigation[3]	Threshold dBA	Exceeds Noise Ordinance[4]	
								No MM	With MM
Central Reservoir Recreation Area	Front End Loader	79	65	40%	73	NA	70	Yes	NA
Central Reservoir Recreation Area	Excavator	81	65	40%	75	NA	70	Yes	NA
Central Reservoir Recreation Area	Compactor	83	65	20%	74	NA	70	Yes	NA
Central Reservoir Recreation Area	Haul and Water Trucks	77	65	1 per hour	46	NA	70	No	NA
Central Reservoir Recreation Area	**Combined Total**	**NA**	**65**	**NA**	**79**	NA	70	**Yes**	NA

NOTES:
1 L_{max} at 50-feet.
2 The L_{eq} level is adjusted for distance and percentage of usage.
3 Modeled noise reduction based on a 16-foot high temporary noise barrier is applied with Mitigation Measure NOI-1. Mitigated values are reported at the 2nd story because the resultant noise reduction at the school will depend on the height of the receptor.
4 Noise exceeding 65-dBA for more than 10-days near residences is considered exceeding the noise ordinance. For the Central Reservoir Recreation Area, a 70-dBA standard applies. MM= Mitigation Measure.
5 Southern Residences include the Oakland Heights Nursing and Rehabilitation facility and Residences near East 29th Street/25th Avenue.

See Figure 3.10-1 for noise measurement locations. L_{eq} represents the hourly constant sound level.

SOURCE: ESA, 2019

Chapter 4incorporation of Mitigation Measure NOI-1which includes a temporary noise barrier adjacent to the Redwood Day School, noise from site restoration activities would exceed the ordinance levels for all sensitive receptors adjacent to the Project site.

Chapter 5Therefore, noise increases associated with site restoration activities are considered to be significant and unavoidable because, after implementation of feasible mitigation, noise levels would still exceed the 65-dBA threshold at the property line daytime (7:00 a.m. to 7:00 p.m.) established by Section 17.120 of the Oakland Planning Code for residential receptors and the 70-dBA threshold applicable to the Central Reservoir recreation area. The threshold would be exceeded intermittently, when restoration activities are closest to receptors. Overall, site restoration activities would take place over a period of approximately 100 work days. Based on the duration and location of construction activities, including site restoration, as construction progresses around the perimeter of the reservoir, no location (or receptor) would experience noise levels in excess of ordinance levels for more than a total of about 30-days over the entire 6-year construction period, including all phases of construction.

Truck Traffic Noise 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 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 high, individual noise peaks of 75- to 80-dBA at 50-feet are common during a truck passage.[8] However, in noisy environments or during less noise-sensitive daytime hours (7:00 a.m. to 7:00 p.m.), truck noise is perceived as part of the total noise environment rather than as an individual disturbance. Therefore, noise levels associated with hourly haul truck volumes were assessed (rather than a single passing truck).

As indicated in Table 2-4 in Chapter 2, *Project Description*, truck and worker vehicle volumes would vary with each construction phase. To assess the Project's maximum traffic noise impact, the maximum hourly truck and worker vehicle trips were assigned to two primary routes, as indicated in Figures 3.12-2 and 3.12-3 of Section 3.12, Transportation: (1) 23rd Avenue to the east Project site entrance (both directions); and (2) Fruitvale Avenue to East 27th Street to 25th Avenue (both directions). Consistent with the Transportation analysis on Page 3,12-15, half of the material truck trips were assumed to travel from north of the Project site, and the remaining half of the hauling truck trips were assumed to travel from south of the Project site. By assigning all construction-related traffic equally to each street along these routes, the maximum noise increase that could occur on any neighborhood street during the demolition phase of the Project was evaluated, which is the phase that would generate the greatest number of truck trips.

The greatest number of truck trips would occur during the demolition phase, when a projected maximum of 197 truck trips per day would occur over an approximately 30-day period. Assigning these trips equally along Fruitvale Avenue and 23rd Avenue results in a

8 California Vehicle Code (Section 27204) limits noise from trucks to 80-dBA (models after 1987).

total of approximately 99 trips per 12-hour workday along each route, or about 9 truck trips per hour along each route. Additionally, while worker arrivals and departures would actually be divided by allocation of work shifts, it was conservatively assumed that half of all project construction workers would commute in passenger vehicles or light duty trucks during the analyzed hour along the same routes. Using the FHWA Traffic Noise Model, the addition of these haul trucks and worker trips would contribute an estimated 57-dBA to the hourly L_{eq} along each of these roadways.

Table 3.10-16 presents estimated maximum hourly traffic noise increases along access routes by adding the maximum hourly projected Project-related traffic increases to monitored daytime (7:00 a.m. to 7:00 p.m.) noise levels along the truck route. Noise measurements indicate that existing daytime ambient noise levels in the Project vicinity when hauling would occur range from 58- to 65-dBA (L_{eq}; see Table 3.10-3 above). The largest noise increase would occur along 25th Avenue, which has the lowest existing daytime volumes. However, this increase is below the 5-dBA threshold used by the City of Oakland to assess traffic noise impacts. Therefore, the noise increases along roadways from haul trucks would be less than significant with respect to the potential for resulting in substantial temporary noise increases.

TABLE 3.10-16
PEAK-HOUR TRAFFIC NOISE LEVELS IN THE PROJECT VICINITY

	dBA, hourly L_{eq}			
Roadway Segment[b]	**Existing Monitored Daytime Noise Level (7:00 a.m. to 7:00 p.m.)**	**Contribution of Haul Trucks**	**Resultant Noise Level with Haul Trucks**	**Difference between Existing and Resultant Noise Level[a]**
25th Avenue north of East 27th Street	57.5	57.0	60.3	2.8
23rd Avenue south of East 27th Street	63.7	57.0	64.5	0.8
Fruitvale Avenue south of East 27th Street	62.0	57.0	63.2	1.2
Fruitvale Avenue south of Foothill Boulevard	64.8	57.0	65.5	0.7
23rd Avenue south of Foothill Boulevard	63.5	57.0	64.4	0.9

NOTES:

a Considered significant if the incremental increase in noise from traffic is greater than the existing ambient (modeled) noise level by 5-dBA L_{eq}, per City of Oakland CEQA Thresholds/Criteria of Significance Guidelines.

b Road center to receptor distance is 32-feet for all roadway segments. Noise levels were determined using the FHWA Traffic Noise Model.

SOURCE: ESA, 2018

Operation

The Project would include the replacement of an existing open-cut reservoir with three concrete tanks, which would not generate a new source of ambient noise. Maintenance and repair activities would occur as needed or as part of routine facility monitoring in accordance with standard inspection schedules, and the frequency of monitoring or maintenance activities would not change from current conditions. The Project would not result in any permanent surface operations that would introduce new sources of noise or vibration. Therefore, there would be no impact associated with Project operations resulting 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.

Significance Determination Before Mitigation

Significant. Because noise levels associated with demolition, substructure construction, tank and valve structure construction, and site restoration would exceed the following City of Oakland Noise Ordinance standards:

- Daytime (7:00 a.m. to 7:00 p.m.) standard of 65-dBA applicable to adjacent residential and school uses;
- Daytime (7:00 a.m. to 7:00 p.m.) standard of 70-dBA applicable to the Central Reservoir Recreation Area; and
- Evening and nighttime (7:00 p.m. to 7:00 a.m.) standard of existing ambient noise levels.

Noise impacts associated with those phases of construction would be potentially significant and would therefore require mitigation.

Mitigation Measures

Mitigation Measure NOI-1: Noise Control Measures

EBMUD shall erect a 16-foot tall temporary noise barrier along EBMUD's property adjacent to the Redwood Day School for the entire construction duration. The noise barrier will be Sound Transmission Class (STC) rated and specific to sound attenuation applications. There may be some periods of construction when the noise barrier may be temporarily moved or dismantled to accommodate the Project construction area. EBMUD will schedule construction activities outside of normal school hours when it is feasible to do so if heavy construction equipment, including but not limited to impact equipment, is operated within 100 feet[9] of the closest classroom or if the noise barrier needs to be temporarily removed to accommodate construction.

Mitigation Measure NOI-2: Off-site Accommodations for Affected Nighttime Receptors

At least ten (10) days in advance, EBMUD will notify residents of the Southern Residences that could be affected by nighttime (10:00 p.m. to 7:00 a.m.) pipeline connection construction near the 25th Avenue/East 29th Street intersection. Residences within 500-feet of the pipeline connection construction site 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 5 miles of the affected residence or as close as feasible. Alternative

[9] At 100-feet or more, noise levels during the nosiest construction phase (demolition) are attenuated to approximately 65 dBA or less relative to the nearest classroom.

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.). This measure would only be implemented if nighttime construction occurs.

Significance Determination after Mitigation

Significant and unavoidable for daytime (7:00 a.m. to 7:00 p.m.) site preparation and demolition, tank and valve structure construction activities (RCS construction and nighttime [7:00 p.m. to 7:00 a.m.] pipeline connection work), and site restoration phases of reservoir construction. Mitigation Measure NOI-1 would reduce construction noise to less-than-significant levels for all but a few construction activities. Over the entire 6-year construction duration, daytime construction operations are estimated to exceed the 65-dBA and 70-dBA long-term construction noise standards of the City of Oakland's noise ordinance applicable to residences and a school, and to the Central Reservoir Recreation Area, respectively, for a total of less than about 30-days for the closest residences along Ardley Avenue, 23rd Avenue, Southern Residences, the Central Reservoir Recreation Area, and the Redwood Day School.

While the temporary noise barrier required through implementation of Mitigation Measure NOI-1 has the potential to substantially reduce noise levels to a less-than-significant level, it cannot be determined conclusively that a reduction sufficient to reduce daytime noise levels to the applicable 65-dBA and 70-dBA standards at all times is achievable; this daytime impact is conservatively identified as significant and unavoidable. The potential also exists for nighttime work to result in noise levels exceeding nighttime standards for the two consecutive nights of pipeline connection activity. Consequently, noise impacts from daytime and nighttime construction work would be significant and unavoidable.

Impact NOI-2: Result in the generation of excessive groundborne vibration or groundborne noise levels. (Criterion 2)

Construction

Project construction activities could produce excessive groundborne vibration. Not all construction equipment operations generate measureable vibration and reference vibration levels have been published for equipment most commonly associated with vibration effects (FTA, 2018). Equipment proposed to be involved project construction activities that are expected source of vibration include hoe rams, drill rigs, some types of compactors (vibratory), and to a lesser degree trucks operating on uneven surfaces.

An impact hammer (hoe ram) would be used for demolition of the existing reservoir. Other types of construction equipment include a drill rig for CDSM column development and vibratory compactors for site restoration. 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 where discontinuities in the roadway exist.

If groundborne vibration generated by Project-related demolition and construction activities for any of the project phases were to exceed 0.5 in/sec PPV, vibration could damage nearby structures, including adjacent buildings.

Table 3.10-17 lists reference vibration levels at 25-feet associated with the operation of various types of construction equipment proposed to be used for the Project at specified distances, as well as the vibration levels corresponding to the closest adjacent structures, which are at Redwood Day School and represent the worst-case scenario with respect to the potential to cause building damage). While vibration attenuation with distance can vary depending on subsoils, estimated vibration levels generated by construction equipment would not exceed the 0.5 in/sec PPV threshold at Redwood Day School structures, based on vibration attenuation equations (FTA, 2018).

TABLE 3.10-17
SUMMARY OF VIBRATION LEVELS DURING CONSTRUCTION AT THE CLOSEST SENSITIVE RECEPTOR

Vibration-Inducing Construction Equipment	Equipment Vibration Level at 25-feet (PPV in/sec)[a]	Distance from Nearest Structure (feet)	Attenuated Construction Equipment Vibration Level at Nearest Structure (PPV in/sec)[b]	Exceeds Building Cosmetic Damage Thresholds?
Bore/Drill Rigs	0.089	100	0.0003	No
Hoe Ram	0.089	60	0.034	No
Compactor	0.21	25	0.21	No
Truck	0.076	25	0.076	No

NOTES:
a Reference vibration levels for construction equipment are derived from FTA (2018).
b Attenuated construction equipment vibration levels at the nearest sensitive receptors were calculated using the methodology in FTA (2018).

SOURCE: ESA, as adapted from FTA, 2018

While cosmetic damage would not occur, vibration levels during operation of the hoe ram or vibratory compactors within 100-feet of a residence during demolition could be noticeable to residents (69 VdB and 76 VdB, respectively). However, since construction would occur during the daytime hours (7:00 a.m. to 7:00 p.m.), such noticeable vibrations would not result in sleep disruption. Evening and nighttime work (7:00 p.m. to 7:00 a.m.) for pipeline connections would not involve equipment that is a source of vibration (FTA, 2018). 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, Environmental Requirements, Section 3.5 and Section 1.3(H). EBMUD Standard Construction Specification 01 35 44, Section 3.5, establishes the contractor not to exceed a threshold vibration limit of 0.5 in/sec PPV to minimize the potential for structural damage from vibration. Additionally, EBMUD Standard Construction Specification 01 35 44, Section 1.3(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. Because contractors would be required to maintain their activities such that vibration would not exceed 0.5 in/sec PPV and submit a plan detailing the means and methods for controlling and monitoring surface vibration generated by demolition, construction-related vibration impacts would be less than significant. The EBMUD Practices and Procedures Monitoring and Reporting Plan (Appendix E) lists the applicable standards specifications language.

Operation

The Project would include the replacement of an existing open-cut reservoir with three concrete tanks, which would not generate a new source of vibration. Maintenance and repair activities would occur as needed or as part of routine facility monitoring in accordance with standard inspection schedules, and the frequency of monitoring or maintenance activities would not change from current conditions. The Project would not result in any permanent surface operations that would introduce new sources of vibration. Therefore, there would be no impact associated with Project operations resulting in exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels.

Significance Determination Before Mitigation

Less than significant.

Mitigation Measure

None required.

Cumulative Impact Analysis

This section presents an analysis of the cumulative effects of the Project in combination with other past, present, and reasonably foreseeable future projects that could cause cumulatively considerable impacts.

Construction Noise and Vibration Impacts

The geographic scope of analysis for cumulative noise and vibration construction impacts encompasses sensitive receptors within approximately 500-feet of the Project site. Beyond 500-feet, the contributions of noise and vibration from other projects would be greatly attenuated through both distance and intervening structures, and their contribution would be expected to be minimal. Table 3.0-1, in Section 3.0, lists the reasonably foreseeable projects in the vicinity of the Project site, three of which have construction schedules that could overlap with Project construction. All of these cumulative projects are at least 1,500-feet from the Project site and are therefore sufficiently distant to not meaningfully contribute to cumulative construction noise or vibration impacts. As a result, cumulative noise and vibration impacts would be the same as the project-level impacts identified above.

3.10.4 References

Alameda County Community Development Agency (ACCDA). 2012. *Oakland International Airport, Airport Land Use Compatibility Plan*. December 2012.

California Department of Transportation (Caltrans). 2013. *Technical Noise Supplement*, November 2013.

City of Oakland. 2005. *General Plan*, *Noise Element*, June 21, 2005.

City of Oakland. 2016. CEQA Thresholds of Significance Guidelines, May 22, 2016.

City of Oakland. 2018. Standard Conditions of Approval, Department of Planning and Building Bureau of Planning, Revised November 5, 2018.

City/County Association of Governments of San Mateo County (C/CAG). 2012. *Comprehensive Airport Land Use Compatibility Plan for the Environs of San Francisco International Airport,* November 2012.

EBMUD. 2017. Standard Specification Number 01 14 00, Work Restrictions. May 2017.

EBMUD. 2018. Standard Specification Number 01 35 44, Environmental Requirements. March 2018.

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Federal Transit Administration (FTA). 2018. Transit Noise and Vibration Impact Assessment, September 2018.

U.S. Department of Housing and Urban Development (HUD). 2009. *The Noise Guidebook.* Office of Community Planning and Development, p. 24. Available: https://www.hudexchange.info/resource/313/hud-noise-guidebook/. February 2009.

U.S. Environmental Protection Agency (U.S. EPA). 1974. *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety (Condensed Version),* Appendix B, Table B-4, p. B-6. Washington D.C. (EPA/ONAC 550/9-74-004). Available: http://www.nonoise.org/library/levels74/levels74.htm. March 1974.

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3.11 Recreation

This section presents the physical and regulatory setting for nearby recreation resources and evaluates potential impacts on recreational resources that could result from construction and operation of the Project.

3.11.1 Environmental Setting

Parks and Recreation

Regional Parks

The East Bay Regional Park District (EBRPD) acquires and develops regional parks, open spaces, and trails throughout the East Bay. Spanning more than 120,000 acres in Alameda and Contra Costa counties, the EBRPD owns and maintains 73 parks and over 1,250 miles of trails (EBRPD, 2018). Of these, Redwood Park and Martin Luther King Jr Park are nearest to the Project site; located approximately 2.5-miles northwest and approximately 2.5-miles south of the Project site, respectively.

Local Parks and Recreation Facilities

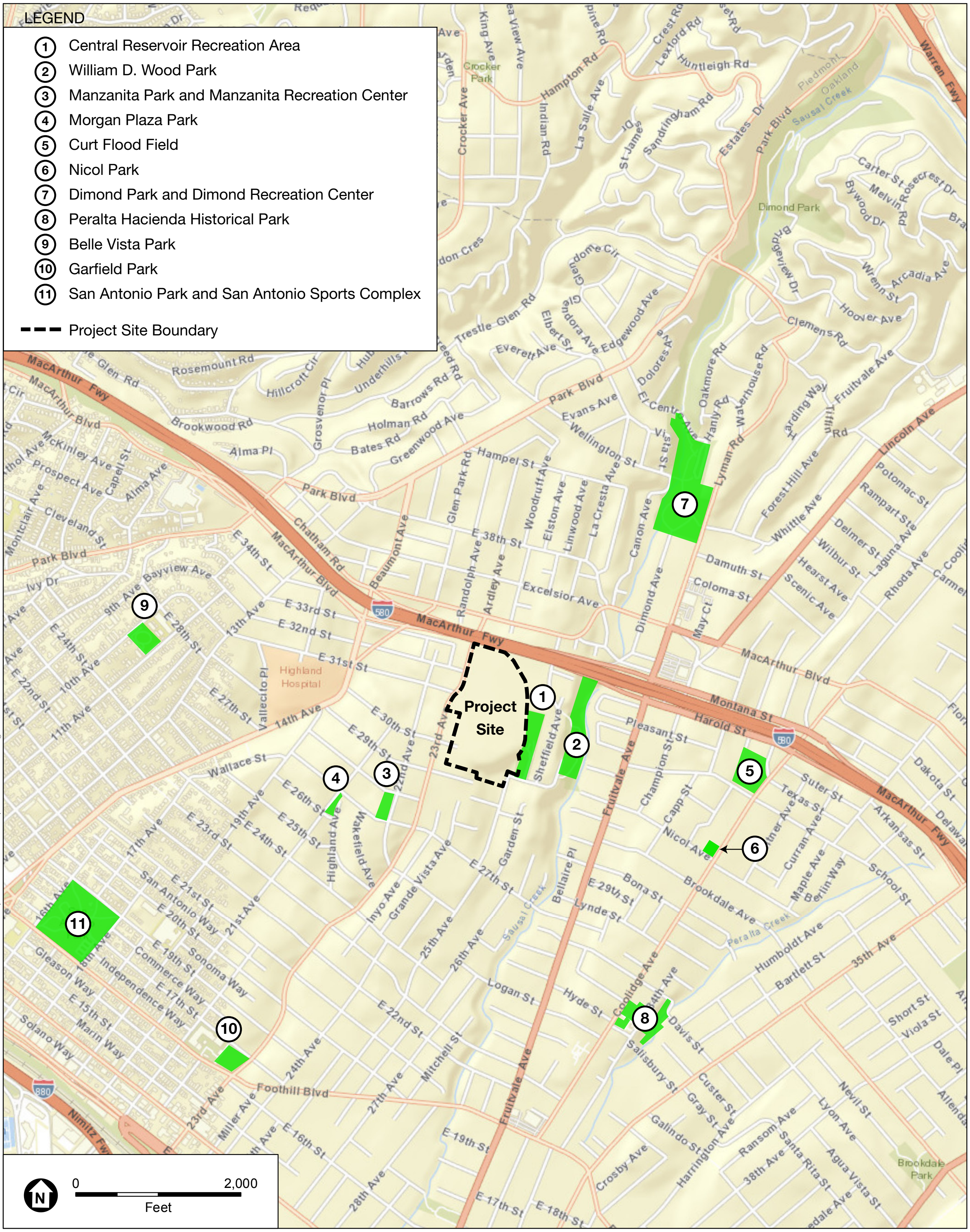
The City of Oakland Parks, Recreation and Youth Development Department manages approximately 130 parks and provides recreation programs to the community, including exercise classes, child care, and school break camps. The City of Oakland parks and recreation facilities located within a 1-mile radius of the Project site are shown on Figure 3.11-1 and described in Table 3.11-1.

3.11.2 Regulatory Framework

This section describes local policies and regulations that may apply to the Project. There are no federal or state operated recreational resources in the vicinity of the Project and thus, no federal or state policies are applicable to the Project’s potential effects on recreation.

Local Regulations

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 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.



SOURCE: ESRI World Imagery; ESA, 2018

EBMUD Central Reservoir Replacement Project

Figure 3.11-1
Parks and Recreation Facilities
Near Central Reservoir Project Site

TABLE 3.11-1
LOCAL PARKS AND RECREATION FACILITIES

No. on Figure 3.11-1	Name	Address	Distance from Project Site	Size (acres)	Amenities
1	Central Reservoir Recreation Area	2506 East 29th Street	Immediately adjacent - borders the eastern edge	3.7	playground, baseball field, basketball courts, picnic tables, swing set
2	William D. Wood Park	2920 McKillop Road	0.18 miles east	5.7	playing field, swing set, recreational use pathways
3	Manzanita Park; Manzanita Recreation Area	2701 22nd Avenue	0.25 miles southwest	1.2	playground, picnic area, gymnasium, lighted basketball courts, recreational programs, after school youth programs
4	Morgan Plaza Park	21st Avenue & East 26th Street	0.4 miles southwest	0.8	swing set, playing field
5	Curt Flood Field	3303 Laguna Way	0.5 miles east	3.7	softball field, baseball field, large grass field
6	Nicol Park	Nicol Avenue & Coolidge Avenue	0.5 miles southeast	0.2 acres	playground, picnic tables
7	Dimond Park; Dimond Recreation Center	3860 Hanly Road	0.5 miles northeast	14	contains portions of Sausal Creek, several hiking trails, the Lions swimming pool, tennis courts, picnic tables, playgrounds, Dimond Native Demonstration Garden, Dimond Education Garden
8	Peralta Hacienda Historical Park	2500 34th Avenue	0.5 miles southeast	6	historical education exhibits of the hacienda, 1870s state landmark farmhouse, outdoor recreation space
9	Belle Vista Park	1025 East 28th Street	0.75 miles west	2	community garden, basketball nets, and playground
10	Garfield Park	2260 Foothill Blvd	0.95 miles southwest	1.7	softball field, large grass field
11	San Antonio Park; San Antonio Sports Complex	1701 E 19th Street	0.95 miles southwest	12.25	playground, picnic area, large grass field, community garden, tennis courts, soccer field, lighted basketball court, community garden, offers fitness courses for adults and the Homework Club for students.

City of Oakland General Plan

The City of Oakland General Plan, Open Space, Conservation and Recreation Element (City of Oakland, 1996), is the official policy document addressing the management of open space, natural resources, and parks in Oakland. The main policies of the Recreation portion that are applicable to the Project include:

> ***Policy REC-1.1: Protection of Park Open Space***. Use a variety of measures, including zoning and park classification, to protect the basic function of parks as public open spaces and to evaluate and review future park projects.

Policy REC-1.2: No Net Loss of Open Space. Unless overriding considerations exist, allow no net loss of open space within Oakland's urban park system.

Policy REC-2.1: Park Conversions to Other Uses. Protect parks from conversion to other uses, except for minor boundary changes which would improve their value or usefulness.

***Policy REC-2.2: Conflicts Between Park Uses*:** Site park activities and facilities in a manner which minimizes conflict between park uses.

Policy REC-2.4: Off-Site Conflicts. Manage park facilities and activities in a manner which minimizes negative impacts on adjacent residential, commercial, or industrial areas.

3.11.3 Impact Analysis

Methodology for Analysis

Recreational impacts are assessed based on the Project's level of physical impact on existing and planned parks and recreational facilities in the vicinity.

Significance Criteria

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

1. 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.
2. Include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment.

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: 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.*** The Project consists exclusively of water distribution facilities and does not require the construction or expansion of recreational facilities. Construction would not result in closure of the Central Reservoir Recreation Area and construction activities would be primarily confined to the reservoir site and to the 25th Avenue/East 29th Street intersection. Therefore, there would be no impacts.

Impacts and Mitigation Measures

Impact REC-1: 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. (Criterion 1)

Construction

The Project does not propose to construct new homes or businesses and would not increase the number of residents in the Project area. Thus, the Project would not generate or attract additional population that could result in increased use of existing recreational facilities, such that substantial physical deterioration of the facilities could occur or be accelerated.

As presented in Table 3.11-1, all regional and local parks are more than 0.25 miles away from the Project site, with the exception of the Central Reservoir Recreation Area, which borders the east side of the Project site. The Project would not have long-term effects on recreational use and construction would not prevent the community from accessing or result in closure of the Central Reservoir Recreation Area because reservoir construction would be primarily confined to the reservoir site.

Construction trucks would access the Project site through both the primary entrance at the 25th Avenue and East 29th Street intersection and the secondary entrance at the eastern terminus of East 30th Street. The Project access at 25th Avenue and East 29th Street is approximately 220 feet west of the Central Reservoir Recreation Area. Recreational users must access the Central Reservoir Recreation area via East 29th Street and users can park along East 29th Street as well. Construction activities near the East 29th Street entrance could decrease the ease of access to the Central Reservoir Recreation Area or discourage users from parking and using the recreation area during construction. The potential decrease in ease of access may reduce public use of the Central Reservoir Recreation Area over the short-term, but the possibility of conflicts is reduced by the fact that construction would not occur on weekends, which is typically the peak use time for recreation facilities.

Pipeline construction as part of the Rate Control Station would extend along East 29th Street, but this construction would be confined to the public right-of-way and would be of relatively short duration (approximately 1 week), and would thus not be expected to affect recreational activities at Central Reservoir Recreation Area. The potential for construction to affect traffic and parking on East 29th Street is addressed in Section 3.12, Transportation and Circulation.

Some potential recreational users may choose to avoid the Central Reservoir Recreation Area during construction work hours, particularly if there are higher levels of construction noise or other factors that could diminish their experience. As a result, some may choose to utilize other parks and recreational facilities in the Project area during Project construction. The Project would not be expected to cause permanent displacement of users of these areas because there would be no permanent change to recreation areas and the construction would end after 6-years.

As represented in Table 3.11-1, there are a substantial number of parks and recreational facilities within 1-mile of Project site with similar recreation opportunities as offered at Central Reservoir Recreation Area. Accordingly, sufficient alternative recreational facilities exist in the immediate Project area to accommodate any temporarily “displaced” recreationists and some additional use of these areas during construction work hours over the 6-year construction time period would not result in substantial physical deterioration. Therefore, impacts would be less than significant.

Operation

The Project would replace the existing fencing along the boundary with the Central Reservoir Recreation Area as needed, at the same height with the standard 1-inch mesh and v-arm barbed wire style fence, but this would not affect any of the recreation amenities at the park. The Project would operate in the same way as the existing facilities. EBMUD worker vehicle trips for operation and maintenance would remain the same as existing with up to approximately 4-trips per month. The worker vehicles would access the Project site through the primary entrance at the 25th Avenue and East 29th Street intersection and would not prevent the community from accessing the Central Reservoir Recreation Area. Because the access to the Central Reservoir Recreation Area would remain available during operation of the Project, use of existing neighborhood and regional parks or other recreational facilities would not increase and there would be no impact associated with operation of the Project.

As described in Section 3.1, Aesthetics, the proposed tanks would be taller than the existing reservoir. These tanks would remain as a water utility facility and blend within the surrounding vegetation and landscape. As shown in Figure 2-3 of the Project Description, the Project is directly adjacent to the Central Reservoir Recreation Area and would include a basin and bioretention area that would be mulched and landscaped, with sloped sides, which would replace the existing built facilities and remove the existing roof glare. Most of the trees adjacent to the recreation area would also be retained with the Project, further screening the site. The portions of the basin that would be visible between the breaks in the trees would consist of sloped and flat landscaping with mulch, ground cover, trees, and shrubs, which would provide more views of the landscape and natural features than currently exist. Because the proposed tank design would blend within the surrounding vegetation and landscape and the new mulched and landscaped basin would replace the existing built reservoir facilities, recreation users would likely continue using Central Reservoir Recreation Area. Therefore, operation of the Project would not result in an increase in the use of existing neighborhood and regional parks or other recreational facilities and impacts would be less than significant.

Significance Determination Before Mitigation

Less than significant.

Mitigation Measure

None required.

Cumulative Impact Analysis

The scope and analysis for cumulative impacts on recreational resources encompasses other projects within a one-mile radius of the Project site that could occur during construction and operation of the Project. A significant cumulative effect on recreational resources would result if the effects of the Project combined in space and time with those of cumulative projects to cause substantial degradation of existing recreational facilities.

The cumulative projects listed in Table 3.0-1 and shown on Figure 3.0-1 of Section 3.0 are between 1,320-feet and 1.5-miles away from the Project site. The Paramount Road, Sunnyhills Road, Montana Avenue, Excelsior Avenue, Georgia Street, Humbolt Avenue, and 22nd Avenue Water Pipeline Replacement projects involve temporary construction within the roadway, but do not immediately border any recreational facility, nor do they block key access streets to nearby recreational facilities. Similarly, the Trestle Glen and the Park Boulevard Sanitary Sewer Upgrade projects, as well as the I-880 North Safety and Operational Improvements project neither border, nor block key access streets to nearby recreational facilities. Construction activities at all of the project sites could discourage people from traveling along these lengths of roadways, but would not result in a decrease in access to nearby recreational facilities. Construction activities occurring at all of the cumulative project sites, including impacts to roadways potentially used for entrance to recreational facilities, may result in temporary traffic and roadway access impacts. However, these impacts would be confined in extent to the immediate work areas and limited in duration to periods of a few days to weeks. Cumulative construction activities at all of the cumulative project sites would not cause an increase in the use of existing recreational facilities such that substantial physical degradation of these facilities would occur. Therefore, the Project would not contribute to any cumulative impact on recreational resources.

3.11.4 References

City of Oakland, 1996. *Open Space, Conservation, and Recreation (OSCAR) Element of the Oakland General Plan*. Adopted June 1996.

East Bay Regional Park District, 2018. *About Us.* Available at https://www.ebparks.org/about/default.htm. Accessed October 23, 2018.

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3.12 Transportation and Circulation

This section describes the physical and regulatory setting for transportation resources and identifies and evaluates potential impacts on transportation resources that could result from construction and operation of the Project. The section is based on a Transportation Impact Study that was prepared as a resource document for the Central Reservoir Replacement Project (CHS Consulting Group, 2018) (see Appendix K).

3.12.1 Environmental Setting

Roadway Network

The transportation and circulation study area extends beyond the Project site and includes the roadways and transportation facilities that could be affected by the Project (Figure 3.12-1). The setting includes descriptions of roadways and documentation of vehicular traffic, transit service, bicycle, pedestrian, and parking conditions.

Regional Access

The Project site is immediately south of Interstate 580 (I-580) and approximately 1.5 miles north of Interstate 880 (I-880). While the regional truck access to and from the Project site would be limited to I-880 due to California Vehicle Code Section 35655.5, which prohibits trucks over 4.5-tons from traveling on I-580 between Grand Avenue and the city of San Leandro border, construction workers would use the most direct access routes to and from the Project site via I-580. The interstate freeway facilities are described below.

I-580 is a regional freeway located north of the Project site, extending from U.S. 101 in Marin County to Interstate 5 (I-5) south of Tracy. In the vicinity of the Project site, I-580 runs in an east-west direction with four lanes in each direction. Access to the Project site from I-580 is provided through off-ramps at Fruitvale Avenue, Park Boulevard, and Montana Street, and access from the Project site to I-580 is provided through on-ramps at MacArthur Boulevard and Montana Street. The speed limit on I-580 is generally 65-miles per hour (mph). In the vicinity of the Project site, the average daily traffic volume on I-580 is approximately 148,500 vehicles (California Department of Transportation [Caltrans], 2016). The AM and PM peak-hour traffic volumes are approximately 12,100 and 13,800 vehicles, respectively (Caltrans, 2018).

I-880 is a north-south freeway that runs between Interstate 80 (I-80) in Oakland and the Interstate 280/Highway 17 interchange in San Jose. In the vicinity of the Project site, I-880 is an eight-lane freeway with four lanes in each direction. The Project site can be directly accessed from off-ramps on High Street, 23rd Avenue, 29th Avenue, and Kennedy Street; the nearest on-ramps are on 29th Avenue, East 9th Street, and 23rd Avenue. The speed limit on I-880 is generally 65-mph for passenger vehicles and 55-mph for trucks with three or more axles. In the vicinity of the Project site, the average daily traffic volume on I-880 is approximately 221,000 vehicles (Caltrans, 2016). The AM and PM peak-hour traffic volumes are approximately 10,600 and 10,200 vehicles, respectively (Caltrans, 2018).

SOURCE: CHS Consulting Group, 2018

EBMUD Central Reservoir Replacement Project

Figure 3.12-1
Roadway Network and Transportation Study Area

Local Access

The Project site is located within a residential area, and neighboring land uses along 23rd Avenue, East 29th Street, and Sheffield Avenue include residences, schools (Redwood Day School and Manzanita Community School), recreational facilities (Central Reservoir Recreation Area), and a healthcare facility (Oakland Heights Nursing and Rehabilitation). The local roadway network is described below, with the functional designation of local roadways obtained from the *City of Oakland General Plan* (City of Oakland, 1998).

Sheffield Avenue is a two-way, north-south street that extends between MacArthur Boulevard and East 29th Street, adjacent to the east boundary of the Project site. In the vicinity of the Project site, Sheffield Avenue has one travel lane in each direction with a posted speed limit of 15-mph. On-street parking and sidewalks are on both sides of the street. The *City of Oakland General Plan* identifies Sheffield Avenue as a local street.

MacArthur Boulevard is a two-way, east-west street that extends between Camden Street and Fairmount Avenue, approximately 400-feet north of the Project site. MacArthur Boulevard has one travel lane and bike lanes in each direction, with on-street parking and sidewalks on both sides of the street. The posted speed limit on MacArthur Boulevard is 25-mph. The *City of Oakland General Plan* identifies MacArthur Boulevard as a regional transit street.

Fruitvale Avenue is a two-way, north-south street that extends between Hoover Avenue and Blanding Avenue, approximately 0.3-mile east of the Project site. Fruitvale Avenue has one travel lane in each direction and bike lanes in the northbound direction between Foothill Boulevard and I-580. Between Foothill Boulevard and East 12th Street, Fruitvale Avenue has one travel lane in the southbound direction, two travel lanes in the northbound direction, and bike routes in both directions. Sidewalks and on-street parking are generally provided on both sides of the street. The posted speed limit on Fruitvale Avenue is 25-mph. The *City of Oakland General Plan* identifies Fruitvale Avenue as an arterial street, as well as a designated truck route.

San Leandro Street is a two-way, east-west street that extends between Fruitvale Avenue and West Broadmoor Boulevard, approximately 1.5-miles south of the Project site. San Leandro Street has two travel lanes in each direction. On-street parking and sidewalks are provided on both sides of the street. The posted speed limit on San Leandro Street is 25-mph. The *City of Oakland General Plan* identifies San Leandro Street as an arterial street, as well as a designated as a truck route.

East 30th Street is a two-way, east-west street that extends between 14th Avenue and 23rd Avenue and serves as the secondary entrance to the Project site at its east terminus. In the vicinity of the Project site, East 30th Street has one travel lane in each direction with a posted speed limit of 25-mph. Sidewalks and on-street parking are provided on both sides of the street. The segment from 21st Avenue to 23rd Avenue is designated as a bike boulevard (i.e., bicycle route on a residential street that prioritizes through trips for bicyclists) (City of Oakland, 2007). The *City of Oakland General Plan* identifies East 30th Street as a local street.

East 29th Street is a two-way, east-west street that runs intermittently between 14th Avenue and Sheffield Avenue (i.e., the street runs continuously between 14th Avenue and 23rd Avenue, then there is a break in the street until 25th Avenue, where it picks up again and runs continuously to Sheffield Avenue), approximately 300-feet southwest of the Project site. East 29th Street has one travel lane in each direction. Sidewalks and on-street parking are generally provided on both sides of the street. The posted speed limit on East 29th Street is 25-mph. The *City of Oakland General Plan* identifies East 29th Street as a local street.

East 27th Street is a two-way, east-west street that runs intermittently between 13th Avenue and Coolidge Avenue (i.e., the street runs continuously between 13th Avenue and 14th Avenue, then there is a break in the street until 19th Avenue, where it picks up again and runs continuously to Sunset Avenue, then there is another break in the street until Coolidge Avenue), approximately 0.2-mile southwest of the Project site. East 27th Street has one travel lane in each direction with a posted speed limit of 25-mph. Sidewalks and on-street parking are generally provided on both sides of the street. The *City of Oakland General Plan* identifies East 27th Street as a local street.

East 12th Street is a two-way, east-west street that runs between 1st Avenue and 54th Avenue, approximately 1.2-miles south of the Project site. East 12th Street has two travel lanes and bike lanes in each direction with a center median. Sidewalks are generally provided on both sides of the street, and on-street parking is provided on the south side of the street. The posted speed limit on East 12th Street is 30-mph. The *City of Oakland General Plan* identifies East 12th Street as an arterial street, as well as a designated truck route.

East 7th Street is a two-way, east-west street that runs between Kennedy Street and Fruitvale Avenue, approximately 1.6-miles south of the Project site. East 7th Street has one travel lane in each direction with a posted speed limit of 15-mph. Sidewalks and on-street parking are generally provided on both sides of the street. The segment from 23rd Avenue to Fruitvale Avenue is designated as a bike boulevard (i.e., bicycle route on a residential street that prioritizes through trips for bicyclists) (City of Oakland, 2007). The *City of Oakland General Plan* identifies East 7th Street as a local street.

29th Avenue is a two-way, north-south street that runs between the Park Street Bridge and East 17th Street, approximately 1-mile south of the Project site. 29th Avenue has two travel lanes in each direction, and parking is prohibited. Sidewalks are provided on both sides of the street, and the posted speed limit is 25-mph. The *City of Oakland General Plan* identifies 29th Avenue as an arterial street.

25th Avenue is a two-way, north-south street that runs intermittently between East 10th Street and East 29th Street (i.e., the street runs continuously between East 10th Street and East 11th Street, then there is a break in the street at the railroad tracks, then the street picks up again at East 12th Street and runs continuously to East 29th Street), and serves as the primary entrance to the Project site at the street's north terminus. In the vicinity of the Project site, 25th Avenue has one travel lane in each direction with a posted speed limit of 25-mph. Sidewalks and on-street parking are generally provided on both sides of the street. The *City of Oakland General Plan* identifies 25th Avenue as a local street.

23rd Avenue is a two-way, north-south street that runs intermittently between the Park Street Bridge and East 31st Street (i.e., the street runs continuously between the Park Street Bridge and East 12th Street, then there is a break in the street along East 12th Street near International Boulevard, then the street picks up again and runs continuously to East 31st Street). 23rd Avenue is adjacent to the west boundary of the Project site. In the vicinity of the Project site, 23rd Avenue has one travel lane in each direction with a posted speed limit of 30-mph. Sidewalks and on-street parking are generally provided on both sides of the street. The segment from East 30th Street to East 31st Street is designated as a bike route. The *City of Oakland General Plan* identifies 23rd Avenue as a local transit street, as well as a designated truck route.

Existing Traffic Operations

Intersections Level of Service

Traffic operating characteristics of intersections are described by the concept of level of service (LOS). Signalized intersection LOS is stated in terms of average control delay per vehicle (in seconds) during a specified time period, such as AM and PM peak hours. 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.

A total of 16 intersections (15 signalized and 1 stop-controlled) were analyzed for the Project. Figure 3.12-1 shows the location of these intersections, which include the following:

1. MacArthur Boulevard / Sheffield Avenue
2. East 27th Street / 23rd Avenue
3. East 27th Street / 25th Avenue
4. East 27th Street / Fruitvale Avenue
5. Foothill Boulevard / 23rd Avenue
6. Foothill Boulevard / Fruitvale Avenue
7. East 12th Street / 23rd Avenue
8. International Boulevard / Fruitvale Avenue
9. San Leandro Street / Fruitvale Avenue
10. San Leandro Street / High Street
11. East 12th Street / 29th Avenue
12. East 9th Street / Fruitvale Avenue
13. East 7th Street / Kennedy Street
14. Harold Street / Fruitvale Avenue
15. MacArthur Boulevard / Beaumont Avenue
16. MacArthur Boulevard / Ardley Avenue

Intersection LOS 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 Wednesday, May 23, 2018 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. Intersection turning movement count data are provided in Appendix K.

The intersections were evaluated using the 2000 Highway Capacity Manual operations methodology, which determines the capacity for each lane group approaching the intersection (TRB, 2000). LOS is then based on the average stopped delay per vehicle (seconds per vehicle) for the various movements within the intersection. Table 3.12-1 presents the LOS and delay data for the study intersections under existing conditions, which shows that all of the study intersections currently operate at LOS D or better during the AM and PM peak hours. Detailed intersection LOS calculations are provided in Appendix K. According to the *City of Oakland Transportation Impact Review Guidelines*, the City no longer has a standard for intersection LOS (City of Oakland, 2017b). For reference, it should be noted that prior to the elimination of an LOS standard, the City considered LOS D as the minimum operating condition for intersections outside of the Downtown area.

TABLE 3.12-1
INTERSECTION LEVEL OF SERVICE: EXISTING WEEKDAY AM AND PM PEAK HOURS

Intersection	Control	AM Peak Hour		PM Peak Hour	
		Delay (sec)	LOS	Delay (sec)	LOS
1. MacArthur Boulevard / Sheffield Avenue	Signal	12	B	7.1	A
2. East 27th Street / 23rd Avenue	Signal	12.6	B	12.7	B
3. East 27th Street / 25th Avenue	AWSC[a]	9.5	A	8.7	A
4. East 27th Street / Fruitvale Avenue	Signal	29.6	C	17.9	B
5. Foothill Boulevard / 23rd Avenue	Signal	11	B	12.2	B
6. Foothill Boulevard / Fruitvale Avenue	Signal	42.2	D	28.4	C
7. East 12th Street / 23rd Avenue	Signal	24.6	C	16.4	B
8. International Boulevard / Fruitvale Avenue	Signal	18.7	B	17.7	B
9. San Leandro Street / Fruitvale Avenue	Signal	32.6	C	37	D
10. San Leandro Street / High Street	Signal	28.8	C	29.7	C
11. East 12th Street / 29th Avenue	Signal	35	C	35.4	D
12. East 9th Street / Fruitvale Avenue	Signal	15.8	B	14.2	B
13. East 7th Street / Kennedy Street	Signal	9.7	A	12	B
14. Harold Street / Fruitvale Avenue	Signal	20.5	C	21.4	C
15. MacArthur Boulevard / Beaumont Avenue	Signal	34.8	C	47.1	D
16. MacArthur Boulevard / Ardley Avenue	Signal	12.5	B	9.2	A

NOTE:
[a] AWSC = All-way stop controlled.

SOURCE: CHS Consulting Group, 2018.

Daily Traffic Conditions

To assess existing traffic conditions along streets around the Project site, 24-hour traffic counts were collected on Wednesday, May 23, 2018 along the following residential streets and in the vicinity of Redwood Day School (Figure 3.12-1):

A. 23rd Avenue (between East 28th Street and East 29th Street)
B. 25th Avenue (between East 27th Street and East 28th Street)
C. East 27th Street (west of 25th Avenue)
D. Ardley Avenue south of I-580
E. Sheffield Avenue north of Sausal Street
F. Sheffield Avenue south of Morrison Avenue

Table 3.12-2 summarizes the daily and peak-hour traffic volumes along these roadways. 23rd Avenue carries the highest traffic volumes, with approximately 6,100 daily vehicle trips. Sheffield Avenue and Ardley Avenue carry approximately 2,870 and 5,390 daily vehicle trips, respectively, in the vicinity of the Project site. The peak hour of traffic on Sheffield Avenue occurs between 7:30 a.m. and 8:30 a.m., just before the adjacent Redwood Day School starts, with approximately 580 vehicle trips over the hour.

Transit Network

The Alameda-Contra Costa Transit District (AC Transit) serves 13 cities and adjacent unincorporated areas in Alameda and Contra Costa Counties and the Transbay Terminal in San Francisco.[1] AC Transit operates the following two local bus routes within a 0.25-mile radius of the Project site:

- ***Route 62*** operates between the West Oakland Bay Area Rapid Transit (BART) Station and Fruitvale BART Station via 7th Street, 10th Street, 8th Avenue, 23rd Avenue, and East 12th Street. Service is provided from 5:30 a.m. to 12:30 a.m., with buses running every 15 to 20 minutes throughout the day. The nearest bus stop to the Project site is at the intersection of 23rd Avenue and East 30th Street, approximately 200 feet west of the secondary entrance to the Project site at East 30th Street.

- ***Route 14*** operates between the West Oakland BART Station and Fruitvale BART Station via 14th Street, East 21st Street, 25th Avenue, East 27th Street, Fruitvale Avenue, Brookdale Avenue, Coolidge Avenue, 35th Avenue, MacArthur Boulevard, High Street, and International Boulevard. Service is provided from 5:00 a.m. to 11:00 p.m., with buses running every 15 minutes during peak periods and 30 minutes during nonpeak periods. The nearest bus stop to the Project site is at the intersection of 25th Avenue and East 27th Street, approximately 0.25-mile south of the main entrance to the Project site.

[1] Cities served by AC Transit include Alameda, Albany, Berkeley, Emeryville, Fremont, Hayward, Newark, Oakland, Piedmont, San Leandro, Union City, El Cerrito, and Richmond.

TABLE 3.12-2
WEEKDAY DAILY AND PEAK-HOUR TRAFFIC VOLUMES ALONG RESIDENTIAL STREETS

Letter Designation on Figure 3.12-1	Street	Direction	# of Lanes	Daily Volume[a]	Peak Hour		
					Time	Volume	Percent of Daily
A	23rd Avenue	Northbound	1	3,317	7:45 a.m. – 8:45 a.m.	338	10%
		Southbound	1	2,809		233	8%
		Total	**2**	**6,126**		571	9%
B	25th Avenue	Northbound	1	456	5 p.m. – 6 p.m.	61	13%
		Southbound	1	408		46	11%
		Total	**2**	**864**		107	12%
C	East 27th Street	Eastbound	1	1,728	8 a.m. – 9 a.m.	179	10%
		Westbound	1	1,821		261	14%
		Total	**2**	**3,549**		440	12%
D	Ardley Avenue	Northbound	1	3,210	7:45 a.m. – 8:45 a.m.	368	11%
		Southbound	1	2,179		211	10%
		Total	**2**	**5,389**		579	11%
E	Sheffield Avenue North of RDS	Northbound	1	1,494	7:30 a.m. – 8:30 a.m.	282	19%
		Southbound	1	1,377		298	22%
		Total	**2**	**2,871**		580	20%
F	Sheffield Avenue South of RDS	Northbound	1	679	4:30 p.m. – 5:30 p.m.	56	8%
		Southbound	1	560		94	17%
		Total	**2**	**1,239**		150	12%

NOTES:
[a] Represents the average of 24-hour counts.
RDS=Redwood Day School.

SOURCE: CHS Consulting Group, 2018.

Regional transit service is primarily provided by BART at the Fruitvale Station, approximately 1.5 miles south of the Project site.

Bicycle Circulation

The *City of Oakland Bicycle Master Plan* (2007) classifies bikeways as bicycle paths (Class 1), bicycle lanes (Class 2), or bicycle routes (Class 3), defined as follows:

- **Class 1 bikeways** (bicycle paths) provide for bicycle travel on a paved right-of-way that is completely separated from the street.
- **Class 2 bikeways** (bicycle lanes) are striped lanes on streets, designated with specific signage and stencils, for use by bicyclists.
- **Class 3 bikeways** (bicycle routes) designate preferred streets for bicycle travel using lanes shared with motor vehicles.

In the city of Oakland, the three types of Class 3 bikeways include arterial bicycle routes, bicycle boulevards, and neighborhood connectors. The following bicycle facilities are located in the vicinity of the Project site:

- Class 2 bikeways (bicycle lanes):
  - East 12th Street (both directions).
  - MacArthur Boulevard (both directions).
  - Ardley Avenue (both directions between East 31st Street and MacArthur Boulevard).
  - Fruitvale Avenue (northbound direction between Foothill Boulevard and I-580).
- Class 3 bikeways (bicycle routes):
  - 23rd Avenue (between MacArthur Boulevard and East 31st Street).
  - Fruitvale Avenue (between Foothill Boulevard and East 7th Street).
  - East 7th Street (between 23rd Avenue and Fruitvale Avenue).
  - East 30th Street (between 21st Avenue and 23rd Avenue).

Based on the bicycle counts collected 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 Wednesday, May 23, 2018, the highest numbers of bicyclists at the study intersections were observed on Fruitvale Avenue near East 27th Street (study intersection 4), where 15 bicyclists were observed during peak hours. Appendix K includes the bicycle counts at all study intersections.

Pedestrian Circulation

In the vicinity of the Project site, sidewalks are provided on both sides of all roadways including local roads, collectors, and arterials. Sidewalks are approximately 5- to 6-feet wide along 23rd Avenue, East 27th Street, and 25th Avenue.

Based on the pedestrian counts conducted 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 Wednesday, May 23, 2018 at the intersections listed above in Table 3.12-1, up to 130 pedestrians were observed crossing at the 25th Avenue and East 27th Street intersection near the Manzanita Community School (study intersection 3) during both the AM and the PM peak hours. The pedestrian volumes observed along Fruitvale Avenue were higher, with up to 540 pedestrian crossings at the intersection of Fruitvale Avenue and Foothill Boulevard (study intersection 6) observed during the peak hours.

Parking Conditions

The Project site is located within a residential area, and on-street parking is generally allowed on both sides of the street where curb space is provided, except along Ardley Avenue immediately adjacent to the Project site from the I-580 overcrossing to East 31st Street where no parking is allowed. To assess parking availability and utilization surrounding the Project site, an on-street parking survey was conducted on Wednesday, June 13, 2018 during the morning period (6:00 a.m. to 8:00 a.m.).[2] The survey area was generally bounded by 22nd Avenue to the west, East 28th Street to the south, Sheffield Avenue and McKillop Road to the east, and East 31st Street to the north. Table 3.12-3 provides the parking supply and occupancy information. There are a total of 389 publicly available on-street parking spaces within the surveyed area, and the average occupancy rate was approximately 55 percent during the morning period.

TABLE 3.12-3
ON-STREET PARKING SUPPLY AND OCCUPANCY DURING WEEKDAY MORNING PERIOD

Street	From	To	Supply (spaces)	Occupancy (percent)
22nd Avenue	East 28th Street	East 29th Street	19	70%
	East 29th Street	East 30th Street	20	60%
	East 30th Street	East 31st Street	38	60%
23rd Avenue	East 28th Street	East 29th Street	21	60%
	East 29th Street	East 30th Street	19	50%
	East 30th Street	East 31st Street	36	60%
East 28th Street	22nd Avenue	23rd Avenue	14	60%
	Dead end	25th Avenue	25	55%
	25th Avenue	Garden Street	14	60%
East 29th Street	22nd Avenue	23rd Avenue	15	50%
	Project main entrance	Sheffield Avenue	21	30%
East 30th Street	22nd Avenue	23rd Avenue	18	75%
	23rd Avenue	Project secondary entrance	8	75%
East 31st Street	22nd Avenue	23rd Avenue	19	50%
25th Avenue	East 28th Street	Project main entrance	20	45%
Sheffield Avenue	East 29th Street	Morrison Avenue	50	50%
McKillop Road	Sheffield Avenue	Dead end	32	40%
		Total	**389**	

NOTE: Most on-street parking spaces in the parking survey area are unmarked open spaces. The total number of parking spaces represents a rough estimate of publicly available parking spaces, assuming about 20 feet per parking space.

SOURCE: CHS Consulting Group, 2018.

3.12.2 Regulatory Framework

Federal Regulations

There are no federal regulations that pertain to traffic and transportation in the Project area.

[2] This time was chosen for the parking counts to account for the peak parking times for the schools.

State Regulations

California Vehicle Code Section 35655.5

The Project site is adjacent to I-580 and 1.5-miles north of I-880. The regional truck access to and from the Project site is limited to I-880 due to California Vehicle Code Section 35655.5, which prohibits trucks over 4.5 tons from traveling on I-580 between Grand Avenue and the city of San Leandro border. The California Vehicle Code Section 35655.5 includes the following:

- "(a) Notwithstanding this article or any other provision of law, no vehicle, as described in Sections 410 and 655, with a gross weight of 9,000 pounds or more, shall be operated on the segment of Interstate Route 580 (I-580) that is located between Grand Avenue in the City of Oakland and the city limits of the City of San Leandro. This subdivision does not apply to passenger buses or paratransit vehicles.
- (b) The Department of Transportation shall erect suitable signs at each end of the portion of highway described in subdivision (a) and at any other points that the department deems necessary to give adequate notice of the weight limit imposed under this section."

Local Regulations

Under Section 53091 of the California Government Code, EBMUD, as a local agency and utility district, is not subject to building and land use zoning ordinances (such as tree ordinances) for projects involving facilities for the production, generation, storage, treatment, or transmission of water. However, EBMUD's practice is to work with local jurisdictions and neighboring communities during project planning and to consider local environmental protection policies for guidance.

Alameda County Transportation Commission Congestion Management Program

The Alameda County Transportation Commission (Alameda CTC) plans, funds, and delivers transportation programs and projects that expand access to and improve mobility for Alameda County (Alameda CTC, 2017). Alameda CTC combines the functions of two formerly separate agencies: the Alameda County Congestion Management Agency and the Alameda County Transportation Improvement Authority. Alameda CTC delivers the Expenditure Plan for Measure BB, the one-cent Alameda County sales tax dedicated to funding transportation projects. The Expenditure Plan contains a number of capital projects (e.g., freeway widening, interchange improvements, high-occupancy vehicle lanes, BART extensions, and transit station development), as well as programs for local street and road improvements (e.g., fixing potholes), special transportation services for seniors and disabled individuals, bicycle and pedestrian safety, and transit operations. As the congestion management agency, the Alameda CTC is also responsible for managing the Congestion Management Program (CMP). The CMP for Alameda County incorporates various strategies and measures to improve congestion management on the Alameda County multi-modal transportation system, including LOS monitoring of a designated CMP roadway network (Alameda CTC, 2017). The CMP indicates a standard of LOS E for the freeway segments along I-580 and I-880 in the vicinity of the Project site.

City of Oakland Plans and Policies

The City of Oakland's adopted plans and policies shape the transportation analysis framework. The overall goals of these policies are to achieve an effective, sustainable, multi-modal transportation system for the city, including the City's Complete Streets Policy, *General Plan Land Use and Transportation Element* (1998), *Bicycle Master Plan* (2007b), and *Pedestrian Master Plan* (2017a), which affirm that the City will provide transportation facilities that are safe and convenient for all users of the roadway, including pedestrians, bicyclists, motorists, persons with disabilities, users and operators of public transit, seniors, children, and movers of commercial goods.

The *City of Oakland Transportation Impact Review Guidelines* include the City' significance criteria, thresholds of significance, and screening criteria related to vehicle miles traveled (VMT) for analysis in CEQA document/transportation studies (City of Oakland, 2017b). Intersection operations analysis may be recommended if the development project would generate more than 800 peak-hour vehicle trips or 400 peak-hour transit trips. According to the *City of Oakland Transportation Impact Review Guidelines*, a project would have a significant effect on the environment if it would:

- "Conflict with a plan, ordinance, or policy addressing the safety or performance of the circulation system, including transit, roadways, bicycle lanes, and pedestrian paths (except for automobile level of service or other measures of vehicle delay); or
- Cause substantial additional VMT per capita, per service population, or other appropriate efficiency measure; or
- Substantially induce additional automobile travel by increasing physical roadway capacity in congested areas (i.e., by adding new mixed-flow lanes) or by adding new roadways to the network."

Public services (e.g., police, fire stations, public utilities) do not generally generate VMT. Instead, these land uses are often built in response to development from other land uses (e.g., office and residential). Therefore, public services land uses can be presumed to have impacts that are less than significant on VMT. However, the less-than-significant impacts on VMT would not apply if the project is in a location that would require employees or visitors to travel substantial distances, and the project is not within 0.5-mile of a major transit stop or does not meet the small project screening criterion. The Project does not meet any of the criteria for consideration of impacts on VMT for public service lands uses.

EBMUD Standard Construction Specifications

The Project would be required to comply with EBMUD's Standard Construction Specification 01 55 26 (Traffic Regulation) which requires compliance with the California Manual on Uniform Traffic Control Devices (CA MUTCD). Standard Construction Specification 01 55 26 requires preparation of a Traffic Control Plan, which would require implementation of various measures. As outlined in Standard Construction Specification 01 55 26, the Project's Traffic Control Plan 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 (Section 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 (Section 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 (Section 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 (Section 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 (Section 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 (Section 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 (Section 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 (Section 1.2 A.4).

3.12.3 Impact Analysis

Methodology for Analysis

The transportation and circulation analysis evaluated transportation impacts for the following three traffic scenarios:

- ***Existing Plus Project Construction*** – Existing conditions[3] with added construction traffic.
- ***Existing Plus Project Operation*** – Existing conditions with added traffic related to operation of the Project.
- ***Existing Plus Project Operation with Redwood Day School Access Driveway*** – Existing conditions with added traffic related to operation of the Project and operation of the Redwood Day School Access Driveway Design Option.

The City of Oakland does not require an analysis of intersection operations unless the Project would generate more than 800 peak-hour vehicle trips on a long-term basis. However, an intersection operational analysis was performed for key locations along the Project access routes to provide information on projected intersection operating conditions with the addition Project traffic and to identify any deficiencies (such as highly congested conditions that could lead to hazardous conditions for vehicles, bicycles, and pedestrians).

Short-Term Construction Traffic

Construction traffic volumes generated by the Project were estimated based on the number of construction-related vehicle trips needed in each construction phase for the Project. Construction-related vehicle trips include trips made by construction workers traveling to and from the Project site, material (e.g., soil, concrete, water, etc.) hauling and delivery truck trips, and equipment delivery trips. The number of Project-generated trips would vary on a daily basis, depending on the construction phase, planned activity, and material delivery needs. Appendix K includes detailed construction trip generation worksheets. Travel demand generated by construction-related vehicles was estimated using the following criteria:

- ***Construction Worker Trips*****:** The number of daily worker vehicle trips was estimated based on the number of daily construction workers assigned for each construction phase. The number of workers would vary from 3 to 13 per day depending on the construction phase, which would result in maximum worker vehicle trips ranging from 6 to 26 per day depending on the construction phase. Construction shifts would generally occur between 7:00 a.m. and 7:00 p.m., consistent with the City of Oakland construction hours (City of Oakland, 2018). 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 (4:00 p.m. to 6:00 p.m.) peak periods, respectively. Therefore, half of the daily construction worker vehicle trips were assumed to be inbound trips during each hour of the AM peak period, and the remaining half were assumed to be outbound trips during each hour of the PM peak period.

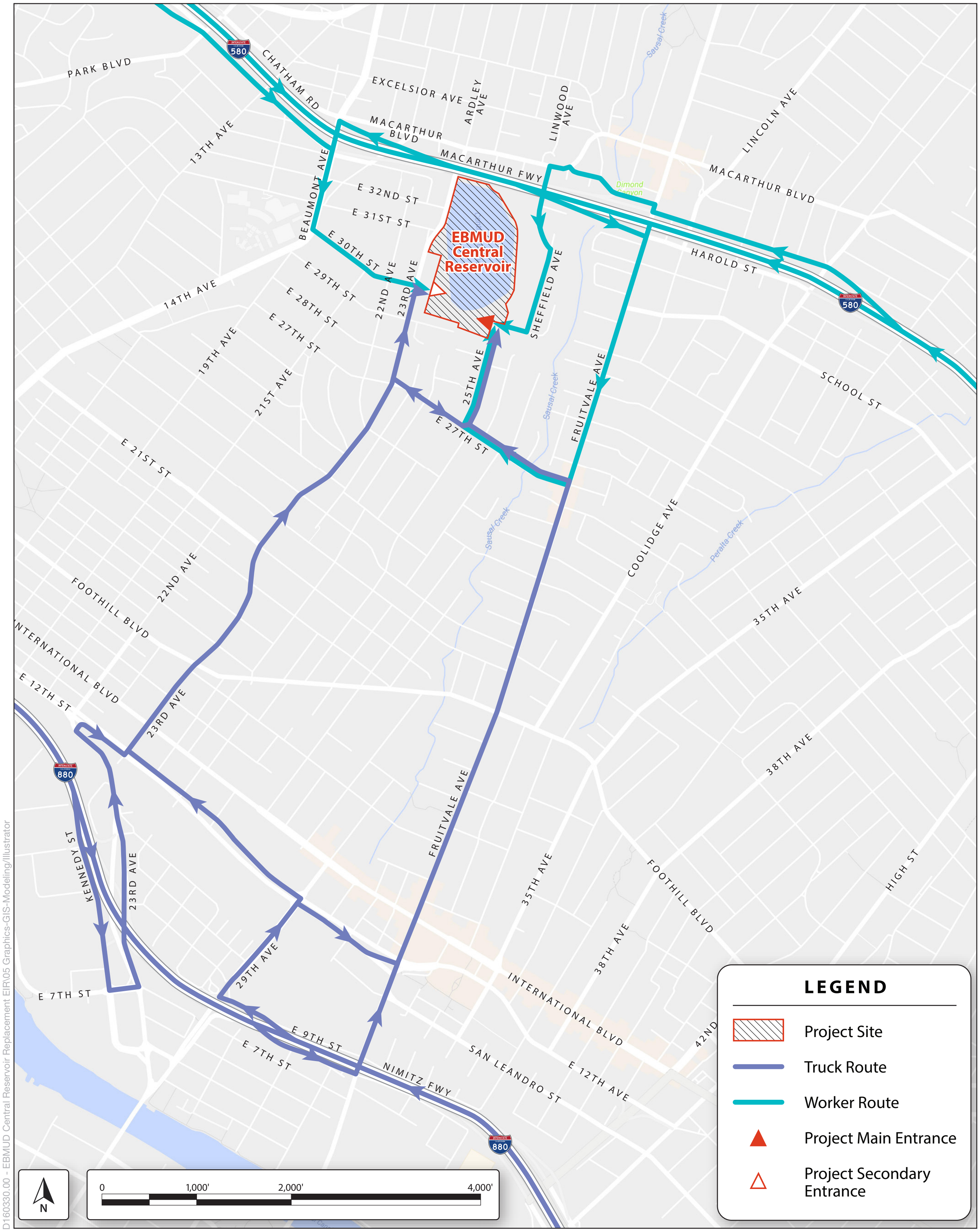
3 Existing conditions were assumed to represent existing conditions "on the ground" at the commencement of environmental review.

For the purpose of conservative analysis, all workers were assumed to drive alone to the Project site and park their vehicles in the designated staging areas within the Project site (staging areas are shown on Figure 2-12 in the Project Description). For the analysis, it was assumed that all workers would use the most direct access routes to the Project site from freeways (e.g., I-580); about half of the workers were assumed to originate from north of the Project site (via I-580 southbound), and the remaining half of the workers were assumed to originate from south of the Project site (via I-580 northbound). Figure 3.12-2 and Figure 3.12-3 present the inbound and outbound worker access routes.

- ***Hauling and Material Delivery Truck Trips*****:** Construction trucks and personnel could report to the site at 7:00 a.m. for minor tasks and meetings, but as required by EBMUD Standard Specification 01 14 00, Work Restrictions, subsection 1.8A, Construction Noise, no construction work that generates noise over 90 A-weighted decibels (dBA) would occur until 8:00 a.m. Periodically over the course of construction (approximately 24-times over the approximate 6-years of construction), very large trucks delivering construction equipment may arrive at the Project site as early as 6:00 a.m., via the designated truck routes. When large continuous concrete pours are required (for the new tank foundation and the new tank roof), construction may also need to begin at 6:00 a.m. and concrete delivery trucks could arrive at the site as early as 6:00 a.m. Also, oversized trucks[4] are not allowed on San Francisco vicinity freeways between the hours of 7:00 a.m. and 9:00 a.m. Some hauling and material truck trips may need to arrive before 7:00 a.m. to avoid the oversized truck hauling restriction.

  Half of the material truck trips were assumed to travel from north of the Project site, and the remaining half of the hauling truck trips were assumed to travel from south of the Project site, all via I-880 as shown on Figure 3.12-2 and Figure 3.12-3. Hauling truck trips to dispose of demolished building materials would occur during the demolition phase. Because all of the excavated soil would be reused on site to backfill, no soil debris would be hauled off site. Material delivery trips would bring in new materials during the substructure, tank and valve structure construction, and site restoration construction phases. As shown in Table 2-4 in the Project Description, the number of daily hauling and material truck trips would vary substantially throughout the entire Project duration, from 0 to 197 one-way truck trips per day depending on the phase of construction.

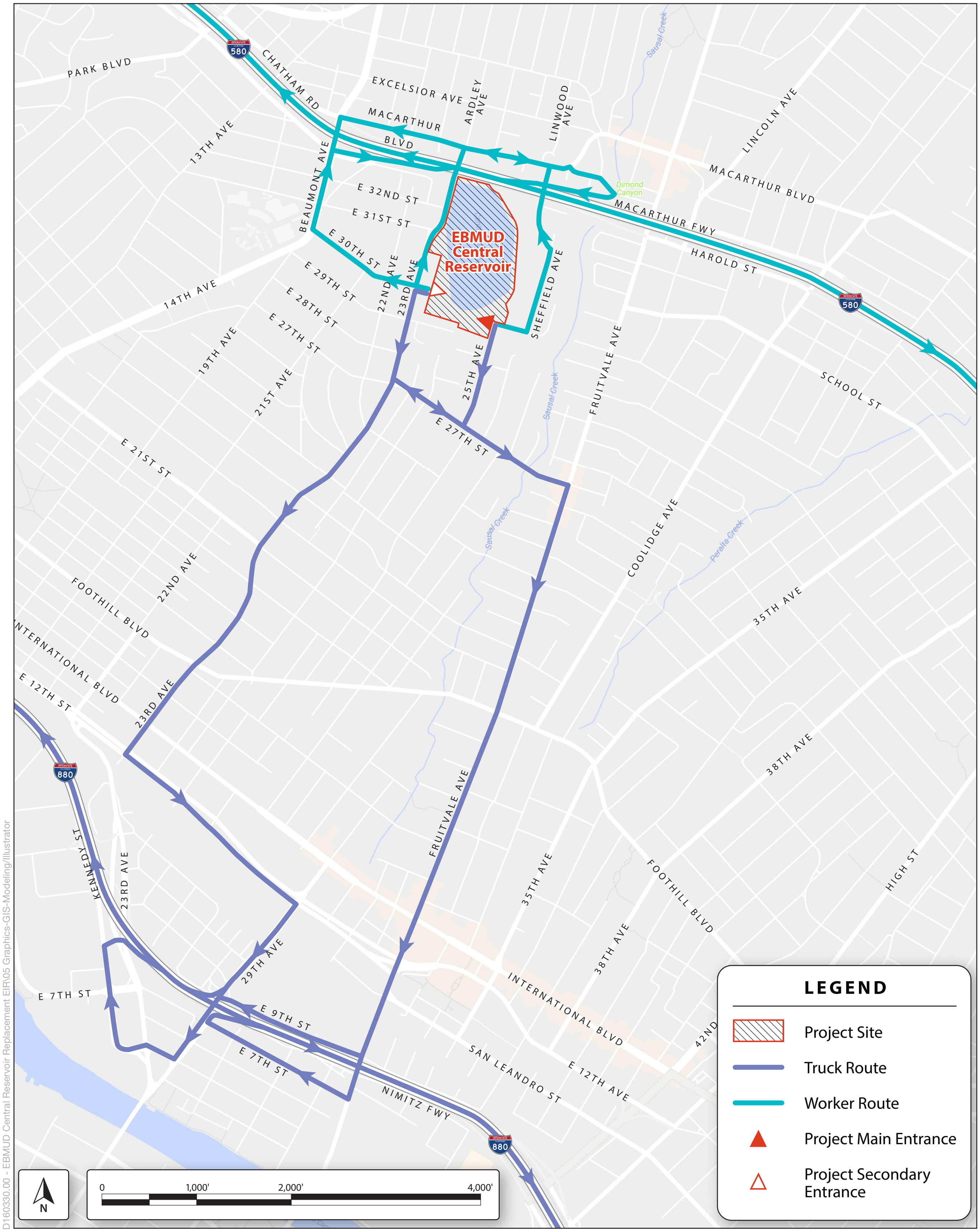
4 In accordance with the Caltrans legal truck size and weight limitations, Section 35400. (a) A vehicle may not exceed a length of 40 feet; Section 35100. (a) The total outside width of any vehicle or its load shall not exceed 102 inches; Section 35550. (a) The gross weight on any one axle shall not exceed 20,000 pounds, and the gross weight upon any one wheel, or wheels, supporting one end of an axle, shall not exceed 10,500 pounds; and Section 35250. No vehicle or load shall exceed a height of 14 feet measured from the surface upon which the vehicle stands.



SOURCE: CHS Consulting Group, 2018

EBMUD Central Reservoir Replacement Project

Figure 3.12-2
Inbound Truck and Worker Access Routes



SOURCE: CHS Consulting Group, 2018

EBMUD Central Reservoir Replacement Project

Figure 3.12-3
Outbound Truck and Worker Access Routes

ESA

- ***Equipment Delivery Trips*:** Inbound and outbound equipment delivery trips for reservoir construction would occur at the beginning and end of each phase, ranging from 1 to 8 one-way truck trips per day depending on the phase of construction. Oversized trucks are not allowed on San Francisco vicinity freeways between the hours of 7:00 a.m. and 9:00 a.m. Some equipment delivery trips may need to occur before 7:00 a.m. to avoid the oversized truck restriction on the designated truck routes. For the purposes of the impact analysis, half of the delivery truck trips would travel from north of the Project site, and the remaining half of the hauling truck trips would travel from south of the Project site. Because of the truck restriction on I-580, hauling and material trucks would use I-880 to access the Project site, as shown on Figure 3.12-2 and Figure 3.12-3.

Overall Construction Trips

The Project construction activities would occur at varying levels of intensity over the 6-year construction timeframe. The highest volume period for worker vehicle trips, material truck trips, and equipment delivery trips would differ depending on the phase of construction. The highest volume of worker trips would occur for the substructure, and tank and valve structure construction phases; whereas the highest volume of hauling and material truck trips would occur during the removal of the liner from the existing reservoir. To develop a conservative estimate of construction traffic volumes for the traffic analysis, the highest combined volume of worker vehicle trips, and hauling and material truck trips was used. Overall, the highest combined construction traffic volume including worker vehicle trips, hauling and material truck trips, and equipment delivery trips would last for approximately 8-weeks (3-percent of the total construction period) during the removal of the liner from the existing reservoir. The level of construction traffic outside of the highest-volume period would be substantially lower for the majority of the time. As stated above, half of the daily worker vehicle 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. Daily truck trips generated during this 8-week period of highest-intensity construction activity would be about 28 truck trips per hour, assuming that hauling and material truck trips would occur over a 7-hour period between 9 a.m. and 4 p.m. (i.e., 197 daily truck trips / 7 hours).

Long-Term Operational Traffic

After Project completion, the reservoir site would be routinely inspected by EBMUD operations and maintenance staff. The Project would continue to generate approximately 4-trips per month for operation and maintenance, the same as the existing condition.

Redwood Day School Access Driveway Design Option

As part of the Project, EBMUD is considering a design option to potentially lease a strip of property along the north end of the existing reservoir property at Ardley Avenue, and authorize Redwood Day School to construct a private driveway at this location. If the design option is approved by the City of Oakland and pursued by Redwood Day School, it would not generate any new vehicle trips; however, the existing vehicles that currently make U-turns on Sheffield Avenue to pick-up or drop-off students at the school would be diverted from Sheffield Avenue to Ardley Avenue.

Significance Criteria

Consistent with Appendix G of the *CEQA Guidelines,* an impact related to traffic and transportation would be significant if the Project would:

1. Conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities.
2. Conflict or be inconsistent with *CEQA Guidelines* Section 15064.3, Subdivision (b).
3. Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).
4. Result in inadequate emergency access.

Impacts and Mitigation Measures

Impact TRA-1: Conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities. (Criterion 1)

Construction

The City of Oakland does not require an analysis of intersection operations unless the Project would generate more than 800 peak-hour vehicle trips on a long-term basis (City of Oakland, 2017b). Although the Project would result in no more than 13 worker vehicle trips during each AM or PM peak hour and 28 truck trips outside of the peak hours (i.e., 9:00 a.m. and 4:00 p.m.), an intersection operational analysis was performed for key locations along the Project access routes to provide information on projected intersection operating conditions with the addition of the Project construction traffic. Table 3.12-4 presents the projected LOS and delay for the intersections with the increase in traffic under the Existing Plus Project Construction condition. Appendix K includes detailed LOS calculations. As shown in the table, compared to Existing Conditions, average intersection delay would remain virtually unchanged and the LOS would remain the same at all study intersections with the addition of Project trips during the construction period. Therefore, traffic operating conditions at study intersections under the Existing Plus Project Construction condition would not present substantial differences from the existing conditions.

Table 3.12-5 shows the daily and the peak-hour Project construction trip generation during the highest volume period, which would occur during the site preparation and demolition phase. The Project would generate a total of 215 daily vehicle trips during the highest-volume period, including 18 construction worker vehicle trips and 197 truck trips. During the peak hours of this construction phase, the Project construction would generate up to

9 worker vehicle trips during each AM or PM peak hours and up to 28 truck trips outside of the peak hours (i.e., 9:00 a.m. and 4:00 p.m.).

TABLE 3.12-4
INTERSECTION LEVEL OF SERVICE: EXISTING PLUS PROJECT CONSTRUCTION

Intersection[a]	AM Peak Hour				PM Peak Hour			
	Existing		EPP Construction		Existing		EPP Construction	
	Delay[b]	LOS[b]	Delay[b]	LOS[b]	Delay[b]	LOS[b]	Delay[b]	LOS[b]
1. MacArthur Boulevard / Sheffield Avenue	12	B	**12.1**	B	7.1	A	**7.2**	A
2. East 27th Street / 23rd Avenue	12.6	B	12.6	B	12.7	B	12.7	B
3. East 27th Street / 25th Avenue	9.5	A	9.5	A	8.7	A	8.7	A
4. East 27th Street / Fruitvale Avenue	29.6	C	29.6	C	17.9	B	17.9	B
5. Foothill Boulevard / 23rd Avenue	11	B	11	B	12.2	B	12.2	B
6. Foothill Boulevard / Fruitvale Avenue	42.2	D	42.2	D	28.4	C	28.4	C
7. East 12th Street / 23rd Avenue	24.6	C	24.6	C	16.4	B	16.4	B
8. International Boulevard / Fruitvale Avenue	18.7	B	18.7	B	17.7	B	17.7	B
9. San Leandro Street / Fruitvale Avenue	32.6	C	32.6	C	37	D	37	D
10. San Leandro Street / High Street	28.8	C	28.8	C	29.7	C	29.7	C
11. East 12th Street / 29th Avenue	35	C	35	C	35.4	D	35.4	D
12. East 9th Street / Fruitvale Avenue	15.8	B	15.8	B	14.2	B	14.2	B
13. East 7th Street / Kennedy Street	9.7	A	9.7	A	12	B	12	B
14. Harold Street / Fruitvale Avenue	20.5	C	20.5	C	21.4	C	21.4	C
15. MacArthur Boulevard / Beaumont Avenue /	34.8	C	34.8	C	47.1	D	**47.0**	D
16. MacArthur Boulevard / Ardley Avenue	12.5	B	12.5	B	9.2	A	9.2	A

NOTES:
[a] All intersections are signalized except for the intersection of East 27th Street and Fruitvale Avenue, which is all-way stop-controlled.
[b] The LOS and delay (in seconds per vehicle) for signalized intersections and all-way stop-controlled intersection represent conditions for the overall intersection; **Bold** indicates the changed delays under EPP condition.

EPP = Existing Plus Project.

SOURCE: CHS Consulting Group, 2018.

TABLE 3.12-5
TRIP GENERATION DURING CONSTRUCTION PHASE WITH HIGHEST VOLUME

Vehicle Type	Daily			AM Peak Hour			MD Peak Hour			PM Peak Hour		
	IB	OB	Total	IB	OB	Total	IB	OB	Total	IB	OB	Total
Worker Vehicle Trips	9	9	18	9	0	9	0	0	0	0	9	9
Truck Trips	99	98	197	0	0	0	14	14	28	0	0	0
Total	**108**	**107**	**215**	**9**	**0**	**9**	**14**	**14**	**28**	**0**	**9**	**9**

NOTES:
IB = Inbound; OB = Outbound; MD = Midday.

SOURCE: CHS Consulting Group, 2018.

The Project would also generate up to 26 construction worker vehicle trips during other construction phases, but these would have fewer truck trips, so the total construction trips would be less in these other construction phases. Appendix K includes the estimated Project volumes at the study intersections in the area. These Project-generated construction trips would spread onto multiple streets in the vicinity of the Project site and would be temporary in nature (i.e., not permanent operational trips); therefore, construction would not generate a substantial increase in VMT on a long-term basis. Project construction would also not increase the physical roadway capacity. Therefore, construction of the Project would not conflict with the *City of Oakland Transportation Impact Review Guidelines* criterion related to VMT and roadway capacity. 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.

Transit Network. AC Transit operates two bus routes (Routes 62 and 14) in the vicinity of the Project site, and the nearest stop to the Project site is at the intersection of 23rd Avenue and East 30th Street. Project construction activities would not generate a substantial number of transit riders because most construction workers would likely drive to and from the Project site. The Project access routes for construction traffic (which would support approximately 28 truck trips, and 13 worker vehicle trips during each AM and PM peak hour) would partially overlap with the operation of AC Transit Routes 62 and 14 along 23rd Avenue, East 12th Street, East 27th Street, and Fruitvale Avenue. However, the conflicts between construction traffic and transit vehicles would be minor due to the low volumes of construction traffic and low service frequencies for Routes 62 and 14 (i.e., approximately 4 trips per hour).

Bicycle Circulation. The bike routes nearest the Project site are along Fruitvale Avenue and portions of 23rd Avenue, as well as a bike lane on Ardley Avenue. Bicycle volumes in the busiest hour are approximately 15 along Fruitvale Avenue and 6 along 23rd Avenue at East 27th Street (based on observed count data). The increased construction traffic on public roadways would potentially decrease the safety of bicyclists because local users may not be accustomed to the presence of large construction vehicles. 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 EBMUD Standard Construction Specification 01 55 26, which would require the contractor to prepare a Traffic Control Plan to minimize impacts on bicycle circulation on local streets. To maintain safe bicycle circulation, the Traffic Control Plan would identify specific measures around the Project site during periods of construction with heavy truck traffic (such as during concrete pours). The Traffic Control Plan may include measures such as signs, flashing lights, barricades, and other traffic safety devices to minimize impacts on circulation on the streets surrounding the Project site. Therefore, the Project would not result in changes in bicycle use or safety that would conflict with an applicable plan or policy related to bicycle use, and impacts would be less than significant. The EBMUD Practices and Procedures Monitoring Plan (Appendix E) lists the applicable standard specifications language.

Pedestrian Circulation. Worker parking and staging areas would be provided on site during Project construction; therefore, construction activities would not generate a substantial number of pedestrian trips to and from the Project site. The pedestrian volumes in the vicinity of the Project site are generally moderate, with approximately 130 pedestrian crossings at the intersection of East 27th Street and 25th Avenue in both the AM and PM peak hour (based on observed count data). Potential conflicts between pedestrians and construction traffic would generally be low. 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 EBMUD Standard Construction Specification 01 55 26, which would require the contractor to prepare a Traffic Control Plan to minimize impacts on pedestrian circulation on local streets. Sidewalks for pedestrians would remain open if safe for pedestrians, and alternate routes and signage provided if pedestrian routes are closed. Therefore, the Project would not result in changes in pedestrian use or safety that would conflict with an applicable plan or policy, and impacts would be less than significant. The EBMUD Practices and Procedures Monitoring Plan (Appendix E) lists the applicable standard specifications language.

Parking. Although no CEQA significance criterion addresses parking, the temporary loss of on-street vehicle parking along construction routes was considered in this analysis. The Project would provide approximately 22,000 square feet of staging areas within the Project site (refer to Figure 2-12). All construction equipment, trailers, and worker parking would be contained within the staging area. If construction workers (up to 13 daily workers [26 worker vehicle trips] during construction) are not able to park on site, a sufficient number of available on-street parking spaces (up to about 175 available spaces) would be available in the vicinity of the Project site based on the existing on-street parking conditions as described above in Section 3.12.1, Environmental Setting. Because on-street parking is typically underutilized, the loss of parking would not inconvenience local residents.

Because Project construction would not conflict with the *City of Oakland Transportation Impact Review Guidelines* criteria related to VMT and roadway capacity, and would not result in substantial differences in traffic operating conditions at study intersections from the existing condition, the Project construction impacts would be less than significant.

Operation

After completion, the reservoir site would be routinely inspected by EBMUD operations and maintenance staff. Vehicle trips generated by Project operations would remain the same as the existing condition, with approximately 4-monthly vehicle trips for operation and maintenance activities. There would be no change in the VMT, safety, or performance of transit, roadways, bicycle lanes, and pedestrian facilities.

Redwood Day School Access Driveway Design Option

If the Redwood Day School Access Driveway Design Option were adopted and Redwood Day School constructs a new private driveway connecting Ardley Avenue with the school, the vehicles that currently make U-turns on Sheffield Avenue to pick-up or drop-off students at the school would likely no longer make these U-turns. Instead, vehicles would enter the school on Sheffield Avenue, and exit onto Ardley Avenue.

Based on 24-hour traffic counts collected on Wednesday, May 23, 2018 along residential streets in the vicinity of Redwood Day School, approximately 222 vehicles currently make U-turns on southbound Sheffield Avenue at Morrison Avenue during the peak AM drop-off (7:30 a.m. to 8:30 a.m.), and 132 vehicles make U-turns during PM pick-up (3:00 p.m. to 4:00 p.m.) hours.

Table 3.12-6 presents the projected vehicle volumes on Sheffield Avenue and Ardley Avenue after the construction of a new driveway on Ardley Avenue, where cars would make right-turns into the parking lot from Sheffield Avenue and then exit to Ardley Avenue via the new driveway (instead of making U-turns on Sheffield Avenue). The Project would cause a marginal decrease in VMT of 0.2-mile per trip. In addition, the Project would potentially improve the safety of vehicular traffic, pedestrians, and bicyclists along Sheffield Avenue by diverting vehicles that would otherwise make U-turns on Sheffield Avenue to the existing parking lot. The construction of the new driveway would not increase physical roadway capacity in congested areas or induce additional vehicle trips.

TABLE 3.12-6
REDWOOD DAY SCHOOL TRIP DIVERSION AFTER CONSTRUCTION[a]

	Peak Drop-Off Hour (7:30 a.m. to 8:30 a.m.)			Peak Pick-Up Hour (3:00 p.m. to 4:00 p.m.)		
Location	Existing	Diversion to Sheffield Avenue[b]	Existing Plus Project Design Option	Existing	Diversion to Sheffield Avenue[b]	Existing Plus Project Design Option
Southbound Sheffield Avenue south of Redwood Day School	256	-222	34	166	-132	34
Northbound Ardley Avenue north of Redwood Day School	367	+222	589	213	+132	345

NOTE:
a Existing traffic conditions along streets around the Project site are based on 24-hour traffic counts collected on Wednesday, May 23, 2018 along residential streets in the vicinity of Redwood Day School.
b Estimated existing U-turns from southbound to northbound Sheffield Avenue after drop off at Redwood Day School, based on the existing traffic volumes in northbound and southbound directions north and south of Morrison Avenue.

SOURCE: CHS Consulting Group, 2018.

The new driveway on Ardley Avenue would potentially decrease traffic volumes on Sheffield Avenue south of Redwood Day School but increase traffic volumes on Ardley Avenue. Ardley Avenue currently carries approximately 367 and 213 vehicle trips during the peak AM drop-off and PM pick-up periods, respectively. The Project would divert approximately 222 and 132 vehicle trips from Sheffield Avenue to Ardley Avenue through the new driveway. While most of the exiting vehicles are expected to make right-turns onto Ardley Avenue to access I-580, some vehicles would make left-turns, which could cause vehicle delay and increase the potential for conflicts between vehicular traffic, pedestrians, and bicyclists along Ardley Avenue. An intersection operational analysis was performed for affected intersections.[5] Table 3.12-7 presents the projected LOS and delay for the intersections with the increase in traffic under the Existing Plus Project condition with Design Option, which shows that delay and/or LOS at two of the study intersections affected by the Project operation would improve (Intersection nos. 1 and 15) and delay and/or LOS would deteriorate at one study intersection (Intersection no. 16). Although the Project would result in increased delay at Intersection no. 16, the LOS would still continue to operate at an acceptable LOS (i.e., LOS D or better).

TABLE 3.12-7
INTERSECTION LEVEL OF SERVICE: EXISTING PLUS PROJECT OPERATION WITH REDWOOD DAY SCHOOL ACCESS DRIVEWAY DESIGN OPTION

	AM Peak Hour				PM Peak Hour			
	Existing		EPP Operation With Design Option		Existing		EPP Operation With Design Option	
Intersection[a]	Delay[b]	LOS[b]	Delay[b]	LOS[b]	Delay[b]	LOS[b]	Delay[b]	LOS[b]
1. MacArthur Boulevard / Sheffield Avenue	12	B	**6.8**	**A**	7.1	A	**3.2**	**A**
15. MacArthur Boulevard / Beaumont Avenue	34.8	C	34.8	C	47.1	D	**46.2**	**D**
16. MacArthur Boulevard / Ardley Avenue	12.5	B	**43.2**	**D**	9.2	A	11.1	B

NOTES:
a All intersections are signalized except for the intersection of East 27th Street and Fruitvale Avenue, which is all-way stop-controlled.
b The LOS and delay (in seconds per vehicle) for signalized intersections and all-way stop-controlled intersection represent conditions for the overall intersection; **Bold** indicates the changed delays under the future condition.

EPP = Existing Plus Project.

SOURCE: CHS Consulting Group, 2018.

Because the intersections affected by the Project operation would continue to operate at an acceptable LOS, Project operation would not result in substantial differences in traffic operating conditions at the study intersections as compared with existing conditions.

As described previously, if the Redwood Day School Access Driveway Design Option were adopted and Redwood Day School constructs a new private driveway connecting Ardley Avenue with the school, the vehicles that currently make U-turns on Sheffield Avenue to pick-up or drop-off students at the school would be diverted from Sheffield Avenue to Ardley Avenue. The Project would potentially improve the safety of bicyclists and pedestrians on Sheffield Avenue by diverting vehicles that would otherwise make U-turns on Sheffield Avenue to the existing parking lot. The Project would divert approximately 222 and 132 vehicle trips from Sheffield Avenue to Ardley Avenue through the new driveway during the peak drop-off and pick-up hours, respectively. While most of the exiting vehicles would make right-turns onto Ardley Avenue to access I-580, some vehicles would make left-turns, which could cause vehicle delay and

5 For the purpose of this analysis, all of the diverted vehicles on the new driveway are assumed to turn right to northbound Ardley Avenue, and the intersection operation analysis was conducted based on the peak hour of background traffic (7:45 a.m. to 8:45 a.m. and 5:00 p.m. to 6:00 p.m.) with the addition of school traffic during the peak student drop-off (7:30 a.m. to 8:30 a.m.) and pick-up (3:00 p.m. to 4:00 p.m.) periods.

increase the potential for conflicts between pedestrians and bicyclists along Ardley Avenue; a potentially significant impact. With the implementation of the Mitigation Measure TRA-1, which requires that Redwood Day School conduct an operational and safety analysis by a traffic engineer for the Ardley Avenue/new Redwood Day School driveway intersection, and implement measures to address safety issues, the Project operational impacts under the design option would be less than significant.

Congestion Management Program

As described above in Section 3.12.2, Alameda CTC is responsible for developing and updating the CMP, which identifies a LOS E standard for the freeway segments along I-580 and I-880 in the vicinity of the Project site.

Construction. In the vicinity of the Project site, the average daily traffic volumes are approximately 148,500 and 221,000 on I-580 and I-880, respectively (Caltrans, 2016). Project construction would generate a maximum of 13 worker vehicle trips on I-580 during each AM or PM peak hour. Project construction would generate 28 truck trips on I-880 outside of the peak hours between hours of 9:00 a.m. and 4:00 p.m. The temporary increase in Project-generated traffic would be less than significant in relation to the existing traffic load and capacity of the street system because the percent increase in traffic volumes on I-580 and I-880 (less than 1-percent) would not be substantial relative to background traffic conditions, and would not significantly disrupt traffic flow on these roadways or affect LOS. The magnitude of these increases is within the range of typical daily variation in traffic levels (usually on the order of ±5-percent) on the major roadways serving the Project site, and roadway operating conditions on these roadways would remain substantially similar to current conditions. Therefore, the Project construction would not conflict with the established Alameda CTC’s standards for its CMP.

Operation. After completion, the reservoir site would be routinely inspected by EBMUD operations and maintenance staff. Vehicle trips generated by Project operations would remain the same as existing conditions, with approximately 4-monthly vehicle trips for operation and maintenance activities. The Project would not increase trips on I-880 or I-580. Therefore, Project operations would not affect traffic flow on these roadways or affect LOS, and would not conflict with the established Alameda CTC’s standards for its CMP; impacts would be less than significant.

Redwood Day School Access Driveway Design Option. If the Redwood Day School Access Driveway Design Option were adopted and Redwood Day School constructed a new private driveway between Ardley Avenue and the school, no additional trips would be generated, but it would affect the circulation of local traffic by shifting approximately 222 and 132 vehicle trips from Sheffield Avenue to Ardley Avenue during the peak morning drop-off (7:30 a.m. to 8:30 a.m.) and the afternoon pick-up (3:00 p.m. to 4:00 p.m.) hours for Redwood Day School, respectively. While most of the exiting vehicles would make right-turns onto Ardley Avenue to access I-580, some vehicles would make left-turns. As noted above, the Alameda CTC is responsible for developing and updating the CMP. Sheffield Avenue and Ardley Avenue are not identified by the Alameda CTC as CMP facilities; however, I-580 and I-880 are identified as CMP facilities. The Project would not increase trips on I-880 or I-580. Therefore, the design option would not affect traffic flow on these roadways and would not conflict with the established Alameda CTC standards for its CMP; impacts would be less than significant.

Significance Determination Before Mitigation

Potentially significant (Redwood Day School Access Driveway Design Option).

Mitigation Measure

Mitigation Measure TRA-1: Conduct an operational and safety analysis by a traffic engineer for the Ardley Avenue/new Redwood Day School Driveway intersection for the Redwood Day School Access Driveway Design Option.

To minimize potential conflicts between the existing traffic on Ardley Avenue and the diverted traffic exiting onto Ardley Avenue from the new Redwood Day School Access Driveway Design Option, EBMUD shall as part of any agreement with Redwood Day School require that the school conduct an operational and safety analysis by a traffic engineer for the Ardley Avenue/new Redwood Day School access driveway intersection. The performance standard for the analysis is to minimize potential vehicular, pedestrian, and bicycle conflicts, based on the professional opinion of the traffic engineer and in accordance with City of Oakland Public Works Department standards. At a minimum, the analysis would evaluate the following:

- Traffic operational analysis consistent with City of Oakland Public Works Department standards to determine what type of stop-control (e.g., stop sign, traffic signal, etc.) is appropriate.
- An evaluation of sight distances for vehicles turning out of the Redwood Day School access driveway to ensure that any turns out of the driveway can be made safely.
- An evaluation of pedestrian and bicycle volumes along Ardley Avenue to determine whether signage and/or flashing beacons are warranted to alert driveway users to the presence of pedestrians and bicyclists on Ardley Avenue.
- An evaluation of whether signage is warranted along both travel directions of Ardley Avenue in advance of the driveway to alert roadway users of “Driveway Ahead.”
- An evaluation of vehicular travel speeds on Ardley Avenue to determine whether traffic calming features such as school signage and/or speed bumps are warranted to slow traffic in the vicinity of the driveway.

If the operational and safety analysis concludes that turns out of the driveway can be safely accommodated, and this finding is endorsed by City of Oakland Public Works Department staff, then EBMUD could allow vehicular movements from the driveway onto Ardley Avenue.

Significance Determination after Mitigation

Depending on whether and what stop-control and/or traffic calming features are implemented, implementation of Mitigation Measure TRA-1 would reduce the potentially significant safety impacts on vehicles, bicyclists, and pedestrians caused by the creation of a new intersection on Ardley Avenue to a less-than-significant level.

Impact TRA-2: Conflict or be inconsistent with *CEQA Guidelines* Section 15064.3, Subdivision (b). (Criterion 2)

In accordance with Senate Bill (SB) 743, the new *CEQA Guidelines* Section 15064.3, subdivision (b) was adopted in December 2018 by the California Natural Resources Agency. These revisions to the *CEQA Guidelines* criteria for determining the significance of transportation impacts are primarily focused on projects within transit priority areas, and shift the focus from driver delay to reduction of greenhouse gas emissions, creation of multi-modal networks, and promotion of a mix of land uses. Vehicle miles traveled, or VMT, is a measure of the total number of miles driven to or from a development and is sometimes expressed as an average per trip or per person.

As described above in Section 3.12.3, under the discussion of the City of Oakland's plans and policies, the Project does not meet any of the criteria for consideration of impacts on VMT for public service land uses. Therefore, there would be no impact associated with VMT.

Significance Determination Before Mitigation

No impact.

Mitigation Measure

None required.

Impact TRA-3: Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment). (Criterion 3)

Construction

The increased construction traffic on public roadways could potentially decrease the safety of vehicles, bicyclists, and pedestrians because the larger vehicles may not be compatible with residential streets. Larger construction vehicles would also temporarily and intermittently reduce the capacity of local roadways due to their slower movements and larger turning radii. Construction trucks would access the Project site through both the primary entrance at the 25th Avenue / East 29th Street intersection and the secondary entrance at the east terminus of East 30th Street. East 30th Street is approximately 30 feet wide with perpendicular parking on both sides of the street, and East 29th Street and 25th Avenue are residential streets with on-street parking allowed on both sides of the street. Truck turning movements at the primary and secondary entrances to the Project site would potentially conflict with existing vehicles, pedestrians, and bicyclists along East 30th Street, East 29th Street, and 25th Avenue.

Redwood Day School typically begins the school year during the last week of August and ends the school year in the second week of June. The school hours are generally between 8:30 a.m. and 3:00 p.m., with peak drop-off and pick-up activities from 7:30 a.m. to 8:30 a.m. and from 3:00 p.m. to 4:00 p.m., respectively. Project construction activities would generate up to 14 one-way truck trips to and from the primary Project site entrance at the intersection of 25th Avenue and East 29th Street outside of the peak hours (i.e., 9:00 a.m. and 4:00 p.m.). Large truck traffic would not travel along Sheffield Avenue, in front of Redwood Day School, and so construction truck traffic would not substantially conflict with the majority of Redwood Day School traffic. As shown in Table 3.12-2, most of the existing traffic volume in the vicinity of Redwood Day School occurs along Sheffield Avenue (580 peak-hour[6] trips in front of Redwood Day School verses 107 peak-hour trips along 25th Avenue). Even so, construction traffic could potentially conflict with Redwood Day School traffic (vehicular, pedestrian, and bicyclists) along 25th Avenue.

Manzanita Community School is located at 2409 East 27th Street, approximately 0.25-mile south of the primary and secondary entrances to the Project site. Manzanita Community School typically begins the school year during the middle of August and ends the school year in the beginning of June. The school hours are generally between 8:30 a.m. and 3:00 p.m., with peak drop-off and pick-up activities from 7:30 a.m. to 8:30 a.m. and from 3:00 p.m. to 4:00 p.m., respectively. The student pick-up and drop-off zones are on East 27th Street, which is one of the access routes that may be used for Project construction. Project construction traffic may not be compatible with school traffic (vehicular, pedestrian, and bicyclists).

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 55 26, Traffic Regulation, which requires a Traffic Control Plan that conforms to the most current version of the Caltrans Manual of Traffic Controls for Construction and Maintenance Work Zones. The Traffic Control Plan would identify specific measures to control traffic and provide guidance to motorists as to when and how to safely move around the Project site during construction. Additionally, the contractors would be required to use traffic signs, flashing lights, barricades, and other traffic safety devices to control traffic to minimize impacts on circulation on the streets surrounding the Project site. The EBMUD Practices and Procedures Monitoring Plan (Appendix E) lists the applicable standard specifications language.

Even with the incorporation of EBMUD's standard practices and procedures for traffic control measures, the Project's construction impacts on traffic operations along East

6 The peak hour of traffic on Sheffield Avenue occurs between 7:30 a.m. and 8:30 a.m.

27th Street near Manzanita Community School would still be significant. However, implementation of Mitigation Measure TRA-2 would reduce this potential impact to less than significant by scheduling truck trips to avoid drop-off and pick-up hours for the schools. Adjustment of truck operating hours in this manner would allow for safer and more efficient movement of people picking up and dropping children off at school.

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 change in traffic operations would create potential safety hazards for motorists due to truck traffic on East 27th Street, which is not normally a truck route. Travel on East 27th Street would be constrained in a manner that could present challenges to drivers unaccustomed to truck traffic. However, with the implementation of Standard Construction Specification 01 55 26 and Mitigation Measure TRA-2, the Project's impacts related to traffic hazards on East 27th Street would be reduced to a level of less than significant.

Operation

After completion, the reservoir site would be routinely inspected by EBMUD operations and maintenance staff. Vehicle trips generated by Project operations would remain the same as the existing condition, with approximately 4-monthly vehicle trips for operation and maintenance activities.

Redwood Day School Access Driveway Design Option

If the Redwood Day School Access Driveway Design Option were adopted and Redwood Day School constructed a new private driveway between Ardley Avenue and the school, vehicles would be allowed to make right-turns into the parking lot from Sheffield Avenue and exit to Ardley Avenue through the new driveway instead of making U-turns at Sheffield Avenue, which would decrease the conflicts between current U-turn vehicles and pedestrians, as well as bicyclists. While most of the exiting vehicles are expected to make right-turns onto Ardley Avenue to access I-580, some vehicles would make left-turns, which could cause vehicle delay and increase the potential for conflicts between vehicular traffic, pedestrians, and bicyclists along Ardley Avenue. This potential increase in hazards would be a significant impact. With the implementation of Mitigation Measure TRA-1, introduced above under Impact TRA-1, the design option impacts would be less than significant.

Significance Determination Before Mitigation

Potentially significant.

Mitigation Measure

Mitigation Measure TRA-2: As part of the Traffic Control Plan, include traffic control measures for trucks traveling along East 27th Street.

The following measures shall be implemented during the entire duration of the Project construction, to reduce the Project's temporary impacts on traffic circulation:

- Hauling and material delivery trucks and equipment delivery trucks traveling to and from the Project site during construction shall be restricted in both travel directions along East 27th Street between Fruitvale Avenue and 23rd Avenue during the typical Manzanita Community School (2409 East 27th Street) drop-off and pick-up hours. Manzanita Community School is open between 8:30 a.m. and 3:00 p.m., and the peak drop-off and pick-up hours are from 7:30 a.m. to 8:30 a.m. and from 3:00 p.m. to 4:00 p.m., respectively. The construction contractor shall confirm the start and dismissal times prior to the beginning of each school year.
- If it is not feasible to avoid hauling and material delivery trucks and equipment delivery trucks during school drop-off and pick-up hours, the construction contractor shall provide flaggers at the crosswalks of the East 27th Street/25th Avenue intersections to manage traffic flow and maintain traffic safety. If construction trucks travel along East 27th Street, between 25th Avenue and 23rd Avenue, the construction contractor shall also provide flaggers near the existing white passenger loading zone on East 27th Street between the gate of Manzanita Community School and 25th Avenue.

Significance Determination after Mitigation

Implementation of Mitigation Measure TRA-1 would reduce potential conflicts between vehicles, pedestrians, and bicyclists associated with the Redwood Day School Access Driveway Design Option. Implementation of Mitigation Measure TRA-2 would ensure that potential conflicts between construction trucks and school traffic on East 27th Street would be avoided. These measures would reduce the impacts associated with traffic hazards to less than significant.

Impact TRA-4: Result in inadequate emergency access. (Criterion 4)

The Alameda County Sheriff's Office of Homeland Security and Emergency Services developed the *Alameda County Emergency Operations Plan* (OHSES, 2012). The plan does not provide any specific evacuation routes as these are anticipated to be coordinated by local law enforcement and emergency services.

Construction

Project construction activities would not require any full roadway closures. Partial lane closures would be needed for the installation of pipeline work in East 29th Street over a period of approximately 1 week, including approximately 2 nights. 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 55 26, Traffic Regulation, which requires a Traffic Control Plan, including a description of emergency response vehicle access. The Traffic Control Plan would include specific measures to control traffic where alternating one-way traffic is necessary and provide guidance to motorists as to when and how to safely move around the Project site during construction. Warning signs for nighttime conditions would also be posted. Access to driveways would be maintained at all times, and open trenches would be covered (plated) at the end of each day to provide access. Impacts on emergency access would be less than significant because the Traffic Control Plan would include a description of emergency response vehicle access to ensure that emergency responders have access during the construction period. The EBMUD Practices and Procedures Monitoring Plan (Appendix E) lists the applicable standard specifications language.

Operation

Vehicle trips generated by Project operations would remain the same as the existing conditions, with approximately 4 monthly vehicle trips for operation and maintenance activities. The existing street network currently accommodates access by emergency vehicles that travel to and around the Project site. Once the pipeline work is completed for the rate control station (RCS), the pipeline alignment along East 29th Street would be repaved and would be essentially unchanged from existing conditions. The Project would not include any permanent physical changes in the roadways surrounding the Project site that would impede emergency vehicle access. Emergency vehicles would be able to access the roadways surrounding the Project site in the same way as under existing conditions. Therefore, the Project operational impacts on emergency vehicle access would be less than significant.

Redwood Day School Access Driveway Design Option

If the Redwood Day School Access Driveway Design Option were adopted and the school constructed a new private driveway between Ardley Avenue and the school, vehicles would be allowed to make right-turns into the parking lot from Sheffield Avenue and exit to Ardley Avenue through the new driveway instead of making U-turns at Sheffield Avenue. The existing street network currently accommodates access by emergency vehicles that travel to and around the Project site. The design option would not include any permanent physical changes in the roadways surrounding the Project site that would impede emergency vehicle access. Emergency vehicles would be able to access the roadways surrounding the Project site in the same way as under existing conditions. Furthermore, the new driveway would provide additional east-west access across the Project site where none currently exists, thereby improving emergency access to the Project site. Therefore, the operational impacts of the design option on emergency vehicle access would be less than significant.

Significance Determination Before Mitigation

Less than significant.

Mitigation Measure

None required.

Cumulative Impact Analysis

The geographical extent for cumulative impacts related to transportation includes areas in the vicinity of the Project site that would experience construction activity at the same time as the Project. Given that the Project would not result in additional traffic during its operational period, only the construction period is evaluated relative to potential cumulative impacts. Because of increased traffic disruptions, concurrent construction of the Project and the projects listed in Table 3.0-1 could result in potentially significant cumulative impacts on traffic. Such impacts would include a short-term increase in vehicle traffic, and reductions in the number or the available width of travel lanes on roads where construction would occur. In addition, concurrent construction of these projects could create traffic safety hazards for vehicles, bicyclists, and pedestrians on public roadways. Access to adjacent land uses and streets for both general traffic and emergency vehicles could be disrupted. Several projects listed in Table 3.0-1 and shown on Figure 3.0-1 are currently or expected to soon be under construction and could overlap (in time and space) with the Project's anticipated construction schedule, thereby causing the types of regional and local transportation impacts described above.

Potentially significant cumulative traffic and transportation access and facility impacts of the type described above could occur along the regional transportation corridors and identified truck routes, in the vicinity of the Project site. Such impacts also would be expected along local arterial and neighborhood roadways connecting regional thoroughfares with specific project construction sites.

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 55 26, Traffic Regulation, which requires the preparation of a Traffic Control Plan. This Traffic Control Plan would reduce the Project's safety hazards, emergency access, and bicycle and pedestrian facilities impacts. Therefore, the Project's contribution to cumulative construction-related transportation impacts would be less than significant.

3.12.4 References

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CHAPTER 4

Alternatives

This chapter evaluates alternatives to the Central Reservoir Replacement Project (Project) and examines the potential environmental impacts associated with each alternative. Alternatives are compared to the No Project Alternative, and the relative environmental advantages and disadvantages of each are identified.

4.1 Alternatives Analysis Approach

4.1.1 Consideration of Alternatives under CEQA

The *California Environmental Quality Act* (*CEQA*) *Guidelines* Section 15126.6 requires Environmental Impact Reports (EIRs) to evaluate a range of reasonable alternatives to a project, or to the location of a project that would feasibly attain most of the basic project objectives and avoid or substantially lessen significant effects of the project. The following criteria for selecting alternatives are set forth in the *CEQA Guidelines*:

- An EIR must consider a reasonable range of potentially feasible alternatives that will foster informed decision-making and public participation. The lead agency is responsible for selecting a range of project alternatives for examination and must publicly disclose its reasoning for selecting those alternatives. The range of alternatives addressed in an EIR should be governed by a rule of reason. Not every conceivable alternative must be addressed, nor do infeasible alternatives need to be considered (*CEQA Guidelines* Section 15126.6(a)). When addressing feasibility, factors that may be taken into account include site suitability, economic viability, availability of infrastructure, general plan consistencies, other plans or regulatory limitations, jurisdictional boundaries, and the proponent's ability to reasonably acquire, control, or otherwise have access to an alternative site.
- Evaluation should focus on those alternatives capable of avoiding or substantially lessening any significant environmental effects of the project, even if the alternative would impede, to some degree, the attainment of the project objectives, which are identified in Chapter 2, *Project Description*, or would be costlier.
- The EIR should identify alternatives that were considered by the lead agency but were rejected as infeasible and the reasons for the lead agency's determination (Section 15126.6(c)).
- A "No Project" alternative must be evaluated, and the EIR must also identify an environmentally superior alternative (Section 15126.6(e)).

The discussion should not consider those alternatives whose implementation is remote or speculative, and the analysis need not be presented in the same level of detail as the assessment of a proposed project.

Based on the *CEQA Guidelines*, several factors should be considered in determining the range of alternatives to be analyzed in an EIR and the level of analytical detail that should be provided for each alternative. These factors include:

1. The potential for the proposed project to result in significant impacts;
2. The ability of alternatives to reduce or avoid the significant impacts associated with the proposed project;
3. The ability of the alternatives to meet the objectives of the proposed project; and
4. The feasibility of the alternatives.

4.1.2 Approach to Analysis

Alternatives considered in this analysis include those alternatives identified by the East Bay Municipal Utility District (EBMUD) in the *West of Hills Master* Plan (EBMUD, 2010) and *Central Reservoir Replacement Value Engineering Project Final Report* (Value Engineering Study; AECOM, 2017), as well as alternatives suggested by members of the public during scoping, and alternatives identified by the EIR preparers based on the environmental impacts described in Chapter 3. The analysis in this EIR indicates that the Project would result in temporary significant and unavoidable impacts related to construction noise. There are no long-term significant and unavoidable impacts associated with the Project. The alternatives analysis thus considers whether there is an alternative that would avoid or reduce construction noise impacts. Table 2-1 in Chapter 2, Project Description, identifies the Project objectives.

The EBMUD Board of Directors will review and consider the information contained in this EIR before deciding whether to approve, disapprove, or modify the Project.

4.2 Project Alternatives Development: West of Hills Master Plan

This section describes the process undertaken to develop alternatives to the Project identified in the *West of Hills Master Plan;* subsequent sections describe the Project design alternatives identified in the *Value Engineering Study* and additional EIR team efforts. In Section 4.5, the alternatives are screened for feasibility and ability to meet Project objectives in order to determine which alternatives are developed further and carried forward for analysis in this EIR.

4.2.1 West of Hills Master Plan

The *West of Hills Master Plan* identified deterioration of the Central Reservoir liner and the need to repair the reservoir pursuant to the agreement with the Alameda County District Attorney's Office (the major concern being the presence of polychlorinated biphenyls [PCBs] in the panel craft lining system). The *West of Hills Master Plan* recommended initially repairing the reservoir liner and removing the black tar-board coating of the panel craft liner (Phase 1), and then ultimately demolishing Central Reservoir and replacing it with tanks on site at a higher elevation at a future date (Phase 2).

Repair Existing Reservoir

The *West of Hills Master Plan* considered repair of Central Reservoir as a Project alternative. The Repair Existing Reservoir alternative would rehabilitate the Central Reservoir for continued operation, and would:

- Remove the black tar-board coating of the panel craft lining, which would serve to remove the PCBs;
- Repair of the liner underneath, which would stop leakage;
- Remove the existing roof, which, does not meet seismic code requirements and contains asbestos-containing materials, to facilitate liner rehabilitation and then install a new roof;
- Demolish the existing rate control station (RCS) and construct a new RCS; and
- Replace approximately 80-foot of 24-inch pipeline in the sidewalk and road of East 29th with a 30-inch pipeline (as described under the Project).

Replace Existing Reservoir

Under the Replace Existing Reservoir alternative developed in the *West of Hills Master Plan*, EBMUD would replace the reservoir on site with new tanks. Work would include demolition of existing reservoir features and construction of two new tanks, totaling approximately 50-million-gallons (MG), with an overflow elevation approximately 20-feet higher than the existing reservoir. Several individual reservoir replacement alternatives were subsequently developed in the *Value Engineering Study* and are presented below.

4.3 Project Alternatives Development: Design Study

Subsequent to the *West of Hills Master Plan*, design alternatives to replace Central Reservoir at the existing site were developed in the *Value Engineering Study*. Additional design refinements were described in a memorandum that served as an addendum to the Value Engineering Study (EBMUD, 2018). Over a dozen alternatives were considered including superstructure (i.e., the portion of construction that lies above the foundation) alternatives with different configurations of concrete or steel tanks or basins, substructure (i.e., the part of the structure that extends deep below the ground surface and supports the superstructure) alternatives, and other alternatives involving roof design, construction phasing, truck haul routing. The design alternatives for the superstructure and substructure screened in this EIR are described below.

4.3.1 Superstructure Alternatives

Under the Project, the superstructure would consist of three 17-MG prestressed concrete tanks. The following sections describe the potential reservoir replacement Project alternatives or superstructure replacement Project alternatives; all of superstructure alternatives described below would require an improved substructure.

Two Prestressed Concrete Tanks

The Two Prestressed Concrete Tanks alternative would replace the existing reservoir with two 25-MG prestressed concrete tanks with concrete roofs. Each tank would be approximately 330-foot in diameter and a peak roof elevation of approximately 235-feet, approximately 18-feet higher than the existing roof elevation.[1] Construction would require an estimated 2,187 days, with an estimated 14,710 round trip material truck trips.

Two Welded Steel Tanks

The Two Welded Steel Tanks alternative would replace the existing reservoir with two 25-MG welded steel tanks with aluminum roofs. Each tank would be approximately 330-foot in diameter and a peak roof elevation of approximately 248-feet, approximately 31-feet higher than the existing roof elevation. Steel tanks have taller roofs than concrete tanks because steel tanks require extra “freeboard” height, consistent with industry design standards for seismic protection, and because metal roofs require larger slopes. Construction would require an estimated 2,022 days, with 11,016 round trip material truck trips. Once in operation, each tank would need to be sandblasted to remove internal and external surface coatings to prevent corrosion of the steel and recoated approximately every 20 years.

Three Welded Steel Tanks

The Three Welded Steel Tanks alternative would replace the existing reservoir with three 17-MG welded steel tanks with aluminum roofs. Each tank would be approximately 270-feet in diameter and have a peak roof elevation of approximately 245-feet, approximately 28-feet higher than the existing roof elevation. Steel tanks have taller roofs than concrete tanks because steel tanks require extra “freeboard” height, consistent with industry design standards for seismic protection, and because metal roofs require larger slopes. Construction would require an estimated 2,060 days, with 8,891 round trip

[1] Existing high point roof elevation is 217-feet above mean seal level per EBMUD Drawing 711-A-004. The Project would have a roof elevation of approximately 232-feet.

material truck trips. Once in operation, each tank would need to be sandblasted to remove internal and external surface coatings to prevent corrosion of the steel and recoated approximately every 20 years.

Reinforced Concrete Basin

The Reinforced Concrete Basin alternative would replace the existing reservoir with one rectangular 50-MG reinforced concrete basin with a concrete roof. The concrete basin would be approximately 370-feet by 450-feet and would have a peak roof elevation of approximately 238-feet, approximately 21-feet higher than the existing roof elevation. The concrete basin roof is taller than the roof for 17-MG prestressed concrete tanks because a single 50-MG tank requires a higher roof center elevation to meet the same slope requirements as a smaller tank. Construction would require an estimated 2,136 days, with approximately 11,256 round trip material truck trips.

Three Prestressed Concrete Tanks at a Lower Elevation

The Three Prestressed Concrete Tanks at a Lower Elevation alternative would involve constructing three prestressed concrete tanks with concrete roofs the same size as the Project approximately 20-feet lower in the ground (base elevation) than the Project. The base elevation for the Three Prestressed Concrete Tanks at a Lower Elevation alternative would be approximately the same as the existing Central Reservoir base elevation. The tank roof elevations would also be approximately 20-feet lower than the Project. Improvements to the substructure and construction of the tanks would be similar to the Project. In order to operate at a lower tank elevation, a new RCS would be required (in addition to the one replaced as part of the Project) to control flow into the Central Reservoir service area from other higher elevation reservoirs.

4.3.2 Substructure Alternatives

Under the Project, the foundation for the new tanks would consist of the existing soil foundation reinforced with Cement Deep Soil Mixing (CDSM) columns, overlain with a 30-foot thick fill pad consisting of soil reinforced with cement and/or lime. The 30-foot thick fill pad forms the substructure that will support the new tanks or superstructure. Several potentially feasible substructure alternatives were developed including the use of compacted soil and the use of other advanced methods to reinforce the fill pad.

A geotechnical analysis was completed as part of the *Value Engineering Study* to estimate the amount of settlement for each substructure alternative. The adequacy of each substructure alternative was evaluated by comparing the predicted soil settlement to the maximum settlement allowed by the superstructure while also considering cost, material truck trips, and construction schedule. To satisfy the settlement criteria, advanced soil stabilization techniques would be required to transfer the loads into deeper, more competent, and less compressible subgrade. In total, 9 unique substructure alternatives to the Project were evaluated and a summary of each is provided in Table 4-1.

TABLE 4-1
SUBSTRUCTURE ALTERNATIVES CONSIDERED FOR THE CENTRAL RESERVOIR REPLACEMENT PROJECT

Alternative	Description
Excavation/Trench Spoil Fill	This alternative would reuse excavated materials from the reservoir and embankment demolition and site grading to construct the fill pad for the superstructure. If more fill material is needed than the reservoir and embankment provides, additional fill could be imported from EBMUD trench spoil stockpile sites after soil testing. To ensure uniform settlement across the footprint of the planned fill pad, a single, rather than phased construction effort, is recommended.
Lightweight Cellular Concrete Fill	Lightweight cellular concrete is an engineered, low-density material of preformed foam, Portland cement, fly ash, and water. These materials would be mixed on site, to a density of 66-pounds per cubic foot and placed in cells up to 4-feet thick. A single construction effort is recommended to ensure maximum cost effectiveness and uniform settlement of the fill pad.
Roller Compacted Concrete Fill	This alternative would use a compactable concrete mixture as a fill pad. Concrete would not require form works and would be compacted by steel drum vibratory rollers after pouring. To ensure uniform settlement across the footprint of the planned fill pad, a single, rather than phased construction effort, is recommended.
Excavation Fill with 3-foot Spaced Geogrid	This alternative would reuse excavated materials from the reservoir and embankment demolition and site grading in conjunction with geogrid reinforcement at 3-foot vertical spacing.
Aggregate Base (AB) Fill with 5-foot Spaced Geogrid	This alternative would use imported aggregate base in conjunction with geogrid reinforcement at 5-foot vertical intervals.
Geopiers	This alternative would construct the pad with compacted excavation materials and trench spoils. The pad would be reinforced with geopiers, which are a ground improvement technique to transfer loads to deeper and more competent strata.
Stone Columns	This alternative would involve placement of crushed stone columns 30- to 36-inches in diameter beneath the fill pad. Crushed stone would be discharged from a vibratory probe that descends into deeper and more competent strata.
Drilled Piers and Grade Beam Foundation	Drilled piers, 36-inches in diameter, would be placed below the foundation to a depth of 93-feet. This would transfer loads to surrounding soil through skin friction at the soil-pier interface.
Concrete Caisson	This alternative would involve placing a supporting structure consisting of multiple layers of circular reinforced concrete walls. Vertical perpendicular reinforced concrete walls would be constructed to connect different layers of the circular walls.

SOURCE: EBMUD, 2017.

4.3.3 Construction Alternatives

Phasing Tank Construction

The Phasing Tank Construction alternative involves constructing the substructure for all three tanks but phasing the tank construction to initially construct two 17-MG prestressed concrete tanks. The remaining tank would be constructed in the future when needed to meet future increases in water demand. An important finding of the *Value Engineering Study* was the need to preload the substructure area where a future third tank would be constructed. Preloading the substructure means piling soil on the area, where a third tank would be constructed in order to distribute weight across the entire substructure site and allow for uniform settlement. The preloaded soil would need to be removed prior to construction of the third tank. Because of the loss in efficiency of constructing the tanks concurrently, and the preloading requirement, the Phasing Tank Construction alternative would increase the overall duration of construction activities at the site by approximately 191 days, and the number of truck trips would increase by approximately 4,659 round trip truck trips.

Truck Hauling Routes

The Truck Hauling Routes alternative would utilize different truck hauling routes to the Project site, including potentially Interstate 580 (I-580), which is adjacent to the site.

4.4 Construction Noise Reduction Alternatives

In addition to the alternatives described above the following potential alternatives to reduce construction noise impacts were explored.

4.4.1 Liner Demolition with the Existing Roof In-Place

The Liner Demolition with the Existing Roof In-Place alternative would reduce noise during demolition of the existing reservoir liner. The existing roof would provide significant noise reduction from impact equipment by both breaking the line of sight with receptors and by reflecting noise back into the site, away from the receptors.

4.4.2 Enhanced Noise Reduction

The Enhanced Noise Reduction alternative considers the potential to employ different construction techniques to further reduce construction noise impacts compared with the Project. The specific construction activities triggering the significant and unavoidable noise impacts include site preparation and demolition (of the reservoir liner and RCS), tank and valve structure construction (pipeline connection work), and site restoration near sensitive receptors. The Enhanced Noise Reduction alternative considers using alternative equipment and additional sound barriers to attenuate noise from two of these activities: liner demolition and site restoration near sensitive receptors. Specific components include:

- ***Alternative equipment to hoe ram*** – Consider use of blasting or controlled rock fragmentation by either injecting expansive materials or using pulse plasma injection to break up reservoir concrete.
- ***Use of mobile sound barrier during hoe ram use*** – Consider use of a portable, free-standing acoustic barrier that could be located between hoe-rams and the receptor and moved as the hoe ram is relocated; and
- ***Installation of additional temporary noise barriers*** – Consider use of noise barriers in other areas in addition to the along eastern barrier (adjacent to Redwood Day School) as described under the Project.

4.5 Alternatives Rejected from Further Consideration

4.5.1 Reservoir Replacement Alternatives

Two Prestressed Concrete Tanks

The Two Prestressed Concrete Tanks would result in a significantly higher number of material truck trips compared to the three tank configurations due to a significantly greater amount of fill that needs to be imported, which would increase the magnitude of construction-related transportation, air quality, and noise impacts. The site preparation and demolition, tank and valve structure construction (including pipeline connection), and site restoration phases would be the same as for the Project, resulting in the same significant and unavoidable noise impacts. Therefore, the Two Prestressed Concrete Tanks alternative was rejected because it would not substantially lessen one or more of the significant impacts associated with the Project.

Two Welded Steel Tanks

The Two Welded Steel Tanks alternative requires a significantly higher number of material truck trips, increased maintenance efforts to recoat the tanks approximately every 20 years to prevent corrosion, and a higher roof height (i.e., the aluminum low profile roof would be approximately 13-feet higher than the Project). The Two Welded Steel Tanks would result in a significantly higher number of material truck trips compared to the three tank configurations due to a significantly greater amount of fill that needs to be imported. The site preparation and demolition, tank and valve structure construction (including pipeline connection), and site restoration phases would be the same as for the Project, resulting in the same significant and unavoidable noise impacts. The Two Welded Steel Tanks alternative was rejected because it would not substantially lessen the significant noise impacts or other significant impacts associated with the Project.

Reinforced Concrete Basin

The Reinforced Concrete Basin alternative is less cost effective than the Project, requires additional monitoring, permitting, and other operational costs associated with a managing a dam, requires the most truck trips, and would have a roof that would be approximately 14-feet higher than the Project. The site preparation and demolition, tank and valve structure construction (including pipeline connection), and site restoration phases would be the same as for the Project, resulting in the same significant and unavoidable noise impacts. As a result, the Reinforced Concrete Basin alternative was rejected because it would not substantially lessen one or more significant impacts compared to the Project. Additionally, this alternative fails to meet the secondary objectives related to minimizing life cycle costs and reducing monitoring, permitting, and other operational costs associated with managing a dam.

Three Prestressed Concrete Tanks at a Lower Elevation

The Three Prestressed Concrete Tanks at a Lower Elevation (i.e., at the same base elevation as the existing Central Reservoir) would not improve water service reliability as well as the Project because the base elevation would be lower than the other reservoirs in the Central Pressure Zone and therefore would reduce operating flexibility and system reliability and limit EBMUD's ability to respond to emergencies. Additionally, water quality would not be improved because the water level would be maintained at or above 180-feet elevation to prevent low customer pressures, preventing cycling of approximately one-third of the water storage. Cycling of the water storage is required to reduce water age and improve chlorine residual levels. Therefore, this alternative was rejected because it would fail to meet most of the primary operational objectives of the Project. Additionally, the site preparation and demolition, tank and valve structure construction (including pipeline connection), and site restoration phases would be similar to the Project resulting in similar significant and unavoidable noise impacts.

4.5.2 Substructure Alternatives

Nine unique substructure alternatives were evaluated by estimating how much the tanks (superstructure) may settle under each alternative while also estimating cost, material truck trips, and construction schedule. Out of the 9 substructure alternatives considered, 6 were rejected because they did not provide adequate support (settlement would be too great) or were not feasible. One of the substructure alternatives (Stone Columns) would require up to 15,000 more material truck trips than the foundation proposed for the Project, would take approximately 30 percent more time to construct, and would be more expensive (AECOM, 2017). The remaining two substructure alternatives, would cost more than the Project and not result in any substantial lessening of significant impacts. Because the site preparation and demolition, tank and valve structure construction (including pipeline connection), and site restoration phases would be the same as for the Project, none of the substructure alternatives would substantially lessen the significant and unavoidable noise impacts associated with the Project. Table 4-2, below summarizes the reasons for rejection of the various substructure alternatives.

4.5.3 Construction Alternatives

Phasing Tank Construction

As described above, the Phasing Tank Construction alternative would result in a substantial increase in the number of truck trips and duration of construction. The increase in truck trips and duration of construction would result in an increase in traffic and air quality impacts and extend the duration of construction noise. The site preparation and demolition, tank and valve structure construction (including pipeline connection), and site restoration phases of construction would be the same as for the Project and result in similar significant and unavoidable noise impacts. The phased construction does not present significant cost savings to offset the lengthened construction schedule and additional truck trips. Because this alternative would not substantially lessen one or more of the significant impacts, it was rejected from further consideration. With regard to Project objectives,

TABLE 4-2
REASONS SUBSTRUCTURE ALTERNATIVES WERE ELIMINATED

Alternative	Description
Excavation/Trench Spoil Fill	Settlement scenarios for the substructure alternatives exceed the total and differential settlement criteria. Therefore, the excavation/trench spoil fill option should not be considered as a viable substructure alternative alone.
Lightweight Cellular Concrete Fill	The loading condition from the superstructure remains unchanged and could still cause excessive settlements of the subgrade. Therefore, lightweight cellular concrete should not be considered as a viable substructure alternative alone.
Roller Compacted Concrete Fill	The loading condition applied to the underlying soil conditions (alluvium and San Antonio Formation) does not change and would result in excessive settlements in the subgrade. Therefore, this option should not be considered a viable substructure alternative alone.
Excavation Fill with 3-foot Spaced Geogrid	The loading condition from the superstructure remains unchanged and could still cause excessive settlement of the subgrade. Therefore, the excavation fill option should not be considered as a viable substructure alternative alone.
Aggregate Base (AB) Fill with 5-foot Spaced Geogrid	The loading condition from the superstructure remains unchanged and could still cause excessive settlement of the subgrade. Therefore, the aggregate base fill option should not be considered as a viable substructure alternative alone.
Geopiers	The maximum depth of geopiers is about 25-feet; given that the rigid layer is 70-feet below the top of the fill, installing geopiers from the top of the fill is not feasible.
Stone Columns	Placement of stone columns would require approximately 15,000 more material truck trips. Therefore, this substructure alternative is not feasible.
Drilled Piers and Grade Beam Foundation	The costs associated with drilled piers are substantially higher than the cost of the rest of the substructure alternatives. In addition, this alternative does not present any significant advantages in terms of reducing traffic impacts or accelerating the construction schedule. Therefore, this substructure alternative is not feasible.
Concrete Caisson	The costs associated with a concrete caisson are substantially higher than the cost of the rest of the substructure alternatives. In addition, this alternative does not present any significant advantages in terms of reducing traffic impacts or accelerating the construction schedule. Therefore, this substructure alternative is not feasible.

implementing a phased approach by building two tanks now and a third tank later would not provide the same operational flexibility as constructing three tanks at the same time. With three tanks, EBMUD can respond to planned and unplanned distribution outages, seasonal demand fluctuations, and droughts more effectively because three tanks offer a wider range of operational capabilities.

Truck Hauling Routes

The use of I-580 for haul trucks is prohibited by the California Department of Transportation (Caltrans). Discussions with the City of Oakland, California Highway Patrol, and Caltrans staff concluded that an exception to the prohibition of trucks on I-580 could not be acquired for the Project. Therefore, the Truck Hauling Routes alternative was rejected as infeasible.

Liner Demolition with the Existing Roof In-Place

Demolition of the reservoir liner with the existing roof intact would be very difficult and dangerous and could expose the area to hazardous materials: the roofing materials contain asbestos. The demolition equipment required to demolish the concrete liner is large and the equipment would be difficult to maneuver between the roof support columns without damaging the columns and de-stabilizing the roof. Holes would have to be cut into the roof for ventilation and to remove columns to make room for the concrete crushing equipment. The crushing and concrete recycling operation will occupy a fairly large portion of the site, and will require removal of approximately one third of the roof. Removal of a portion of the roof will further destabilize the roof, increasing the danger to the liner demolition workers under the intact portion of the roof. A roof collapse poses a life safety hazard to the construction workers. If the roof collapses in an uncontrolled way, asbestos could be released into the air. A roof collapse with the liner removed would also allow the asbestos to contaminate the exposed soil. Remediating soil would be much more difficult and time consuming than remediating asbestos that has fallen on top of the liner. The Liner Demolition with the Existing Roof In-Place alternative was rejected because it creates unacceptable risks to the safety of construction workers and a potential for a hazardous materials release, which would fail to meet the Project construction objective to provide safe construction site conditions.

Enhanced Noise Reduction

The Enhanced Noise Reduction alternative was rejected based on its infeasibility. No feasible, practicable alternative construction techniques for demolition of the liner or attenuation of noise from demolition activities were identified that would attenuate noise levels beyond Mitigation Measure NOI-1. Similarly, no alternative construction techniques were identified for pipeline connections to the distribution system at the corner of 25th Avenue and East 29th Street that, for reasons described under Impact NOI-1, may require nighttime construction. Specific components evaluated for feasibility include:

- ***Alternative equipment to hoe ram*** – No feasible alternative equipment was identified; controlled blasting would also have noise and vibration impacts;

- ***Use of mobile sound barrier during hoe ram use*** – This technique would require constant repositioning of a mobile barrier which would increase the demolition construction phase and which would also have limited ability to attenuate noise due to the restrictions on barrier size to maintain mobility; and

- ***Installation of additional sound barriers*** – Due to Project site elevation changes and space limitation surrounding the work areas, it is not feasible to install additional sound barriers that could substantially reduce noise levels.

4.6 No Project Alternative

4.6.1 Alternative Description

Under the No Project Alternative, Central Reservoir would not be demolished and replaced with new tanks. However, long-term continued operation of Central Reservoir in its current condition is not feasible. Likewise, abandonment of Central Reservoir is also not feasible as it is a key component of EBMUD's water distribution system.

Central Reservoir is an aging facility with physical deficiencies and operational issues. Physical deficiencies include the reservoir liner, which leaks and contains PCBs, and the presence (or potential presence) of other hazardous materials (i.e., lead based paint) at the site. Operational issues include the need to maintain the water levels of an oversized reservoir within a narrow elevation band, which constrains use of the reservoir's storage capacity, reduces operational flexibility and system reliability, limits EBMUD's ability to respond to emergencies, and leads to water quality operational challenges, which are further exacerbated because the RCS is undersized. In order to address the operational issues, the existing reservoir would still require major rehabilitation as described above for the Repair Existing Reservoir Alternative. For these reasons, the No Project Alternative is substantively the same as the Repair Existing Reservoir Alternative identified in the *West of Hills Master Plan* and described in Section 4.2 of this chapter.

Upon completion of the rehabilitation, the reservoir would remain under Division of Safety of Dams jurisdiction and would continue to require monitoring, permitting and other operational costs associated with managing a dam.

4.6.2 Project Objectives

Table 4-3 presents the Project objectives along with an evaluation of whether the No Project Alternative meets those objectives. As explained in Table 4-3, the No Project Alternative would not meet the Project's primary operational objectives, nor would it meet most of the Project's secondary operational objectives.

4.6.3 Impact Discussion

Because of the need to rehabilitate the liner and roof, the No Project Alternative would not avoid all of the construction impacts associated with the Project. Because the No Project Alternative would not include complete demolition of the liner, the significant and unavoidable construction noise impacts related to demolition would be substantially less than under the Project. However, the significant and unavoidable noise impacts associated with site preparation and demolition (of the RCS) and tank and valve structure construction (pipeline connection work) would be the same as under the Project. Because the No Project Alternative would not include the Redwood Day School Access Driveway Design Option, transportation impacts related to the access driveway would not occur nor require mitigation. In general, the magnitude of all construction-phase air quality and noise impacts would be reduced compared to the Project. Less-than-significant or potentially-significant aesthetic impacts associated with the Project would either not occur or would remain less than significant under the No Project Alternative.

TABLE 4-3
PROJECT OBJECTIVES

	Objective	Does No Project Alternative Achieve Objective?
Primary Operational Objectives	Replace a reservoir at the end of its useful life and remove PCBs in the reservoir interior liner coating.	No, the reservoir would not be replaced, but yes, the liner coating would be removed.
	Improve water service reliability and water quality by: • Providing storage capacity in multiple tanks at the same site, each of which can be removed from service for unplanned and planned outages, or in response to seasonal reductions in demand or reductions in demand during droughts, while the other tank(s) remain in service. • Reducing storage capacity at the same site so the resulting capacity is proportionate to anticipated demand and the entire depth of that capacity may be utilized. • Raising the elevation of storage capacity at the same site so that reservoirs within the central and south portion of the Central Pressure Zone are capable of providing water service anywhere within that area of the pressure zone.	No, with the No Project Alternative, none of the conditions contributing to water service reliability and water quality operational challenges would be remedied.
Secondary Operational Objectives	Maintain a similar and acceptable aesthetic site-environment after construction.	Yes, the aesthetic site-environment would not change.
	Minimize life-cycle costs (capital, operating, and maintenance) to EBMUD's customers.	No, the existing reservoir is at the end of its useful life and requires regular maintenance. As the reservoir continues to age, maintenance costs would increase.
	Maximize the useful life of existing facilities in a manner that reduces costs for customers.	No, simply repairing the liner and the roof without replacing the reservoir would extend, but would not maximize the useful life of the reservoir, and is not a cost-effective option for customers because repairs would be very expensive without operational flexibility and water quality benefits.
	Maintain a safe facility while reducing monitoring, permitting, and other operational costs associated with managing a dam.	No, additional operational costs would be associated with maintaining a safe dam.
Construction Objectives	Minimize environmental impacts on the community during construction.	Yes, construction and demolition activities would be less extensive compared to the Project. However, noise impacts specific to the replacement of the RCS would be the same as under the Project and would remain significant.
	Reuse or recycle building materials on site to the extent feasible, including concrete demolition materials and excavated earth.	Yes, less material would need to be reused or recycled compared to the Project.
	Maintain water service and emergency flows during construction.	Yes, water service and emergency flows would be maintained during construction.
	Protect the local community from construction hazards.	Yes, it is expected that rehabilitation of the liner and roof could be done safely.
	Provide safe travel routes for motorists and pedestrians.	Yes, it is expected that safe travel routes for motorists and pedestrians would be maintained.
	Provide safe construction site conditions.	Yes, liner and roof rehabilitation would be subject to the same safety requirements as the Project.

4.7 Three Steel Tanks Alternative

As described throughout Chapter 3, most of the impacts attributable to the Project as proposed would occur during construction. Among the potential alternatives considered for evaluation (described in Sections 4.2 through 4.4), the Three Steel Tanks Alternative is feasible and would require fewer truck trips and a shorter construction schedule compared to the Project, thus reducing the magnitude and/or duration of some significant impacts. No feasible alternative capable of reducing the Project's significant and unavoidable noise impacts was identified; refer to Sections 4.2 through 4.4 for more information.

4.7.1 Alternative Description

The Three Steel Tanks Alternative, considered in the *Value Engineering Study*, would replace Central Reservoir in the same location as the Project with three 17-MG welded steel tanks. The overall design and layout of the Project site under the Three Steel Tanks Alternative would be similar to the Project design, including major grading, access roads, and landscaping. The welded steel tanks would be in the same location as the concrete tanks under the Project. However, the welded steel tanks would require a more pronounced domed roof structure, with a final peak roof elevation of approximately 245-feet (approximately 13-feet taller than the Project tanks).

The demolition phase would be nearly identical to the Project. Because the site layout would be the same as the Project, the substructure construction phase, including the use of CDSM columns, would also be similar to the Project.

The superstructure construction phase would involve construction of the steel tanks, appurtenances, and RCS replacement. Welded steel tanks require fewer truck trips and less time to construct than the prestressed concrete under the Project. Overall, the Three Steel Tanks Alternative would require approximately 952 fewer material truck trips compared with the Project (approximately 8,891 trips compared with approximately 9,843 trips). The overall construction period for the Three Steel Tanks Alternative would be approximately 90 days shorter than under the Project. After the tanks are constructed and tested, the interior and exterior of the tanks would be coated. The tanks would be tented and sandblasted because of corrosion that occurs between the factory and when assembly is completed.

The following elements would be the same as the Project: tank valve structure, RCS, pipelines, storm drain system, removal of the existing embankment, site security, screening and landscaping, service roads and site paving.

Construction equipment and operating hours would generally be the same as or similar to the Project. Because of the different construction techniques and materials used, overall there would be approximately 10 percent fewer construction truck trips than under the Project.

Regarding operations and maintenance, activities would similar as for the Project with one exception: the welded steel tanks would need to be sandblasted to remove internal and external surface coatings and recoated approximately every 20 years.

4.7.2 Impact Discussion

The Site Preparation and Demolition, Substructure Construction, RCS demolition and pipeline connection activities that would occur as part of Tank and Valve Structure Construction, and Site Restoration phases of construction for the Three Steel Tanks Alternative would be the same as for the Project. As a result, the significant impacts associated with these construction phases and activities would be the same as for the Project. Similar to the Project, the Three Steel Tanks Alternative would have significant and unavoidable impacts related to construction noise (during Site Preparation and Demolition, Site Restoration construction phases, and due to pipeline connections and RCS construction activities during the Tank and Valve Construction phase. Other noise-related impacts during the Tank and Valve Structure construction phase would be mitigated to less-than-significant levels, similar to the Project, but duration of superstructure construction would be shorter, as the steel tanks would be constructed quicker than concrete tanks. However, the phases of construction during which the significant and unavoidable noise impacts occur, as described above, will remain the same length as the Project. Effects on scenic vistas and the existing visual character of the site would be incrementally greater under this alternative (although still less than significant) because the steel tanks would be approximately 13 feet higher than the concrete tanks proposed under the Project. Because there would be approximately 10 percent fewer materials truck trips under this alternative, transportation-related effects on air quality, greenhouse gas emissions, and traffic volumes on local streets would be incrementally less than with the Project.

In addition to noise impacts, significant impacts associated with aesthetics, biological, and transportation resources would be similar to under the Project. The same mitigation measures implemented under the Project would be implemented under the Three Steel Tanks Alternative, reducing significant impacts to less-than-significant levels. Additionally, under the Three Steel Tanks Alternative the steel tanks would be approximately 13-feet taller than the Project tanks, but would not result in significant aesthetics impacts because similar to the Project, scenic vistas would still be intermittently visible in the background of the tanks.

Impacts on biological and transportation resources would be identical to the Project.

4.8 Comparison of Alternatives

Table 4-4 presents a comparison of the Project, No Project Alternative, and Three Steel Tanks Alternative. The No Project Alternative would substantially lessen impacts related to the complete demolition of Central Reservoir and substructure and superstructure construction because only liner repair, removal of the black-tar coating, and roof repair would occur. The No Project Alternative would not achieve either of the primary operational objectives, nor most of the secondary operational objectives because it would not replace the existing Central Reservoir (Table 4-3). The No Project Alternative would result in significant and unavoidable impacts related to the site preparation and demolition (of the RCS) and tank and valve structure construction (pipeline connection) phases of construction, similar to the Project.

Both the Project and the Three Steel Tanks Alternative would achieve both of the primary operational objectives and all construction objectives. The Project would achieve all the secondary operational objectives. The Three Steel Tanks Alternative would achieve most of the secondary operational objectives but would increase life cycle costs due to the need to periodically recoat the steel tanks, which would incur a substantial cost approximately every 20 years. Compared to the Project, the Three Steel Tanks Alternative would result in approximately 10 percent fewer materials truck trips and approximately 90 fewer construction days. The steel tanks would be 13-feet taller than the Project’s concrete tanks, creating a higher overall profile following construction. Because the demolition and substructure phases are similar for both the Project and the Three Steel Tanks Alternative, both would result in significant and unavoidable noise impacts of similar intensity and duration.

TABLE 4-4
COMPARISON OF THE PROJECT, NO PROJECT ALTERNATIVE, AND THREE STEEL TANKS ALTERNATIVE

Impact Statement	Significance[1] Project	Significance[1] No Project	Significance[1] Three Steel Tanks Alternative	Analysis
Aesthetics				
AES-1: Have a substantial adverse effect on a scenic vista.	LTS	NI	LTS+	Views of the Oakland-Berkeley Hills are a designated scenic vista. The Oakland-Berkeley Hills and Oakland Temple are the distant background of views of the Project site from some areas of Ardley Avenue looking north/northeast. **No Project**. With rehabilitation as described under the Repair Existing Reservoir Alternative in Section 4.2.1, there would be no impact on scenic vistas because the elevation and general appearance of the reservoir would likely be similar to existing conditions. **Three Steel Tanks**. Although the new steel tanks would be approximately 35-feet higher than the existing reservoir roof, and approximately 13-feet higher than the Project (incrementally worsening this impact), the views of the Oakland-Berkeley Hills and the Oakland Temple would still be intermittently visible in the background of views where there are breaks in the vegetation, similar to existing conditions.
AES-2: Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway.	LTS	NI	LTS	**No Project**. Assuming no trees would be removed to facilitate repair of the existing reservoir, there would be no impact to scenic resources. **Three Steel Tanks**. Because implementation of the Three Steel Tanks Alternative would not remove any of the existing mature trees and shrubs adjacent to I-580 (the same as the Project), with completion of the steel tanks, views of the tanks in the background would not be out of character with the two-story commercial/ institutional structures and other structures that are currently visible as the viewer travels through this section of the freeway. Therefore, the steel tanks would not damage scenic resources within a state scenic highway, and the impact would not change as compared to the Project.
AES-3: In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings, or in an urbanized area, conflict with applicable zoning and other regulations governing scenic quality.	LTS	LTS	LTS+	**No Project**. While there would be some change in the existing reservoir's appearance with replacement of the roof, the change would not be substantial (e.g., there would be no change in the elevation of the roof). **Three Steel Tanks**. *Views from Ardley Avenue and neighborhood to west:* The difference between the site's existing and proposed visual character as viewed after the steel tanks completion would not be substantial because although the proposed tanks would be taller than the existing reservoir, and approximately 13-feet higher than the Project (incrementally worsening this impact), these tanks would remain as a water utility facility and the tanks' perceived height and massing above the existing reservoir would be consistent with the structures in the vicinity of the site, which include two-story buildings to the east and west of the site. The landscape design would result in site

TABLE 4-4 (CONTINUED)
COMPARISON OF THE PROJECT, NO PROJECT ALTERNATIVE, AND THREE STEEL TANKS ALTERNATIVE

Impact Statement	Significance[1] Project	No Project	Three Steel Tanks Alternative	Analysis
Aesthetics (cont.)				
AES-3 (cont.)				conditions that would be a change from the existing conditions initially, with the removal of vegetation, but the new landscaping under the Three Steel Tanks Alternative would screen the site more than the existing vegetation (the same as the Project). A berm along Ardley Avenue would also partially block the view of the tanks. *South Entrance:* At the south entrance, although the proposed steel tanks would be taller than the existing reservoir (and approximately 13-feet higher than the Project, incrementally worsening this impact) and more visible compared to the existing reservoir facilities before the vegetation matures, these steel tanks would remain as a water utility facility, and earthen berms planted with new vegetation would screen most views of the steel tanks (same as the Project). The removal of the material storage building would also provide more views of the landscape and natural features, similar to the Project. *Central Reservoir Recreation Area:* The site directly adjacent to the Central Reservoir Recreation Area under the Three Steel Tanks Alternative would include a basin and bioretention area that would be mulched and landscaped, with sloped sides, which would replace the existing built facilities and remove the existing roof glare (same as the Project). Most of the trees adjacent to the recreation area would also be retained with the steel tanks, further screening the site. The portions of the basin visible between the breaks in the trees would consist of sloped and flat landscaping with mulch, ground cover, trees, and shrubs, which would provide more views of the landscape and natural features, similar to the Project. The impact would not change as compared to the Project. *Redwood Day School:* The steel tanks would be mostly screened by the vegetation as viewed from Redwood Day School. Because the existing trees at this location would be retained (same as the Project), the landscape design would result in site conditions that would be very similar to existing conditions, and the impact would not change as compared to the Project. *I-580:* Because the Three Steel Tanks Alterative would include the addition of trees along the portion of I-580 adjacent to the site and would not remove any of the mature trees and shrubs (same as the Project), the steel tanks would be consistent with the height of the structures in the background of views along I-580, and the views would be similar to the existing views as viewers pass beyond the site (i.e., landscaping adjacent to the highway with structures in the background of views), the impact would not change as compared to the Project. *Overcrossing at Ardley Avenue:* The steel tanks would include the addition of trees and a berm at the overcrossing at Ardley Avenue (same as the Project), and the tops of the tanks would be consistent with the height of the one- to two-story structures in the background of views, as seen from the I-580 overcrossing at Ardley Avenue. The impact would not change as compared to the Project. *Neighborhood North of I-580:* Views of the reservoir area are screened from public view at the elevated locations in the neighborhood across I-580 and from the neighborhood immediately on the north side of I-580. It may be possible to see a small portion of the edge of the top of one of the

TABLE 4-4 (CONTINUED)
COMPARISON OF THE PROJECT, NO PROJECT ALTERNATIVE, AND THREE STEEL TANKS ALTERNATIVE

Impact Statement	Significance[1] Project	Significance[1] No Project	Significance[1] Three Steel Tanks Alternative	Analysis
Aesthetics (cont.)				
AES-3 (cont.)				steel tanks through the lower vegetation at the end of Woodruff Avenue, but most of the steel tank would be behind the taller trees to the left, and the trees and structures to the right (same as the Project). In addition, the height of the steel tanks would be similar to the heights of the structures to the right of Woodruff Avenue. The impact would not change as compared to the Project. Overall, the Three Steel Tanks Alternative would not substantially degrade the existing visual character or quality of the site and its surroundings. For pipeline connections associated with the steel tanks, nighttime lighting would be required and the construction lighting may be visible to adjacent residences and along public roadways. Mitigation Measure AES-1: Nighttime Lighting Controls requires the shielding of night lighting to be directed downward or oriented such that the light source is not directed toward residential areas or into streets. By directing the light source away from residential areas and streets, the nighttime lighting would be contained on site, reducing the potential to create a new source of light or glare that would adversely affect nighttime views in the area. The impact would not change as compared to the Project.
AES-4: Create a new source of substantial light or glare that would adversely affect day or nighttime views in the area.	LSM	LSM	LSM	**No Project**. Like the Project, pipeline connections would require nighttime construction, which would require nighttime lighting. **Three Steel Tanks**. Like the Project, the Three Tanks Alternative would require nighttime construction for pipeline connections. The only permanent light source used during operation of the steel tanks would be the motion-detected outdoor security lighting on the valve structure between the steel tanks. Because the lighting is on the structure between the steel tanks, and the area requiring lighting would not be close to residences or other land uses sensitive to light and glare, the operation of the steel tanks would not result in a substantial new source of light in the area, and the impact would not change as compared to the Project.
Air Quality				
AIR-1: Conflict with or obstruct implementation of the applicable air quality plan.	LTS	LTS-	LTS-	**No Project**. Because there would be less construction to repair the existing reservoir, construction emissions of criteria air pollutants and TACs would be lower than the Project, and neither construction nor operation of the No Project Alternative would conflict with or obstruct implementation of Climate Action Plan. **Three Steel Tanks**. Construction emissions for the Three Steel Tanks Alternative would be lower than the Project as it would take approximately 90 fewer days for construction and generate approximately 10 percent fewer construction truck trips, which would reduce the use of diesel-powered construction equipment thereby reducing direct emissions of criteria air pollutants and toxic air contaminants (TACs). Once operational, emissions from operation and maintenance of the tanks would be similar to the Project. However, additional emissions would be generated when the steel tanks need to be recoated about every 20 years. Overall, while emissions for the alternative would be lower, both Project and the Three Steel Tanks Alternative would be consistent with the Climate Action Plan.

TABLE 4-4 (CONTINUED)
COMPARISON OF THE PROJECT, NO PROJECT ALTERNATIVE, AND THREE STEEL TANKS ALTERNATIVE

Impact Statement	Significance[1]			Analysis
	Project	No Project	Three Steel Tanks Alternative	
Air Quality (cont.)				
AIR-2: Expose sensitive receptors to substantial pollutant concentrations.	LTS	LTS-	LTS-	**No Project**. Because there would be less construction to repair the existing reservoir, construction emissions of criteria air pollutants and TACs would be lower than the Project, and exposure of nearby sensitive receptors to these pollutants would also be lower. **Three Steel Tanks**. As discussed above, construction emissions of criteria air pollutants and TACs generated by the Three Steel Tanks Alternative would be lower than the Project (due to the shorter construction period) and exposure of nearby sensitive receptors to these pollutants would also be lower, particularly health risk from exposure to TACs. Overall, while both the Project and the Three Steel Tanks Alternative would result in less-than-significant impacts with respect to this criterion, the impact for the Three Steel Tanks Alternative would be less than that from the Project.
Biological Resources				
BIO-1: 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 Wildlife or U.S. Fish and Wildlife Service.	LSM	LSM	LSM	**No Project**. Depending on the timing of the liner repair and roof rehabilitation, impacts on nesting birds and roosting bats could occur but would be of substantially shorter duration. **Three Steel Tanks**. Because construction and operation of the steel tanks would be generally the same as the Project, impacts on nesting birds and roosting bats from night lighting would be similar. Mitigation Measure AES-1 would reduce impacts to less-than-significant levels.
BIO-2: Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service.	LTS	LTS-	LTS	**No Project**. Repairing the liner under the No Project Alternative would stop current leaking. Because the scope and magnitude of changes to the reservoir would be less extensive than with the Project, potential adverse effects on riparian habitat or other sensitive natural communities would also be less. **Three Steel Tanks**. Because construction and operation of the steel tanks would be generally the same as the Project, impacts on riparian habitat or other sensitive natural communities would be less than significant with the Three Steel Tanks Alternative.
BIO-3: Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means.	LTS	LTS-	LTS	**No Project**. Because the scope and magnitude of changes to the reservoir would be less extensive than with the Project, potential adverse effects on wetlands would also be less. **Three Steel Tanks**. Because construction and operation of the steel tanks would be generally the same as the Project, impacts on wetlands would remain less than significant with the Three Steel Tanks Alternative.
BIO-4: 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.	LTS	LTS-	LTS	**No Project**. Because the scope and magnitude of changes to the reservoir would be less extensive than with the Project, potential adverse effects related to interfering with the movements of fish or wildlife species or with migratory wildlife corridors or wildlife nursery sites would also be less.

TABLE 4-4 (CONTINUED)
COMPARISON OF THE PROJECT, NO PROJECT ALTERNATIVE, AND THREE STEEL TANKS ALTERNATIVE

Impact Statement	Significance[1]			Analysis
	Project	No Project	Three Steel Tanks Alternative	
Biological Resources (cont.)				
BIO-4 (cont.)				**Three Steel Tanks**. Because construction and operation of the steel tanks would be generally the same as the Project, impacts on the movement of any resident or migratory fish or wildlife species, migratory wildlife corridors, and wildlife nursery sites would remain less than significant with the Three Steel Tanks Alternative.
BIO-5: Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.	LTS	NI	LTS	**No Project**. Assuming no trees would be removed to facilitate repair of the existing reservoir, there would be no impact related to conflicting with local policies or ordinances protecting biological resources. **Three Steel Tanks**. Because construction and operation of the steel tanks would be generally the same as the Project, impacts related to conflicting with a local policy or ordinance would remain less than significant with the Three Steel Tanks Alternative.
Cultural Resources				
CUL-1: Cause a substantial adverse change in the significance of a historical resource, as defined in Section 15064.5.	LTS	LTS	LTS	**No Project, Three Steel Tanks**. Because the Central Reservoir is not considered a historical resource under CEQA, repairing the existing reservoir is not considered to be a significant impact.
CUL-2: Cause a substantial adverse change in the significance of an archaeological resource, pursuant to *CEQA Guidelines* Section 15064.5.	LTS	LTS	LTS	**No Project, Three Steel Tanks**. Similar to the Project, implementation of EBMUD's Standard Construction Specification 01 35 44, if needed, would render impacts associated with the inadvertent discovery of archaeological resources less than significant.
CUL-3: Disturb any human remains, including those interred outside of dedicated cemeteries.	LTS	LTS	LTS	**No Project, Three Steel Tanks**. Similar to the Project, implementation of EBMUD's Standard Construction Specification 01 35 44, if needed, would render impacts associated with the inadvertent discovery of human remains less than significant.
CUL-4: Cause a substantial adverse change in the significance of a tribal cultural resource as defined in Public Resources Code Section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe.	LTS	LTS	LTS	**No Project Three Steel Tanks**. Similar to the Project, implementation of EBMUD's Standard Construction Specification 01 35 44, if needed, would render impacts associated with the inadvertent discovery of tribal cultural resources less than significant.

TABLE 4-4 (CONTINUED)
COMPARISON OF THE PROJECT, NO PROJECT ALTERNATIVE, AND THREE STEEL TANKS ALTERNATIVE

Impact Statement	Significance[1]			Analysis
	Project	No Project	Three Steel Tanks Alternative	
Energy				
EN-1: Result in wasteful, inefficient, or unnecessary consumption of energy resources during Project construction, operation, or maintenance.	LTS	LTS-	LTS-	**No Project**. Because the scope and magnitude of changes to the reservoir would be less extensive than with the Project, the direct energy consumed by the No Project Alternative would also be less. Energy used would not be inefficient, wasteful, or unnecessary during construction, operation, or maintenance of the No Project Alternative. **Three Steel Tanks**. Direct energy consumed by the Three Steel Tanks Alternative during construction would be less than the Project due to the shorter construction period and fewer truck trips generated, which would reduce use of diesel-powered construction equipment used for the concrete tanks. However, energy used would not be inefficient, wasteful, or unnecessary and all construction equipment and practices under the alternative would also be subject to EBMUD's Standard Construction Specification 01 35 44, Section 3.4(A), which would reduce inefficient use of fuels by limiting idling, keeping engines properly tuned and maintaining appropriate tire pressure, requiring use of alternative-fueled construction equipment, and recycling or reuse of construction waste or demolition materials to the extent feasible. This impact under the Three Steel Tank Alternative would be less than significant (same as the Project).
Geology and Soils				
GEO-1: Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving: strong seismic groundshaking; seismic-related ground failure (liquefaction, lateral spreading); or landslides.	LTS	LTS-	LTS	**No Project**. The No Project Alternative would remove the existing reservoir roof, which does not meet seismic code requirements, and then install a new roof that does meets seismic code requirements. Additionally, because the scope and magnitude of changes to the reservoir would be less extensive than with the Project, the direct or indirect adverse effects related to strong seismic groundshaking, seismic-related ground failure, or landslides would also be less. **Three Steel Tanks**. Because construction and operation of the steel tanks would be generally the same as the Project, impacts from strong seismic groundshaking, seismic-related ground failure, and landslides would be less than significant with the Three Steel Tanks Alternative.
GEO-2: Result in substantial soil erosion or the loss of topsoil.	LTS	LTS-	LTS	**No Project**. Because the scope and magnitude of changes to the reservoir would be less extensive than with the Project, impacts related to substantial soil erosion or the loss of topsoil would also be less. **Three Steel Tanks**. Because construction and operation of the steel tanks would be generally the same as the Project, impacts from soil erosion or the loss of topsoil would be less than significant with the Three Steel Tanks Alternative.
GEO-3: Be located on strata or soil that is unstable or that would become unstable as a result of the Project, and potentially could result in on-site or off-site landslides, lateral spreading, subsidence (i.e., settlement), liquefaction, or collapse.	LTS	LTS-	LTS	**No Project**. The No Project Alternative would be located on the same strata or soil that the Project would occur on, but because the scope and magnitude of changes to the reservoir would be less extensive than with the Project, the potential for the strata or soil to become unstable as a result of implementation of the No Project Alternative would also be less. **Three Steel Tanks**. Because construction and operation of the steel tanks would be generally the same as the Project, impacts from unstable strata or soil would be less than significant with the Three Steel Tanks Alternative.

TABLE 4-4 (CONTINUED)
COMPARISON OF THE PROJECT, NO PROJECT ALTERNATIVE, AND THREE STEEL TANKS ALTERNATIVE

Impact Statement	Significance[1]			Analysis
	Project	No Project	Three Steel Tanks Alternative	
Geology and Soils (cont.)				
GEO-4: Be located on expansive soil creating substantial direct or indirect risks to life or property.	LTS	LTS-	LTS	**No Project**. The No Project Alternative would be located on the same soil that the Project would occur on, but because the scope and magnitude of changes to the reservoir would be less extensive than with the Project, the potential for the expansive soil to create substantial direct or indirect risks to life or property would also be less. **Three Steel Tanks**. Because construction and operation of the steel tanks would be generally the same as the Project, impacts from expansive soil would be less than significant with the Three Steel Tanks Alternative.
GEO-5: Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.	LTS	LTS-	LTS	**No Project**. The No Project Alternative would require less construction and excavation than the Project, and would therefore have less potential to directly or indirectly destroy a unique paleontological resource, site, or unique geologic feature. **Three Steel Tanks**. Because construction and operation of the steel tanks would be generally the same as the Project, impacts on paleontological resources would be less than significant with the Three Steel Tanks Alternative.
Greenhouse Gas Emissions				
GHG-1: Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment.	LTS	LTS-	LTS-	**No Project**. Because there would be less construction to repair the existing reservoir, construction-related greenhouse gas emissions that may have a significant impact on the environment would be lower than the Project. **Three Steel Tanks**. Greenhouse gas (GHG) emissions generated during construction of the Three Steel Tanks Alternative would be less than the Project due to the shorter construction period and fewer construction truck trips. There would be no increase in operational GHG emissions over existing conditions for either the Project and the alternative. This impact would be less than significant.
GHG-2: Conflict with a plan, policy, or regulation adopted for the purpose of reducing greenhouse gas emissions.	LTS	LTS-	LTS-	**No Project**. GHG emissions would primarily be generated during construction of the No Project Alternative and would be less than the Project due to less construction activities needed to repair the existing reservoir. Generated emissions would not be inconsistent with the GHG reduction goals of Assembly Bill 32 and the *2017 Scoping Plan Update,* Senate Bill 32, the BAAQMD's *2017 Clean Air Plan*, and the Oakland Energy and Climate Action Plan. This impact would be less than significant. **Three Steel Tanks**. GHG emissions would primarily be generated during construction of the Three Steel Tanks Alternative and would be less than the Project due to a shorter construction period. Generated emissions would not be inconsistent with the GHG reduction goals of Assembly Bill 32 and the *2017 Scoping Plan Update,* Senate Bill 32, the BAAQMD's *2017 Clean Air Plan*, and the Oakland Energy and Climate Action Plan. This impact would be less than significant.

TABLE 4-4 (CONTINUED)
COMPARISON OF THE PROJECT, NO PROJECT ALTERNATIVE, AND THREE STEEL TANKS ALTERNATIVE

Impact Statement	Significance[1]			Analysis
	Project	No Project	Three Steel Tanks Alternative	
Hazards and Hazardous Materials				
HAZ-1 and HAZ-2: Create a significant hazard to the public or the environment through the routine transport, use, disposal, of hazardous materials. 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.	LTS	LTS	LTS	**No Project, Three Steel Tanks**. Similar to the Project, the required compliance with the numerous laws and regulations along with implementation of EBMUD Standard Construction Specifications and Procedures during Project construction, would ensure that impacts related to hazardous materials and wastes would be less than significant.
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.	LTS	LTS	LTS	**No Project, Three Steel Tanks.** Similar to the Project, the required compliance with the numerous laws and regulations, along with implementation of EBMUD Standard Construction Specifications and Procedures during Project construction, would ensure that impacts associated with handling hazardous materials within one-quarter mile of a school would be less than significant.
HAZ-4: Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.	LTS	LTS	LTS	**No Project, Three Steel Tanks.** Similar to the Project, the required compliance with the numerous laws and regulations, along with implementation of EBMUD Standard Construction Specifications and Procedures, would ensure that implementation of emergency plans was not impaired.
Hydrology and Water Quality				
HYD-1: Violate water quality standards or waste discharge requirements, or otherwise substantially degrade water quality.	LTS	LTS	LTS	**No Project, Three Steel Tanks.** Similar to the Project, the required compliance with the numerous laws and regulations, along with implementation of EBMUD Standard Construction Specifications and Procedures, would ensure that water quality was not degraded.
HYD-2: Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the Project may impede sustainable groundwater management of the basin.	LTS	LTS	LTS	**No Project**. Repair of the reservoir liner would not be expected to interfere with groundwater. **Three Steel Tanks**. Because construction and operation of the steel tanks would be generally the same as the Project, impacts related to decreasing groundwater supplies or interfering with groundwater recharge would be less than significant with the Three Steel Tanks Alternative.
HYD-3a: Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would result in substantial erosion or siltation on or off site.	LTS	LTS	LTS	**No Project**. Repair of the reservoir would not be expected to substantially alter existing drainage patterns compared to existing conditions; there would be no change in the course or a stream nor any increase in impervious surfaces at the site. **Three Steel Tanks**. Because construction and operation of the steel tanks would be generally the same as the Project, impacts from erosion or siltation on or off site would be less than significant with the Three Steel Tanks Alternative.
HYD-3b: Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or through the addition of impervious surfaces, in a manner that would substantially increase the rate or amount of surface run-off that would result in flooding on or off site.	LTS	LTS	LTS	**No Project**. Repair of the reservoir would not be expected to substantially alter existing drainage patterns compared to existing conditions; there would be no change in surface runoff at the site. **Three Steel Tanks**. Because construction and operation of the steel tanks would be generally the same as the Project, impacts from increasing the rate or amount of surface run-off in a manner that would result in flooding on or off site would be less than significant with the Three Steel Tanks Alternative.

TABLE 4-4 (CONTINUED)
COMPARISON OF THE PROJECT, NO PROJECT ALTERNATIVE, AND THREE STEEL TANKS ALTERNATIVE

Impact Statement	Significance[1]			Analysis
	Project	No Project	Three Steel Tanks Alternative	
Hydrology and Water Quality (cont.)				
HYD-3c: Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or through the addition of impervious surfaces, in a manner that would create or contribute run-off water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted run-off.	LTS	LTS	LTS	**No Project**. Repair of the reservoir would not be expected to substantially alter existing drainage patterns compared to existing conditions; there would be no increase in impervious surfaces at the site. **Three Steel Tanks**. Because construction and operation of the steel tanks would be generally the same as the Project, impacts from creating run-off water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted run-off would be less than significant with the Three Steel Tanks Alternative.
HYD-3d: Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or through the addition of impervious surfaces, in a manner that would impede or redirect flood flows.	LTS	LTS	LTS	**No Project**. Repair of the reservoir would not be expected to substantially alter existing drainage patterns compared to existing conditions; there would be no change in surface runoff at the site. **Three Steel Tanks**. Because construction and operation of the steel tanks would be generally the same as the Project, impacts from impeding or redirecting flood flows would be less than significant with the Three Steel Tanks Alternative.
HYD-4: Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan.	LTS	LTS	LTS	**No Project, Three Steel Tanks**. Similar to the Project, the required compliance with the numerous laws and regulations, along with implementation of EBMUD Standard Construction Specifications and Procedures, would ensure that there would be no obstruction of a water quality control plan or sustainable groundwater management plan.
Noise				
NOI-1: Result in the generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the Project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.	SU	SU-	SU	**No Project**. Although the magnitude of construction noise would be less with repair of the reservoir compared to the Project (e.g., because demolition and construction activities would be much less extensive), significant and unavoidable noise impacts would still result from RCS construction and nighttime pipeline connection activities. Three Steel Tanks. Construction noise generated by the Three Steel Tanks Alternative would be similar to the Project. Those construction activities that would result in significant and unavoidable noise impacts would be the same as with the Project, although the shorter construction period for tank and valve structure construction would shorten the duration of some (mitigable) noise impacts.
NOI-2: Result in the generation of excessive groundborne vibration or groundborne noise levels.	LTS	LTS-	LTS	**No Project**. The extent and magnitude of groundborne vibration and noise from repair of the existing reservoir would be less than with the Project because the extent and intensity of most construction activities would be less. **Three Steel Tanks**. Groundborne noise and vibration generated by construction of the Three Steel Tanks Alternative would be similar to the Project but, due to the shorter construction period, the duration of the impacts would be reduced and exposure of nearby receptors would also be reduced. The impact under the Three Steel Tanks Alternative would be less than significant.

TABLE 4-4 (CONTINUED)
COMPARISON OF THE PROJECT, NO PROJECT ALTERNATIVE, AND THREE STEEL TANKS ALTERNATIVE

Impact Statement	Significance[1]			Analysis
	Project	No Project	Three Steel Tanks Alternative	
Recreation				
REC-1: 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.	LTS	LTS-	LTS	**No Project**. Because there would be less construction needed to repair the existing reservoir, construction impacts related to increasing the use of existing parks or other recreation facilities would be lower than the Project. **Three Steel Tanks**. Because construction and operation of the steel tanks would be generally the same as the Project, impacts related to increasing the use of existing parks or other recreational facilities would be less than significant with the Three Steel Tanks Alternative.
Transportation				
TRA-1: Conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities.	LSM	LSM-	LSM-	**No Project**. Repair of the existing reservoir would require fewer truck trips than the Project. The No Project Alternative would not include the Redwood Day School Access Driveway, and as a result, would not create potential conflicts with existing vehicular, pedestrian or bicycle traffic. **Three Steel Tanks**. The Three Steel Tanks Alternative would require approximately 10 percent fewer materials truck trips, as compared to the Project. The increases in traffic volumes due to construction activities under the Project may be noticeable to local residents, but would be less noticeable under the Three Steel Tanks Alternative due to the reduced number of construction truck trips and the reduced construction duration. Construction of the Three Steel Tanks Alternative would generate less vehicle miles traveled compared with the Project and, similar to the Project, would not increase the physical roadway capacity or cause traffic volumes along local streets to exceed or approach the carrying capacity of the roadways or cause queuing issues. The potential for conflicts between construction traffic and transit vehicles, bicycles, pedestrians, and parking availability would be also be incrementally less with the Three Steel Tanks Alternative compared to the Project for the same reasons (i.e., reduced construction traffic and reduced construction duration). The traffic impact associated with the Redwood Day School Access Driveway would be the same as with the Project.
TRA-2: Conflict or be inconsistent with *CEQA Guidelines* Section 15064.3, Subdivision (b).	NI	NI	NI	**No Project, Three Steel Tanks**. Neither alternative would meet any of the criteria for consideration of impacts on VMT for public service lands uses. There would be no impact associated with VMT, and the impact would not change as compared to the Project.
TRA-3: Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).	LSM	LSM-	LSM-	**No Project**. Construction traffic would utilize the same routes as for the Project. The increased construction traffic on public roadways could potentially decrease the safety of vehicles, bicyclists, and pedestrians but to a lesser degree than with the Project because repair of the existing reservoir would require far fewer truck trips. **Three Steel Tanks**. The construction impact on traffic operations along East 27th Street near Manzanita Community School would be significant (similar to the Project) under the Three Steel Tanks Alternative, even though there would be approximately 10 percent fewer materials truck trips and the duration of construction would be shorter compared to the Project. However, implementation of Mitigation Measure TRA-2 (as part of the Traffic Control Plan, include traffic

TABLE 4-4 (CONTINUED)
COMPARISON OF THE PROJECT, NO PROJECT ALTERNATIVE, AND THREE STEEL TANKS ALTERNATIVE

Impact Statement	Significance[1]			Analysis
	Project	No Project	Three Steel Tanks Alternative	
Transportation (cont.)				
TRA-3 (cont.)				control measures for trucks traveling along East 27th Street) would also apply to the Three Steel Tanks Alternative and would reduce this potential impact to less than significant by scheduling truck trips to avoid drop-off and pick-up hours for the schools. Adjustment of truck operating hours would allow for safer and more efficient movement of people picking up and dropping children off at school. Although the construction period and number of trucks would be substantially less under the No Project Alternative, Mitigation Measure TRA-2 would be necessary to mitigation impacts during haul truck use. If the Redwood Day School Access Driveway Design Option were adopted and the school constructs a new private driveway connecting Ardley Avenue with the school, most of the exiting vehicles are expected to make right-turns onto Ardley Avenue to access I-580, although some vehicles would make left-turns, which could cause vehicle delay and increase the potential for conflicts between vehicular traffic, pedestrians, and bicyclists along Ardley Avenue. Implementation of Mitigation Measure TRA-1 would reduce this impact, and the impact would not change as compared to the Project.
TRA-4: Result in inadequate emergency access.	LTS	LTS	LTS	**No Project, Three Steel Tanks**. Impacts on emergency access would be less than significant, and would not change as compared to the Project, because the implementation of EBMUD's Standard Construction Specification 01 55 26, Traffic Regulation, which requires a Traffic Control Plan, would include a description of emergency response vehicle access to ensure that emergency responders have access during construction. Emergency vehicles would be able to access the roadways surrounding the site during operations in the same way as under existing conditions.

[1] NOTES:
LSM = less-than-significant impact, with mitigation.
LTS = less-than-significant impact.
NI = no impact.
SU = significant, unavoidable impact.
(-) or (+) = lower or higher end of impact range, respectively.

4.9 Environmentally Superior Alternative

Construction for both the Project and the Three Steel Tanks Alternative would result in significant and unavoidable noise impacts during the Site Preparation and Demolition, Tank and Valve Structure Construction, and Site Restoration construction phases. Because construction of steel tanks would take less time and require approximately 10 percent fewer materials truck trips, the Three Steel Tanks Alternative would reduce the magnitude and duration of some construction-related air quality, greenhouse gas emissions, noise, and transportation impacts compared to the Project.

During operation, the Project and the Three Steel Tanks Alternative would have significant impacts associated with Redwood Day School Access Driveway Design Option, which could occur under either the Project or the Three Steel Tanks Alternative, and which would be mitigated to less-than-significant levels. Additionally, the Three Steel Tanks Alternative would require periodic recoating (approximately every 20 years), which involves sandblasting the tanks to remove paint and corrosion prior to recoating. Lastly, because the steel tanks would be approximately 13-feet taller than with the Project, less-than-significant aesthetic impacts related to obstruction of scenic vistas and changes in the visual character of the site would be incrementally worse with the Three Steel Tanks Alternative, but would remain less than significant.

Only the No Project Alternative, which would include the reservoir repair activities described in Section 4.2.1, would avoid some of the significant and unavoidable noise impacts of the Project (as well as the Three Steel Tanks Alternative), although noise impacts related to RCS construction and construction of pipeline connections would be the same as under the Project. The No Project Alternative is thus environmentally superior because it eliminates some of the significant and unavoidable adverse impacts associated with construction noise. However, as shown above in Table 4-3, the No Project Alternative does not meet the Project's primary operational objectives, nor does it meet most of the Project's secondary operational objectives, although it would meet the construction objectives.

Section 15126.6(e)(2) of the *CEQA Guidelines* specifies that "If the environmentally superior alternative is the 'no project' alternative, the EIR shall also identify an environmentally superior alternative among the other alternatives." The Three Steel Tanks Alternative would reduce the magnitude and duration of some construction-related air quality and transportation impacts, which are mitigable to less than significant. The Three Steel Tanks Alternative would not reduce the significant and unavoidable construction period noise impacts. Because of the significant impacts associated with the Three Steel Tanks Alternative, there is no clearly environmentally superior alternative. The Project as proposed, is environmentally superior to the alternatives. EBMUD has worked with the community to incorporate suggestions in the landscape design of the Project, and has developed a Project that would provide long-term water supply reliability without any significant long-term operational impacts.

4.10 References

AECOM. 2017. *Central Reservoir Replacement Value Engineering Project*, Final Report. May 24, 2017.

EBMUD (East Bay Municipal Utility District). 2010. *West of Hills Master Plan*. March 2010.

EBMUD. 2017. Memo from Bill Maggiore, Aaron Hope, to David Rehnstrom re: Central Reservoir Replacement Project Final Project Recommendation. April 12, 2017.

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CHAPTER 5
Other CEQA Considerations

5.1 Significant and Unavoidable Impacts

East Bay Municipal Utility District (EBMUD) will be required to adopt Findings and prepare a Statement of Overriding Considerations for unavoidable, adverse impacts as part of its approval of the Central Reservoir Replacement Project (Project). The Project would not entail any operational impacts, and as described in the Environmental Impact Report (EIR) analysis the majority of impacts during construction can be reduced to a less-than-significant level. The only significant and unavoidable impacts identified for the Project are temporary construction-period noise impacts. The following impact was determined to be significant and unavoidable:

Impact NOI-1: Result in the generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the Project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies. (Criterion 1)

The City of Oakland Noise Ordinance imposes differing noise level limits depending on the time of day when construction occurs as well as the overall duration of construction, which are also considered in this analysis. The ordinance has separate standards for short-term construction activity, defined as less than 10-days, and long-term construction activity, defined as more than 10-days. Given that the Project construction would occur over multiple years, the long-term standards are applied in this analysis.

The City of Oakland Noise Ordinance establishes distinct noise level limits for construction activity occurring between the less noise-sensitive daytime hours of 7:00 a.m. and 7:00 p.m. Additionally, the ordinance establishes that construction noise during nighttime hours shall not exceed the nighttime standards established for stationary sources, as summarized in Section 3.10, Table 3.10-5. However, these standards recognize a different increment of nighttime hours (10:00 p.m. to 7:00 a.m.). Consequently, during the nighttime hours established for construction (7:00 p.m. to 7:00 a.m.), two separate standards would be applicable. Table 3.10-7 in Section 3.10 summarizes the construction noise standards for daytime and the two nighttime periods.

Even with the incorporation of EBMUD's standard practices and procedures for noise, as described in Section 3.10, site preparation and demolition and site restoration related noise impacts from the Project would still be above the ordinance noise limit for the closest receptors. Mitigated values in Section 3.10, consider a noise reduction from a temporary sound barrier along the eastern project boundary with Redwood Day School. While a barrier was considered to shield noise at all sensitive receptors around the Project site, there is insufficient space along Ardley Avenue and at the East 29th Street/25th Avenue intersection because of the proximity of the property line to the Project construction area. A noise barrier on the border with the Southern Residences and the 23rd Avenue Residences would be ineffective because the ground elevation outside of the Project construction area where the noise barrier can be located is too low relative to construction and construction noise would travel over the 16-foot tall sound barrier. Even after considering EBMUD standard practices and procedures, which include a range of noise control measures, and after incorporation of Mitigation Measure NOI-1, which includes a temporary noise barrier adjacent to the Redwood Day School, noise from site preparation and demolition and site restoration activities would exceed the ordinance levels for all receptors. Therefore, noise increases associated with site preparation and demolition and site restoration activities are considered to be significant and unavoidable because, after implementation of feasible mitigation, noise levels would still exceed the daytime (7:00 a.m. to 7:00 p.m.) thresholds established by Section 17.120 of the Oakland Planning Code. Noise would exceed the ordinance levels intermittently, when site preparation and demolition and site restoration activities are closest to receptors. Based on the duration and location of all construction activities, including site preparation and demolition and site restoration, as they progress around the perimeter of the reservoir, no location (or receptor) would experience noise levels in excess of ordinance levels for more than a total of about 30 work days over the entire 6-year construction period.

Additionally, there would be a significant construction noise impact at Southern Residences affected by the RCS construction activities and the pipeline connection activities. Even with the incorporation of EBMUD's standard practices and procedures for noise control measures, the combined operation of all equipment would exceed the daytime (7:00 a.m. to 7:00 p.m.) 65-dBA long-term construction noise standard at the Southern Residences and the impact associated with daytime RCS construction and pipeline connection activities would be significant and unavoidable. Additionally, nighttime pipeline connection activities would be subject to the City's L_{33} standard, which for this area was monitored to be 46-dBA. The nighttime work would exceed 46-dBA and represent a short-term significant noise impact over two consecutive nights. Mitigation Measure NOI-2 states that EBMUD will offer residents within 500-feet[1] of the pipeline connection construction site alternative lodging during this 2-day period. Notwithstanding this mitigation, this 2-day nighttime noise impact is also identified as significant and unavoidable because the noise ordinance would still be exceeded.

1 The 500-foot distance applies only to residences within 500 feet to construction activities, and is determined by applying spherical spreading losses (6 dBA per doubling of distance) to a noise level of 80 dBA (Leq) at 50 feet, resulting in a noise level of 60 dBA (Leq) at 500 feet. While an exterior noise level of 60 dBA (Leq) would still exceed the 46-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 (Leq) 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 two nights.

Significance Determination Before Mitigation

Significant. Because noise levels associated with site preparation and demolition, substructure construction, tank and valve structure construction, and site restoration would exceed the following City of Oakland Noise Ordinance standards:

- Daytime (7:00 a.m. to 7:00 p.m.) standard of 65-dBA applicable to adjacent residential and school uses;
- Daytime (7:00 a.m. to 7:00 p.m.) standard of 70-dBA applicable to the Central Reservoir Recreation Area; and
- Evening and nighttime (7:00 p.m. to 7:00 a.m.) standard of existing ambient noise levels.

Noise impacts associated with those phases of construction would be potentially significant and would therefore require mitigation.

Mitigation Measure NOI-1: Noise Control Measures

EBMUD shall erect a 16-foot tall temporary noise barrier along EBMUD's property adjacent to the Redwood Day School for the entire construction duration. The noise barrier will be Sound Transmission Class (STC) rated and specific to sound attenuation applications. There may be some periods of construction when the noise barrier may be temporarily moved or dismantled to accommodate the Project construction area. EBMUD will schedule construction activities outside of normal school hours when it is feasible to do so if heavy construction equipment, including but not limited to impact equipment, is operated within 100 feet of the closest classroom or if the noise barrier needs to be temporarily removed to accommodate construction.

Mitigation Measure NOI-2: Off-site Accommodations for Affected Nighttime Receptors

At least ten (10) days in advance, EBMUD will notify residents of the Southern Residences that could be affected by nighttime (10:00 p.m. to 7:00 a.m.) pipeline connection construction near the 25th Avenue/East 29th Street intersection. Residences within 500-feet of the pipeline connection construction site 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 5 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.). This measure would only be implemented if nighttime construction occurs.

Significance Determination after Mitigation

The noise impact described above would be significant and unavoidable for site preparation and demolition, tank and valve structure construction activities (RCS construction and nighttime [7:00 p.m. to 7:00 a.m.] pipeline connection work), and site restoration phases of reservoir construction. Mitigation Measures NOI-1 and NOI-2 would reduce noise impacts from CDSM and daytime tank and valve structure construction activities to less than significant levels. However, there may still be times when operations associated with site preparation and demolition as well as site restoration activities would exceed the 65-dBA long-term daytime construction noise standard of the City of Oakland's noise ordinance. The potential also exists for nighttime work to result in noise levels exceeding nighttime standards for the two consecutive nights of pipeline connection activity. Consequently, noise from the site preparation and demolition phase, tank and valve structure construction activities (RCS construction and nighttime pipeline connection work), and site restoration phase would be significant and unavoidable.

5.2 Irreversible and Irretrievable Commitments of Resources

The State of California Environmental Quality Act (CEQA) Guidelines (Section 15126(c)) require that an EIR include a discussion of the significant irreversible environmental changes that would be caused by a project should it be implemented.

Irreversible commitment of resources occurs as a result of the use or destruction of a specific resource (e.g., minerals extraction, destruction of cultural resources) which cannot be replaced or, at a minimum, restored over a long period of time. Irretrievable commitment of resources refers to actions resulting in the loss of production or use of natural resources and represents the effects that the use of nonrenewable resources could have on future generations (e.g., land conversion to new uses; construction of levees preventing the natural flooding of floodplains).

The Project would result in the irreversible and irretrievable commitment of the following resources during construction, operation, and maintenance:

- Construction materials such as asphalt, concrete, and steel;
- Energy resources such as electricity, fuel, oil, and natural gas for construction equipment; and
- Nonrenewable materials such as gravel and petroleum products.

Similar to any infrastructure project of its size and kind, the Project would require the commitment of material resources to the construction of new facilities. However, it is likely that materials such as steel and concrete would be recycled off site following the life of the Project. No other irreversible permanent changes, such as those that might result from construction of a large-scale mining project, a hydroelectric dam, or other industrial project, would result from development of the Project. Construction of the new tanks would occur within the footprint of the existing Central Reservoir site and pipelines would be underground, and would not result in the irreversible or irretrievable commitment of the Project area as a land resource.

Operation of the Project would be similar to current operations and would not require commitment of additional energy resources, which would only be needed for construction.

5.3 Growth-Inducing Impacts

CEQA requires the Lead Agency to evaluate whether a Project would directly or indirectly induce growth of population, economic development, or housing construction. Specifically, *CEQA Guidelines* Section 15126.2(d) states the need to evaluate the potential for a project to "foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment. Included in this are projects which would remove obstacles to population growth (a major expansion of a waste water treatment plant might, for example, allow for more construction in service areas)." Directly induced growth is associated with residential or commercial development projects that would result in a population increase or in an increase in the number of employees. Indirectly induced growth is associated with reducing or removing barriers to growth, or creating a condition that encourages additional population or economic activity. Ultimately, both types of growth induction result in population increase, which "may tax existing community service facilities, requiring construction of new facilities that could cause significant environmental effects" (*CEQA Guidelines* Section 15126.2[d]). Other potential environmental impacts related to growth include increased traffic, air emissions, and noise; degradation of water quality; loss of sensitive biological and cultural resources; increased demand on public services and infrastructure; and changes in land use and conversion of agricultural or open space to accommodate development.

Under CEQA, growth inducement is not considered necessarily detrimental, beneficial, or of little significance to the environment. Projects are considered to have growth-inducing implications when economic, housing, or population growth would be stimulated, either directly or indirectly.

The Project would replace the aging 154-million-gallon Central Reservoir with three new 17-million-gallon tanks within the existing reservoir basin. The Project is necessary because Central Reservoir is at the end of its useful life and requires removal and disposal of polychlorinated biphenyls in the reservoir's interior coating. The Project is needed to improve water service reliability, water quality, and operations and maintenance as discussed in Section 2.3, Project Purpose and Objectives. The Project would not increase storage capacity and would not increase the availability of water supply to the Central Pressure Zone, which is served by the Central Reservoir.

The Project would have no potential to directly foster population growth or to result in the construction of additional housing in the Central Pressure Zone because the amount of water stored at the site would be reduced. Operation of the Project would not require new permanent employees who would generate a demand for new housing. Project construction would contribute to local economic growth from construction expenditures for labor and materials, but given the existing population of unemployed construction workers, it is expected that all Project construction labor needs would be readily met by current residents of the region. As such, the Project has no potential to directly induce growth.

Local land use plans provide for land use development patterns and growth policies that allow for the orderly expansion of urban development supported by adequate urban public services, such as water supply, roadway infrastructure, sewer service, and solid waste service. Typically, the growth-inducing potential of a project or program would be considered significant if it encourages growth or a concentration of population in excess of what is projected in the adopted general plan of the community in which the project is located, or significantly exceeds the population and employment projections made by regional planning agencies.

In accordance with California Government Code Section 65300, land use agencies in the EBMUD service area, such as the City of Oakland, develop and adopt long-term planning documents such as general plans for the physical development within their jurisdiction. These planning documents determine the nature and intensity of land uses to be served by EBMUD. The City of Oakland's General Plan, including components that influence water demand such as the Land Use and Transportation Element (City of Oakland, 1998) and the Housing Element (City of Oakland, 2014), was adopted by the Oakland City Council and amended over time. For example, the City of Oakland Housing Element was updated in 2015 and identified opportunities for housing on new, larger tracts of land available for subdivision and opportunities for infill growth within areas of the City of Oakland already designated for development consistent with adopted General Plan policies. Demand associated with Oakland's planned growth, as set forth in those approved planning documents, was accounted for in EBMUD's *2040 Demand Study* (EBMUD, 2009), which was used to determine Project sizing and design.

In 2014, EBMUD completed a *Mid-Cycle Demand Assessment* (EBMUD, 2014), which updated the *2040 Demand Study* projections based on recent changes in development within its service area, including within the City of Oakland, due to General Plan changes and also due to drought and economic conditions after the *2040 Demand Study* was originally adopted. The *Mid-Cycle Demand Assessment* found that the magnitude of demand projections would remain the same but the timing of growth would be delayed. Thus, the original demand estimates developed for the City of Oakland remain valid and are tied to planned development therein.

As explained above, the Project would serve planned land use changes and redevelopment projects within the City of Oakland as identified in the City of Oakland's General Plan, which informed the water demands identified in the *2040 Demand Study*. The project is designed to meet the demand projections of the *2040 Demand Study*. Because the *2040 Demand Study's* demand projections for the City of Oakland are based on planned development already disclosed and incorporated into the City of Oakland's General Plan and subsequent amendments thereto, implementation of the Project would not support growth beyond planned levels or in areas not planned for development by the

City of Oakland. The Project would neither directly nor indirectly support unplanned economic expansion, population growth, or residential construction within the City of Oakland or elsewhere in the EBMUD service area. Therefore, any potential growth-inducing impacts from the Project would be less than significant.

5.4 Cumulative Impacts

The cumulative impact analysis for each individual resource topic is included in each resource section.

5.5 References

City of Oakland, *General Plan, Housing Element 2015-2023*, December 9, 2014.

City of Oakland, *General Plan*, *Land Use and Transportation Element*, March 1998.

East Bay Municipal Utility District (EBMUD), *2040 Demand Study, Water Supply Management Program 2040*, February 2009.

EBMUD, *2040 Demand Study, Mid-cycle Demand Assessment*, October 2014.

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CHAPTER 6
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