

**Mokelumne Aqueduct System Routine Maintenance Project**  
**Counties of Calaveras, San Joaquin, Contra Costa,**  
**and Alameda, California**  
**Initial Study / Mitigated Negative Declaration**



**EAST BAY MUNICIPAL UTILITY DISTRICT**

**December 2019**





December 2019

NOTICE OF INTENT TO ADOPT A MITIGATED NEGATIVE DECLARATION
Mokelumne Aqueduct System Routine Maintenance Project

Project Title: Mokelumne Aqueduct System Routine Maintenance Project

Lead Agency: East Bay Municipal Utility District (EBMUD)

Project Location: The Mokelumne Aqueducts originate at EBMUD's Pardee Reservoir in the Sierra Foothills and extends from the West Portal in Campo Seco for 82 miles through the Central Valley, along the Calaveras River and the Sacramento-San Joaquin River Delta, to the East Portal facility in the EBMUD service area in the East Bay.

Project Description: The Project involves the routine maintenance of aqueduct system facilities at access road and aqueduct stream crossing locations. Access roads are critical to repairs, maintenance, and operations of the aqueducts and maintenance activities provide for safe travel on the access roads at stream crossings, while ensuring adequate drainage for ditches, swales and other watercourses.

Project Objective: The Project's objective is to maintain the functional and structural integrity of EBMUD-owned aqueduct system facilities.

Schedule: Key milestones for project implementation are summarized as follows:

- Complete Environmental Review December 2019
Begin Maintenance Work February 2020

Environmental Determination: Pursuant to the requirements of the California Environmental Quality Act, an Initial Study was prepared for the Project. Based on the results of the Initial Study, it was determined that project-related maintenance work could potentially generate environmental impacts to biological resources, cultural resources, geology and soils, hazards and hazardous materials, hydrology and water quality, noise, tribal cultural resources, and wildfire.

Environmental Mitigation: All impacts will be reduced to Less than Significant levels by implementation of mitigation measures.

Public Comment/Review: The Initial Study /Mitigated Negative Declaration is available for review at:

- East Bay Municipal Utility District, 375 11th Street, Oakland, CA 94607
EBMUD website (www.ebmud.com/AqueductRMA)

In accordance with Section 15073 of the California Environmental Quality Act Guidelines, this Mitigated Negative Declaration is available for public review from December 13, 2019 through January 13, 2020. Written comments on this proposed Mitigated Negative Declaration must be received no later than 4:30 pm on January 13, 2020.

12/9/19
Date

Clifford C. Chan, Director of Operations and Maintenance

*This page intentionally left blank.*

**TABLE OF CONTENTS**

**Chapter 1 Summary..... 1-1**

    1.1 Project Objective ..... 1-1

    1.2 Purpose of Initial Study/ Mitigated Negative Declaration..... 1-2

    1.3 Summary of Environmental Considerations..... 1-2

    1.4 Circulation of the IS/MND ..... 1-2

**Chapter 2 Project Description ..... 2-1**

    2.1 Project Overview ..... 2-1

    2.2 Maintenance Activities ..... 2-17

    2.3 Activities Not Covered Under the Proposed Routine Maintenance ..... 2-19

    2.4 Project Implementation..... 2-20

    2.5 EBMUD Practices and Procedures ..... 2-22

    2.6 Permits and Approvals..... 2-22

**Chapter 3 Environmental Analysis ..... 3-1**

    3.1 Environmental Factors Potentially Affected..... 3-2

    3.2 Environmental Determination ..... 3-2

    3.3 Evaluation of Environmental Impacts and Initial Study Checklist..... 3-3

**Chapter 4 References ..... 4-1**

**TABLES**

Table 2-1: Typical Equipment Use by Maintenance Activity ..... 2-21

Table 2-2: Permits and Regulatory Requirements Potentially Applicable to the Project..... 2-23

Table 3-1: Thresholds of Significance for Air Districts in the Project Area ..... 3-10

Table 3-2: Criteria Pollutant Emissions during Maintenance Activities ..... 3-12

Table 3-3: Special-Status Species with Potential to Occur in the Project Sites ..... 3-19

Table 3-4: Sensitive Natural Communities Occurring in the Aqueduct System Channels ..... 3-59

Table 3-5: Streams within the Aqueduct System by Channel Type..... 3-61

Table 3-6: Average Annual Impacts Anticipated from Project Maintenance Activities..... 3-62

Table 3-7: Recorded Archaeological Resources within 200-feet of Aqueduct System Stream  
Crossings..... 3-66

Table 3-8: Project Fossil Fuel Use ..... 3-71

Table 3-9: General Plan and Noise Ordinance Standards ..... 3-96

Table 3-10: Predicted Noise Levels for Construction Equipment..... 3-98

Table 3-11: Construction Equipment and Vibration Distance ..... 3-100

Table 3-12: Native American Correspondence ..... 3-110

**FIGURES**

Figure 2-1: Regional Location..... 2-3  
Figure 2-2: East Bay Water Service Area Facilities ..... 2-5  
Figure 2-3: Maintenance Site Locations..... 2-9

**APPENDICES**

- A Detailed Project Alignment Sheets
- B EBMUD Practices and Procedures
- C Air Quality, Energy, and Greenhouse Gas Emission Modeling and Calculations
- D Mitigation Monitoring and Reporting Plan

## ACRONYMS AND ABBREVIATIONS

Basin Plan	Water Quality Control Plan
BMPs	Best Management Practices
Cal Fire	California Department of Forestry and Fire Protection
CBC	California Building Code
CCR	California Code of Regulations
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CIPs	Capital improvement projects
CRHR	California Register of Historical Resources
DBH	diameter at breast height
DTSC	Department of Toxic Substance Control
DWR	California Department of Water Resources
EBMUD	East Bay Municipal Utility District
GIS	Geographic Information System
HDPE	high-density polyethylene
IS/MND	This Initial Study/ Mitigated Negative Declaration
LSA	Lake and Streambed Alteration
LSAA	Lake and Stream Alteration Agreements
NAHC	Native American Heritage Commission
NRHP	National Register of Historic Places
PRC	Public Resource Code
Project	Mokelumne Aqueduct Routine Maintenance Agreement Renewal Project
PVC	polyvinyl chloride
RMA	Routine Maintenance Agreement
ROW	right-of-way
RWQCB	Regional Water Quality Control Boards
SGMA	2014 Sustainable Groundwater Management Act
TCR	Tribal Cultural Resource
USL	Upper San Leandro
°F	degrees Fahrenheit

*The page intentionally left blank.*



# CHAPTER 1

## SUMMARY

---

EBMUD owns and operates a raw water conveyance system, comprised of an approximately 100-mile-long pipeline system that includes the Mokelumne Aqueducts, the Lafayette Aqueducts, the Moraga Aqueduct, the Briones Aqueduct, and the Upper San Leandro (USL) Aqueduct that supplies water from the Mokelumne River to the EBMUD service area within the East San Francisco Bay area (East Bay).

### 1.1 Project Objective

The Mokelumne Aqueduct System Routine Maintenance Project (Project) involves the routine maintenance of aqueduct facilities at access road and aqueduct stream crossing locations that require Fish and Game Code Section 1602 Lake and Stream Alteration Agreements (LSAAs) authorized by the California Department of Fish and Wildlife (CDFW). Access roads are critical to repairs, maintenance, and operations of the aqueducts and they provide for safe travel at stream crossings, while ensuring adequate drainage for ditches, swales and other watercourses. Routine maintenance of the access road stream crossings is ongoing due to changing conditions resulting from weather events, deterioration of culverts and normal use. Routine maintenance work is also required due to deterioration of culverts, headwalls and/or weather conditions that could affect the integrity of the aqueduct pipelines. Routine maintenance activities occur every one to five years in the stream zones of the Project depending on location and maintenance needs.

EBMUD performs routine maintenance activities to maintain the functional and structural integrity of its facilities. EBMUD's maintenance approach requires a clear understanding of the maintenance needs at a site and identifying the specific location, extent, and suite of maintenance activities to be implemented. EBMUD's approach is also built on having a comprehensive understanding of a stream's site-specific function and process, and the natural and aquatic resources at the location where maintenance is required. Understanding these resources, their locations, and how they interact guides EBMUD on how, where, and when routine maintenance activities should occur.

EBMUD's routine maintenance program includes the following categories of activities to maintain the functional and structural integrity of EBMUD-owned facilities:

- *Sediment and Debris Removal* - Removal of debris, sediment, vegetation, rubbish, downed trees, and other material that could obstruct the natural flow in channels;
- *Vegetation Management* - Control and removal of weeds, grasses, emergent vegetation, and woody vegetation in channels and on banks;
- *Maintenance and Repair of Culverts, Road Crossings, and Other Structures* - Maintenance, repair and replacement of roads, culverts and drainage and erosion control structures (e.g., gates, barricades, bridges, minor repainting with hand tools, minor geotechnical sampling); and
- *Bank and Levee Repair and Erosion Protection* - Erosion control repairs and bank stabilization.

## **1.2 Purpose of Initial Study/ Mitigated Negative Declaration**

This Initial Study/ Mitigated Negative Declaration (IS/MND) has been prepared in accordance with the California Environmental Quality Act (CEQA), under which the Mokelumne Aqueduct System Routine Maintenance Project constitutes a “Project”. EBMUD, as the lead agency under CEQA, will consider the potential environmental impacts of Project activities when it considers whether to approve the Project. Mitigation measures have been incorporated into the Project to mitigate potentially significant impacts identified in the IS/MND such that no significant impacts will occur.

## **1.3 Summary of Environmental Considerations**

As discussed in this IS/MND, project-related maintenance work could potentially generate environmental impacts to biological resources, cultural resources, hazards and hazardous materials, hydrology and water quality, noise, tribal cultural resources, and wildfire. Mitigation measures incorporated into the Project that will reduce impacts to Less than Significant levels are discussed in Chapter 3 of this IS/MND. In the long-term, maintenance activities would have a beneficial effect by maintaining the functional and structural integrity of EBMUD-owned facilities and would not generate significant impacts. Adherence to EBMUD Standard Practices and Procedures and implementation of mitigation measures would ensure that the Project would not generate a significant impact on the environment. EBMUD determined that an MND is the appropriate level of CEQA review for this Project.

## **1.4 Circulation of the IS/MND**

In accordance with CEQA, a good faith effort has been made by EBMUD during the preparation of the IS/MND to contact affected agencies, organizations and persons who may have an interest in the Project. In reviewing the IS/MND, affected persons and public agencies should focus on the sufficiency of the document in identifying and analyzing the possible impacts on the environment and the ways in which the significant impacts of the Project were avoided or mitigated.

Comments on the IS/MND may be made in writing before the end of the comment period. A 30-day review and comment period has been established in accordance with §15205(d) of the CEQA Guidelines. Following the close of the public comment period, which ends on January 13, 2020, EBMUD will consider this IS/MND and comments in determining whether to approve the Project.

The IS/MND are available online on EBMUD’s webpage ([www.ebmud.com/AqueductRMA](http://www.ebmud.com/AqueductRMA)). Written comments should be sent to EBMUD’s street address or email address as follows:

East Bay Municipal Utility District  
Chris Potter, Senior Civil Engineer  
375 11th Street  
Oakland, CA 94607

christopher.potter@ebmud.com  
or

## CHAPTER 2

# PROJECT DESCRIPTION

---

### 2.1 Project Overview

EBMUD owns and operates a raw water conveyance system, herein referred to as the Mokelumne Aqueduct System, that is comprised of an approximately 100-mile-long pipeline system that includes the Mokelumne Aqueducts, the Lafayette Aqueducts, the Moraga Aqueduct, the Briones Aqueduct, and the USL Aqueduct. This system supplies water from the Mokelumne River to the EBMUD service area within the East San Francisco Bay area (East Bay). The EBMUD service area extends from Crockett on the north, southward to San Lorenzo and portions of Hayward (encompassing the major cities of Oakland and Berkeley), eastward from San Francisco Bay to Walnut Creek, and south through the San Ramon Valley (including Alamo, Danville, and San Ramon) (see **Figure 2-1**).

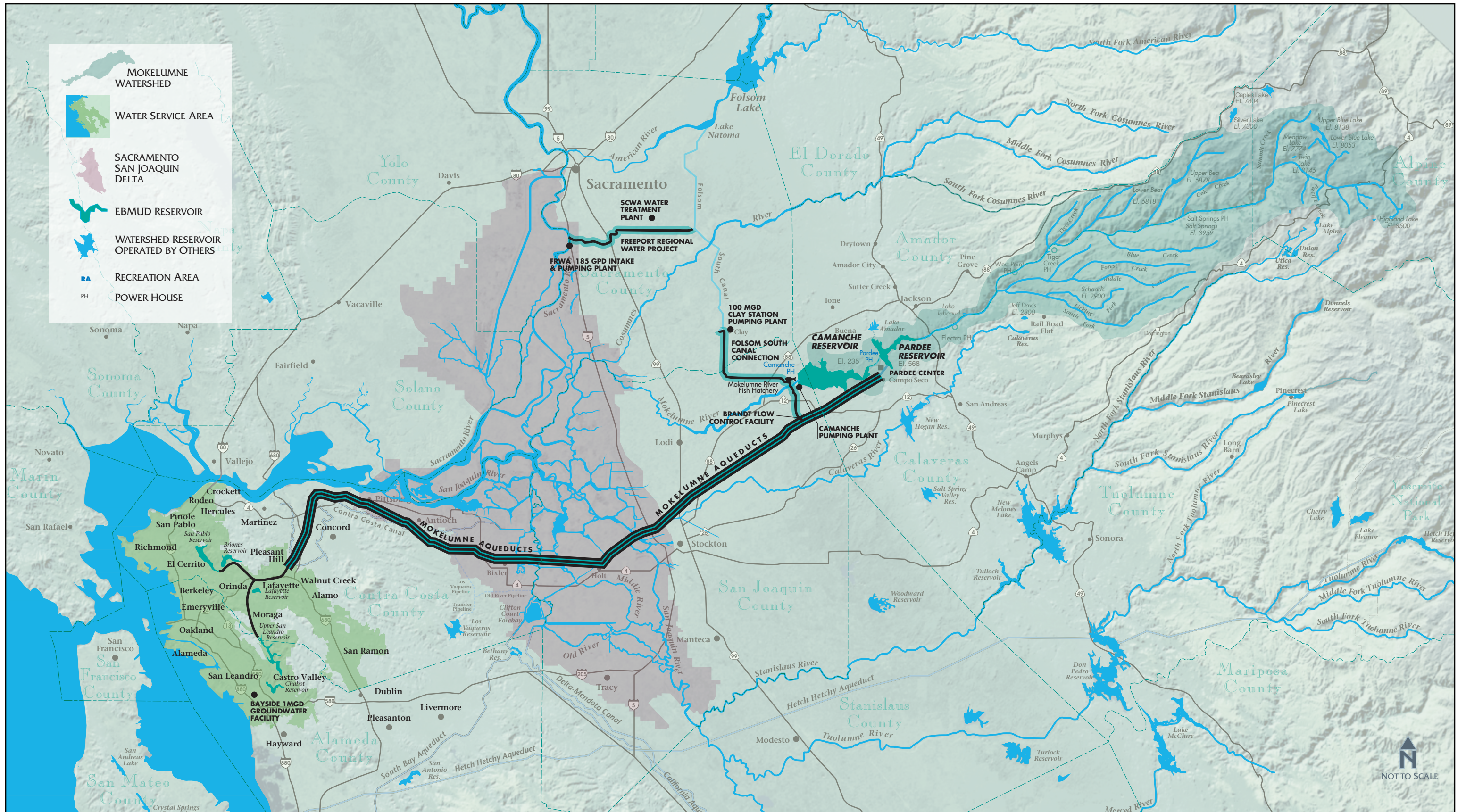
The Mokelumne Aqueducts deliver water to EBMUD's service area through three separate, steel pipelines. The aqueduct pipelines traverse a diverse array of habitats as it leaves the Sierra Foothills, crosses the Central Valley along the Calaveras River, then the Sacramento-San Joaquin River Delta, before making its way to the EBMUD service area in the East Bay. The Mokelumne Aqueducts are maintained within a 100-foot right-of-way (ROW), with the pipelines buried along a majority of the aqueducts' alignment; however, approximately 10 miles of pipeline across the islands in the Delta are located aboveground, supported on timber, reinforced-concrete, or steel bents. An unpaved access road parallels most of the aqueduct system from just southwest of the West Portal Facility in Campo Seco to the East Portal Facility in Walnut Creek. Many stream crossings exist along the Mokelumne Aqueduct alignment, including approximately 220 culverts and seven bridge crossings.

Once the Mokelumne Aqueducts reach the EBMUD service area, there are a number of additional aqueducts for conveying raw water to EBMUD's water treatment plants and terminal reservoirs, which span the various habitat types typical of the East Bay (see **Figure 2-2**). These include the following:

- Lafayette Aqueducts and Tunnels - transport raw water approximately 7.5-miles from the East Portal Facility in Walnut Creek to the Orinda Water Treatment Plant in two separate pipelines that are mostly buried along their alignment.
- Moraga Aqueduct - an approximately 6-mile pipeline that delivers raw water from the Lafayette Aqueducts for terminal storage in the USL Reservoir.
- Briones Aqueduct and Tunnel - a 1.5-mile pipeline that begins at the Briones Center and ends at Briones Reservoir that is used deliver raw water to the Briones Reservoir. The Briones Aqueduct also has an auxiliary discharge structure into Bear Creek adjacent to the bottom of the Briones Reservoir spillway, which flows into San Pablo Reservoir.
- USL Aqueduct and Tunnel - conveys raw water from USL Reservoir to the USL Water Treatment Plant. The aqueduct also has a discharge point within the former Oak Knoll Naval Facility.

There are multiple stream crossings along these five East Bay aqueduct alignments, including approximately 40 culverts and five bridge crossings.

*This page intentionally left blank.*

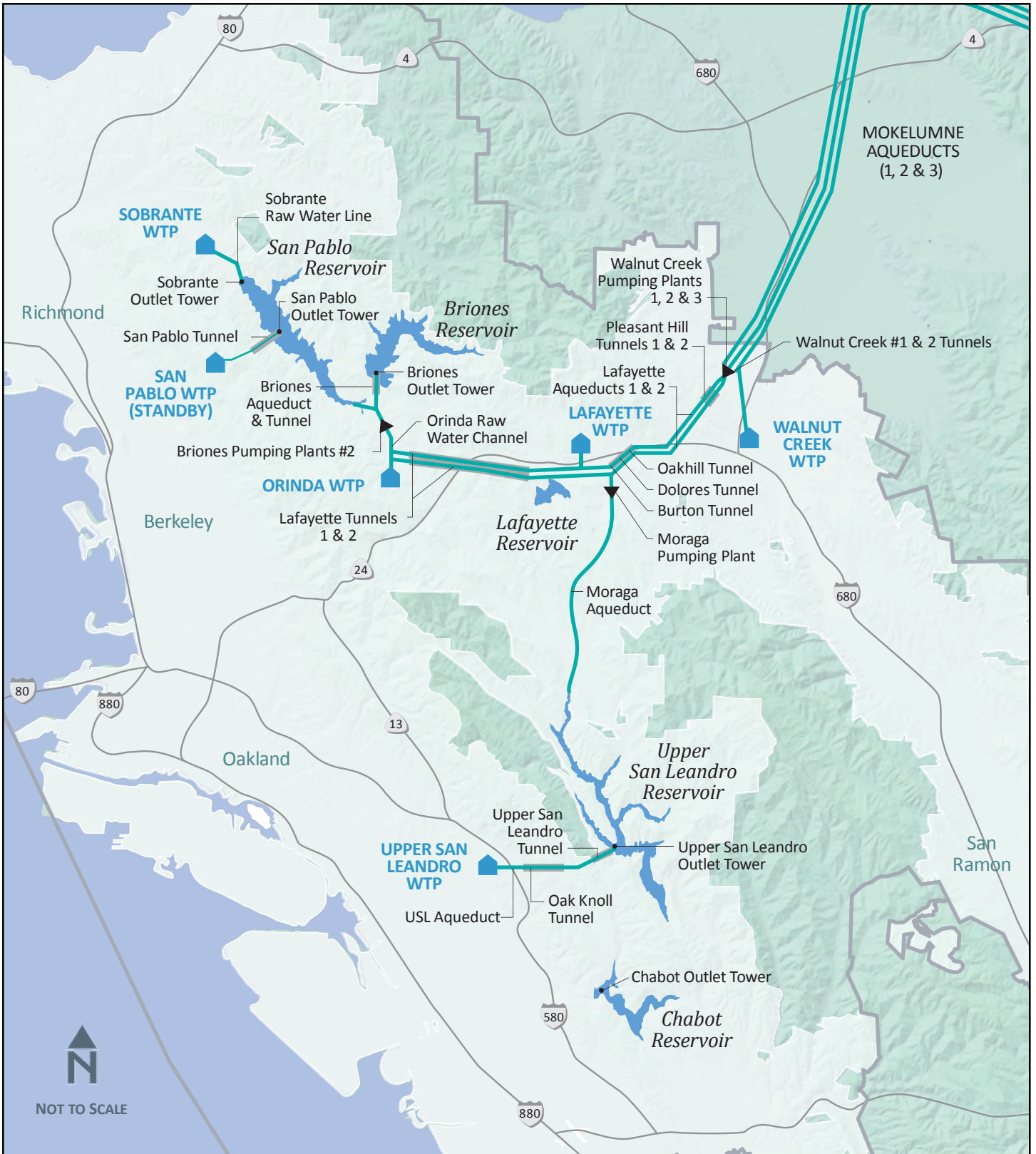


Source: EBMUD 2018



**Figure 2-1.**  
Regional Location and Water Service Area

*Back of Figure 2-1*



Representation of non-EBMUD boundaries is not necessarily authoritative

Source: EBMUD 2018

**Figure 2-2.**  
**East Bay Water Service Area Facilities**

Prepared by:



- Current Area Served
- EBMUD Ultimate Service Boundary

**EBMUD Mokelumne Aqueduct  
Initial Study/Mitigated Negative Declaration**

*Back of Figure 2-2*



Maintaining and operating the Mokelumne Aqueduct System is necessary for EBMUD to provide an essential public service to supply drinking water to approximately 1.4 million people in EBMUD's service area. The Project involves the routine maintenance of aqueduct facilities at access road and aqueduct stream crossing locations that require Fish and Game Code Section 1602 Lake and Stream Alteration Agreements (LSAAs) authorized by the (CDFW). Access roads are critical to repairs, maintenance, and operations of the aqueducts and maintenance activities provide for safe travel on the access roads at stream crossings, while ensuring natural flows for ditches, swales and other watercourses. Routine maintenance of the access road stream crossings is ongoing due to changing conditions resulting from weather events, deterioration of culverts and normal use. Routine maintenance work is also required due to deterioration of culvert ends, headwalls and/or weather conditions that could affect the integrity of the aqueduct pipelines. Routine maintenance activities occur every one to five years in the stream zones of the Project depending on location and maintenance needs.

EBMUD currently performs routine maintenance along portions of the Mokelumne Aqueduct System under two existing LSAAs, one with CDFW Region 2 (North Central Region) covering approximately 18 miles of the Mokelumne Aqueduct, and one with CDFW Region 3 (Bay Delta Region) covering approximately 42 miles of the Mokelumne Aqueduct, 7 miles of the Lafayette Aqueducts, and 6 miles of the Moraga Aqueduct. There is no existing LSAA covering routine maintenance activities in remaining portion of the Mokelumne Aqueduct System. Historically, non-routine maintenance work within the remaining portions was permitted on an individual basis when needed. Subsequent to Project approval, it is EBMUD's intent to incorporate all portions of the Mokelumne Aqueduct System into new CDFW LSAAs, consistent with the appropriate CDFW Region.

For the purposes of compliance with the California Environmental Quality Act (CEQA), this Initial Study evaluates all of the Mokelumne Aqueduct system routine maintenance activities performed in CDFW jurisdictional areas as the proposed Project under CEQA.

### **2.1.1 Project Area**

The Mokelumne Aqueducts originate at EBMUD's Pardee Reservoir in the Sierra Foothills and extend from the West Portal in Campo Seco for 82 miles through the Central Valley, along the Calaveras River and the Sacramento-San Joaquin River Delta, to the East Portal facility in the EBMUD service area in the East Bay. The Project area includes maintenance sites along the 82-mile aqueduct alignment and adjacent waters within the 100-foot-wide EBMUD ROW.

Once the Mokelumne Aqueducts reach the EBMUD service area, there are a number of East Bay aqueducts for conveying raw water to EBMUD's water treatment plants and terminal reservoirs, which span an additional 18 miles through the East Bay. The Project area also includes maintenance sites along these aqueducts, primarily at locations where the aqueducts have discharge structures at local creeks or drainage channels.

**Figure 2-1** and **Figure 2-2** are regional maps of the entire aqueduct alignment from Pardee Reservoir to the EBMUD service area. **Figure 2-3** is a larger scale map of the aqueduct alignment, highlighting the known stream crossing locations along the aqueduct alignment where routine maintenance occurs, as well as the boundaries of CDFW Regions 2 and 3.

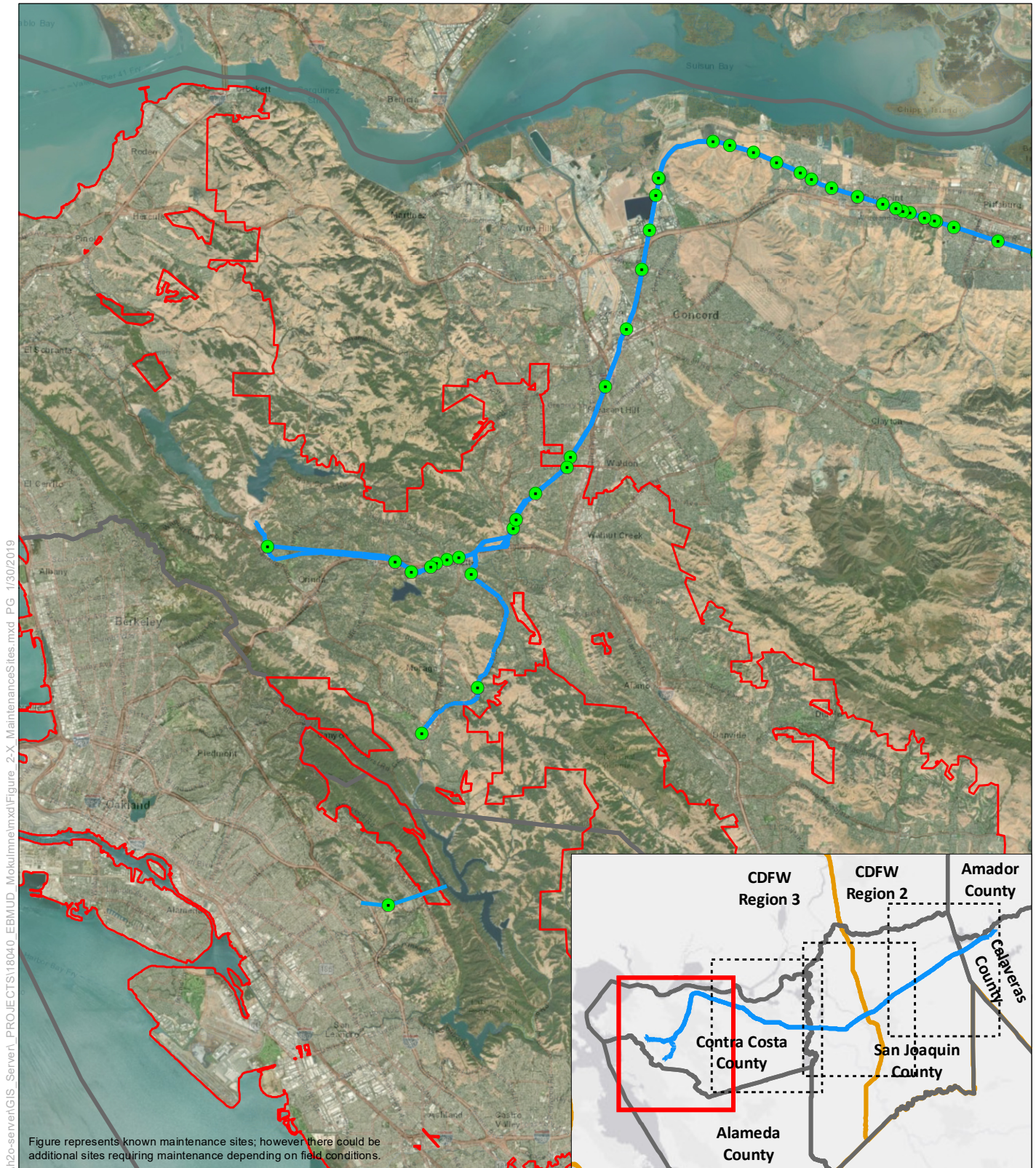
From east to west, the aqueduct system travels through the Counties of Calaveras, San Joaquin, Contra Costa, and Alameda. Approximately 31 miles of the Mokelumne Aqueducts are located in CDFW Region 2 and 51 miles are located in CDFW Region 3. The 18 miles of the East Bay aqueducts are all located in CDFW Region 3.

### **2.1.2 Overview of Maintenance Approach**

EBMUD performs routine maintenance activities to maintain the functional and structural integrity of its facilities. EBMUD's maintenance approach is built on having a comprehensive understanding of a stream's site-specific function and process, and the natural and aquatic resources at the location where maintenance is required. Understanding these resources, their locations, and how they interact guides EBMUD on where, when and how routine maintenance activities should occur. As such, habitat and ground disturbance associated with maintenance activities is limited and small in scale.

EBMUD's routine maintenance includes the following categories of activities to maintain the functional and structural integrity of EBMUD-owned facilities:

- *Sediment and Debris Removal* - Removal of debris, sediment, vegetation, rubbish, downed trees, and other material that could obstruct the natural flow in channels;
- *Vegetation Management* - Control of weeds, grasses, emergent vegetation, and woody vegetation in channels and on adjacent banks;
- *Maintenance and Repair of Culverts, Road Crossings, and Other Structures* - Maintenance, repair and replacement of culverts and drainage and erosion control structures (e.g., gates, barricades, bridges, minor repainting with hand tools, minor geotechnical sampling); and
- *Bank and Levee Repair and Erosion Protection* - Erosion control repairs and bank stabilization.



\\hp2c-server\GIS\_Server\PROJECTS\18040\_EBMUD\_Mokelumne\mxd\Figure\_2\_X\_MaintenanceSites.mxd PG. 1/30/2019

- Maintenance Site
- Aqueduct
- Service Area
- CDFW Region Boundary
- County Boundary

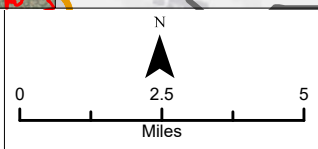
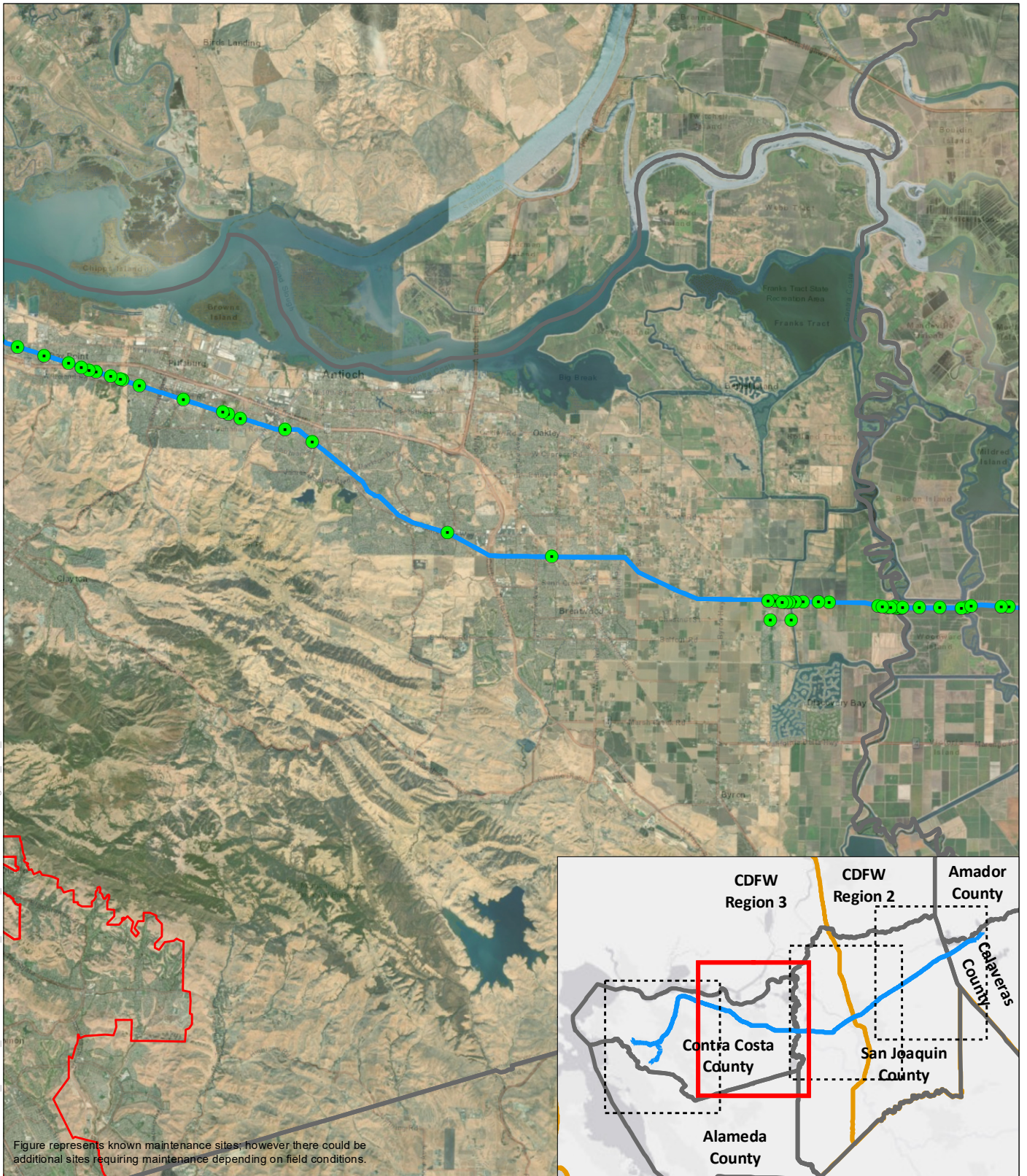


Figure 2-3  
Maintenance Site Locations  
(1 of 4)

Prepared by:  
**Horizon**  
WATER and ENVIRONMENT  
Prepared for:  
EBMUD

**EBMUD Mokelumne Aqueduct System  
Routine Maintenance Project  
Initial Study/Mitigated Negative Declaration**

*Back of Figure 2-3 (1 of 4)*



- Maintenance Site
- Aqueduct
- Service Area
- CDFW Region Boundary
- County Boundary

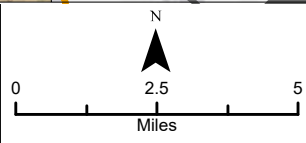


Figure 2-3  
Maintenance Site Locations  
(2 of 4)

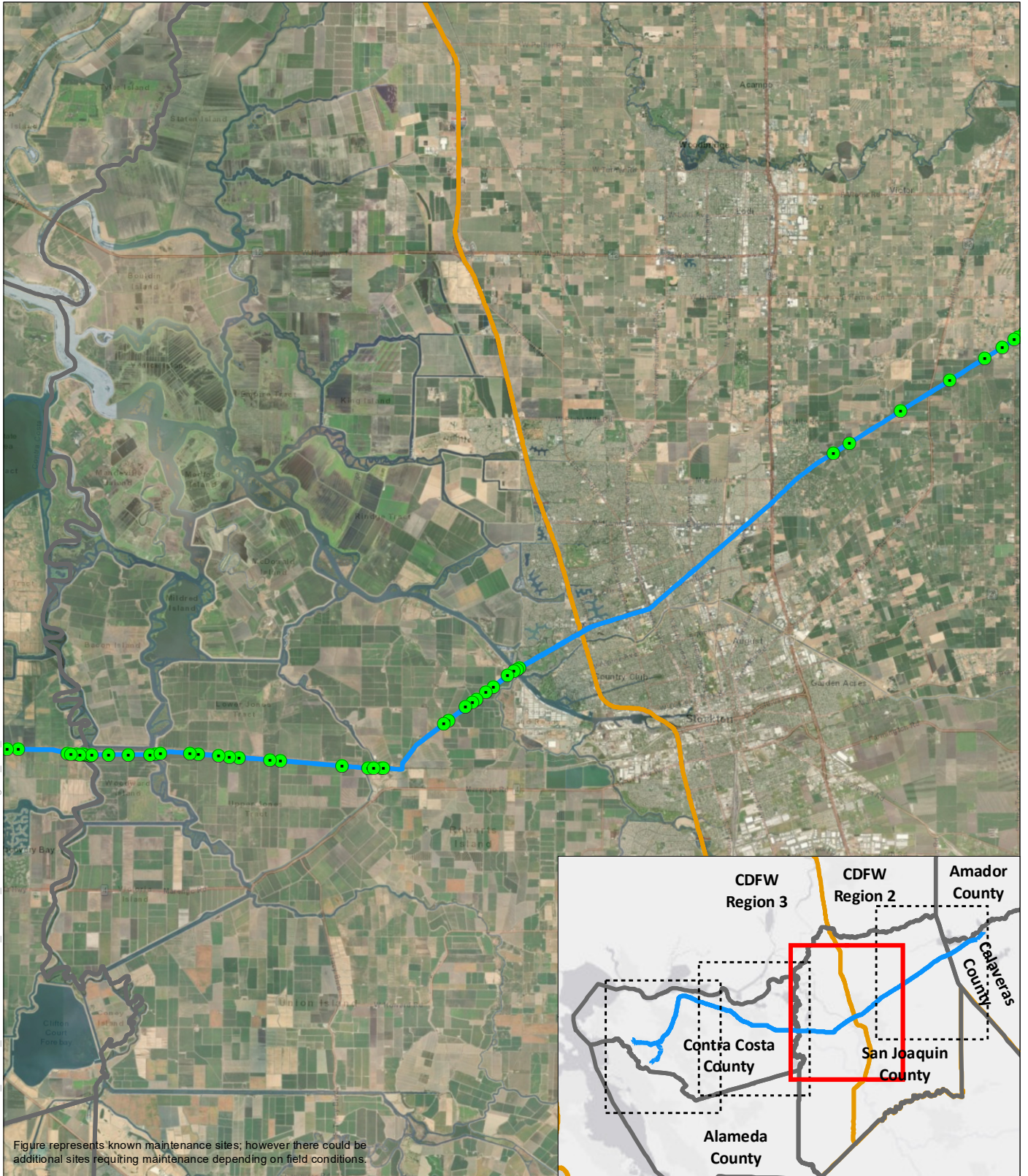
Prepared by:



Prepared for:  
EBMUD

**EBMUD Mokelumne Aqueduct System  
Routine Maintenance Project  
Initial Study/Mitigated Negative Declaration**

*Back of Figure 2-3 (2 of 4)*



- Maintenance Site
- Aqueduct
- Service Area
- CDFW Region Boundary
- County Boundary

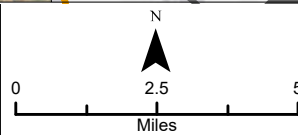
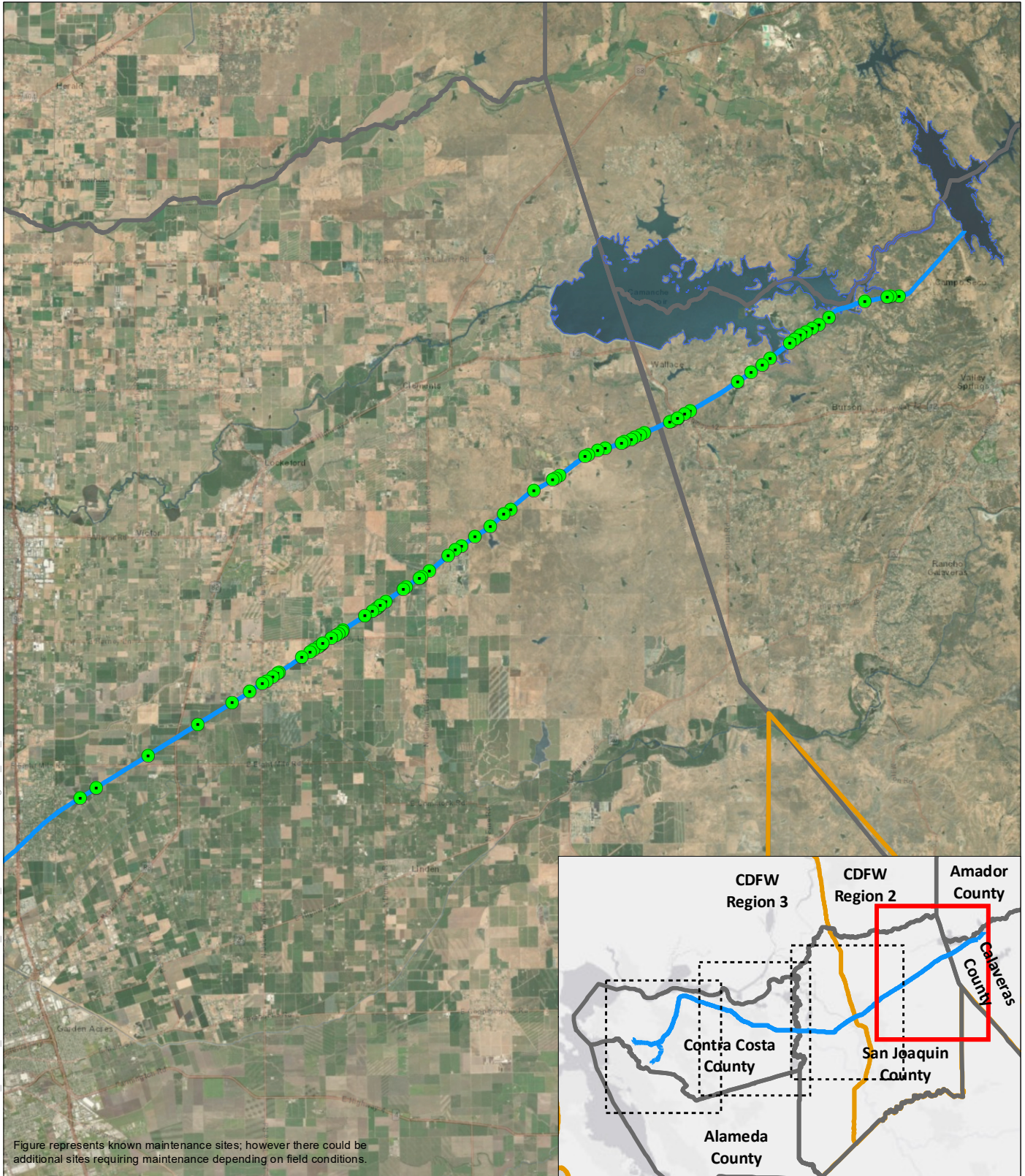


Figure 2-3  
Maintenance Site Locations  
(3 of 4)

*Back of Figure 2-3 (3 of 4)*



\\h2c-server\GIS\_Server\PROJECTS\18040\_EBMUD\_Mokelumne\mxd\Figure\_2-X\_MaintenanceSites.mxd PG 1/30/2019



- Maintenance Site
- Aqueduct
- Service Area
- CDFW Region Boundary
- County Boundary

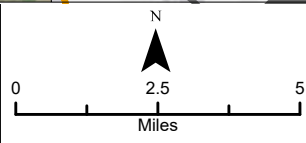


Figure 2-3  
Maintenance Site Locations  
(4 of 4)

Prepared by:  
**Horizon**  
WATER and ENVIRONMENT  
Prepared for:  
EBMUD

**EBMUD Mokelumne Aqueduct System  
Routine Maintenance Project  
Initial Study/Mitigated Negative Declaration**

*Back of Figure 2-3 (4 of 4)*

## **2.2 Maintenance Activities**

Routine maintenance activities at individual locations within drainages along the Mokelumne Aqueduct System would typically be small in scale with limited ground disturbance. Routine maintenance activities are discussed in more detail below within the following four primary categories: (1) sediment and debris removal, (2) vegetation management, (3) maintenance and repair of culverts, road crossings, and other structures, and (4) bank and levee repair and erosion protection.

### **2.2.1 Sediment and Debris Removal**

Deposited and accumulated excess sediment and debris and trash in the vicinity of EBMUD facilities, including culverts and bridges (i.e., within 50 feet) can obstruct water flow, reduce channel capacity, accelerate erosion, damage facilities, and increase the potential for flooding. The number of sediment removal projects undertaken annually varies (typically between one and five per year) and the quantity of sediment removed in a given year depends on recent weather and hydrologic conditions, as well as the frequency and extent of past maintenance activities. Small amounts of debris and sediment (typically less than 50 cubic yards) may be removed from within and around structures affecting no more than 50 feet of watercourse in natural channels and 100 feet in constructed flood control channels. Typically, no more than 50 linear feet of sediment and debris would be removed from each natural stream channel at a specified work site, 100 feet from each artificial earthen channel, and 500 feet from each concrete lined channel. Sediment and debris removal activities typically would not exceed a cumulative annual total of 1,250 feet of work in natural streams, 2,500 feet in flood control channels, or 6,000 feet in concrete lined channels.

Equipment used for sediment removal activities range from hand tools for digging out small accumulations of sediment or in sensitive locations to mechanized equipment for larger sediment removal needs. When using mechanized equipment, EBMUD performs the work using either a backhoe or long-reach excavator located outside the channel on access roads. For maintenance areas where use of equipment from the top-of-bank is not feasible, sediment removal may be conducted by equipment operating directly into a non-wetted portion of the channel. If temporary access ramps are required to get equipment into the channel, they will be regraded and replanted following the sediment removal activities. In-channel equipment may include a small Bobcat®, skid-steer, or walk-behind power-shovel. A vacuum truck may also be used outside the channel to remove sediment from smaller culverts and pipes. Sediment removed from the channel is placed in 10- or 20- cubic yard dump trucks (typically parked on the access road adjacent to the channel or on the stream crossing) and prepared for off-site hauling and disposal.

#### ***Sediment and Debris Disposal***

Removed sediment and debris would be disposed of onsite in a location where it cannot reenter State waters. Typically, removed sediment and/or vegetative debris is placed in surrounding upland areas (normally less than 1,500 square feet in size) within the ROW so that it cannot reenter the waterway.

#### ***Beaver Dam Removal***

Beaver activity occurs infrequently; however, beavers create several maintenance concerns. Beaver dams block the channel and introduce woody and organic material into the channel. In addition, as an area becomes backwatered by the beaver dams, sediment may begin to accumulate in the ponded area, further reducing flood carrying capacity and degrading in-channel habitat. Maintenance activities would remove woody and organic debris associated with beaver dams, which would be chipped and placed in uplands in the vicinity of the removal location so that it cannot reenter the waterway. If excavation is required, excavation would minimally disturb the natural bottom of the channel; the channel would be restored to

its original capacity once excavation is complete. Excavated materials may also be taken to the nearest landfill for disposal, as needed.

### **2.2.2 Vegetation Management**

Vegetation management refers to the trimming, mowing, pruning, and removal of weeds and grasses, woody and herbaceous plants within the bed and banks of drainages or other waterbodies crossing the aqueduct alignment, fallen trees, dead trees in danger of falling in or across a channel, or trunks or limbs in the bed or bank of the channels or on immediately adjacent access roads and shoulders. Vegetation management activities would be conducted only as required to maintain the flow conveyance capacity, prevent loss of habitat and erosion, and control invasive vegetation. Fallen trees may be removed from within streambeds to maintain the flow conveyance capacity. Vegetation management and removal activities would be relatively consistent from year to year, though locations may change depending on recent growth and blockages. Vegetation in the bed or bank of channels is typically cut off at the bed or bank invert with small tools and removed with a winch and cable, or other equipment operated from the top of bank. Root structures would not be disturbed. No heavy equipment would be operated in the streambed.

Vegetation maintenance techniques include hand removal using hand-held tools and equipment and mechanical removal using heavier equipment. EBMUD conducts the majority of vegetation maintenance using mechanical methods. However, on occasion larger equipment used for vegetation removal may include a flail mower attachment on an excavator or Bobcat® to cut cattails or blackberries, or a backhoe or rubber-tracked excavator that is used for removing material from the dry channel. Removed vegetation is generally chipped and either used on site as mulch or taken to a green waste recycling center.

EBMUD conducts the majority of downed tree maintenance using hand tools. However, on occasion heavy equipment including backhoes or rubber-tracked excavators is used to relocate or remove trees within a dewatered portion of the channel.

Goat grazing is not typically used for vegetation management within the ROW. However, goat grazing may be utilized if special-status plants species and habitat do not occur at the maintenance site. If used, goats would be monitored during all grazing activities and removed once the underbrush is cut down, and goats would not be allowed to graze trees or shrubs.

Vegetation management would be performed year-round and would not include clear cutting or wholesale removal of vegetation. Vegetation management would include the removal of dead or dying trees, as well as the select removal of healthy trees (typically less than 4 inches diameter at breast height [DBH]) when necessary to maintain channel flow and capacity across the aqueduct system alignment.

### **2.2.3 Maintenance and Repair of Culverts, Road Crossings, and Other Structures**

Low water crossings and culverts associated with the aqueduct would require routine repair or replacement due to accumulation of sediments, material deterioration, damaged headwalls, or eroding outlets. Typical culverts range in size from 12 to 48 inches in diameter. Old culverts are usually corrugated steel, which are replaced with high-density polyethylene (HDPE) pipe utilizing open-cut installation. If feasible, damaged culverts would be repaired through the use of sleeves or may require replacement. As part of the routine maintenance activities, sediment would be removed, clean gravel would be placed at low water crossings, and rip-rap at the inlet and outlet points of culverts would be replaced. The extent of rip-rap placed at each end of the culvert is typically less than 500 square feet. On average, two culverts would be replaced annually.

Additionally, EBMUD would maintain, repair, or replace other drainage and erosion control structures, including but not limited to, storm drain outfalls, tide gates, slide gates, revetments, energy dissipaters,

grade structures, sediment basins, weirs, trash racks, stream gauge structures, fish ladders, fish screens, utility line crossings, bridges (including support structures), road embankments, and access ramps. These structures are inspected annually and maintained as needed; typically, EBMUD repairs or replaces around 10 sites annually. The drainage culverts that are maintained range from 6 to 48 inches in diameter. Minor concrete work may be performed as a routine activity. Major concrete work for structural repairs would be performed under a separate permit, and not under the existing RMAs.

Minor repairs, inspection, and painting of bridges may be required at Bear Creek Bridge, Kirker Creek pedestrian crossing, and the Trapper Slough elevated aqueduct crossing in the delta. This work would most likely need to be performed in the channel, but would not require dewatering. Work at Trapper Slough would either be performed in the dry season or from a floating platform.

#### **2.2.4 Bank and Levee Repair and Erosion Protection**

The repair and stabilization of banks is undertaken when a bank is weakened, unstable, or failing. If left untreated, eroding or failing banks can cause damage to adjacent properties; increase the flood hazard and threaten public safety; threaten and impair roads, transportation, and access; generate erosion and increase downstream fine sediment yields; and impact and other natural resources. Banks would be repaired and stabilized by using the least environmentally impacting method to address these issues and prevent further degradation of stream conditions. Bank repair activities would occur in both natural and engineered channels. Bank repair in natural channels would typically not exceed 200 linear feet annually and bank repair in engineered channels would be typically be limited to 300 linear feet in any three-month period. Bank repairs are uncommon along the Mokelumne Aqueduct System and typically occur once or twice per year.

Bank stabilization repairs would be confined to an area not to exceed 20 feet beyond (landward of) the failed or failing bank or structure, and care will be taken to disturb the least amount of vegetation feasible, including mature trees. Bank stabilization activities primarily involve the use of biotechnical methods to stabilize eroding streambanks. Bioengineering techniques, such as brush walls, would be used to provide structural stability to channel banks. If bioengineering techniques are not feasible due to poor soils, percolation of water, limited space, or steepness of slopes, other methods would be used such as interlocking polyvinyl chloride (PVC) piles, similar to soldier piles. Riprap would be used if no other method is determined to be feasible or effective in repairing banks and preventing erosion. In order to prevent bank instability in certain channels, channels would be dewatered by drilling and installing plastic drainpipes into the channel bank. During dewatering activities, all equipment would be isolated from the channel by silt fencing or other barriers to keep any contaminants from entering the channel.

Equipment used for bank stabilization activities may include extending arm excavators, small bulldozers (Bobcat style), front-end loaders, and 10 cubic-yard dump trucks. In general, this equipment would be used outside the channel; however, depending upon the location and extent of the repair a bobcat or excavator could be needed in the channel. Staging for repair activities would occur on adjacent access roads. Soil and rip-rap will be staged in areas that have been previously disturbed (i.e., access service road, turn-outs, etc.). Overgrown vegetation at bank failure sites would only be removed to the extent necessary to repair the bank. Bank stabilization projects typically require three to five days to complete.

The placement of earthen fill, installation of rocks, replacement and repair of existing eroded rip-rap would be conducted to control erosion on channel and levee banks. Such erosion control activities typically would not exceed 50 linear feet in length annually.

### **2.3 Activities Not Covered Under the Proposed Routine Maintenance**

Activities not covered under EBMUD's proposed routine maintenance include:

- Major Capital improvement projects (CIPs),
- Maintenance activities that would alter the designed flood conveyance capacity of a channel; and
- Emergency activities and procedures.

A situation is considered an “emergency” if it is a sudden, unexpected occurrence involving a clear and imminent danger that demands immediate action to prevent or mitigate loss of or damage to life, health, property, or essential public services (Public Resource Code [PRC] Section 21060.3). Emergency work would be conducted in accordance with Fish and Game Code Section 1610.

## **2.4 Project Implementation**

### **2.4.1 Work Cycle**

Proposed maintenance activities would be conducted throughout the year as required to maintain the functional and structural integrity of aqueduct facilities; the timing for implementing activities would vary based on the type of activity. Routine maintenance activities would be conducted in accordance with the CDFW permitting and reporting requirements of each region.

### **2.4.2 Timing of Work**

Work within streams with natural (earthen or rock-lined) bottoms and/or banks (i.e., sediment and debris removal, culvert repair and replacement, or bank repairs) typically would be conducted between June 1<sup>st</sup> and October 15<sup>th</sup> when streams are their driest. Comparable work within concrete-lined channels would be typically conducted between April 15<sup>th</sup> and October 15<sup>th</sup>. All non-ground disturbing maintenance activities (i.e., goat grazing, tree pruning and brush clearing) occurring outside of any creek or drainage also would typically take place between April 15 and October 15. Removal of debris necessary to prevent an imminent flooding threat may occur year-round.

Hand removal activities (i.e., pruning and vegetation removal) may be conducted year-round. Removal of large wood, such as downed or dead trees or branches within creeks would generally be conducted during the dry season (June 1 to October 15).

### ***Work Hours and Crew Size***

Maintenance activities would typically occur between 8:00 a.m. and 6:00 p.m., Monday through Friday, with an exception for emergencies. Trucks and personnel may arrive at individual sites for minor coordination and preparation tasks after 7:00 a.m., but maintenance activity that generates loud noise would not commence until 8:00 a.m. when in the vicinity of residents or other sensitive receptors. A typical eight-hour workday between Monday and Friday serves as the basis of estimated maintenance activity durations in this IS/MND. Crew size for maintenance activities would typically consist of three to four staff.

### **2.4.3 Equipment**

The specific pieces of equipment used for the Project maintenance activities would vary depending on the facility and type of maintenance activity required, but may include the following:

- Weed cutters
- Hand tools (i.e., shovels, rakes, loppers, and hand saws)
- Winch and cable
- Chainsaws and power pruners
- Wood chipper
- Bobcat

- Excavator
- Bulldozer
- Tractor
- Dump trucks and trailers

Equipment is stored at maintenance yards

**Table 2-1: Typical Equipment Use by Maintenance Activity**

Maintenance Activity	Type/Number of Equipment Used	Estimated Maximum Daily Truck Trips <sup>1</sup>
Sediment and Debris Removal	1 backhoe <sup>2</sup> 1 excavator <sup>2</sup> 1 dump truck 2 utility trucks	6
Vegetation Management	1 backhoe <sup>2</sup> 1 dump truck 2 utility trucks Weed eater / hand tools	6
Maintenance and Repair of Culverts, Road Crossings, and Other Structures	1 backhoe 1 dump truck 2 utility trucks	2
Bank and Levee Repair and Erosion Protection	1 backhoe 1 dump truck 3 utility trucks	4
<sup>1</sup> Maximum daily truck trips account for trucks/vehicles going to and leaving maintenance sites on a daily basis. <sup>2</sup> Equipment transported on flatbed trailer.		

#### 2.4.4 Maintenance Site Access

An access road that parallels most of the Mokelumne Aqueduct System provides access to aqueduct areas requiring maintenance. The access road is mostly unpaved from Campo Seco till it reaches the East Bay, except for a paved section through the City of Stockton. The access road is mostly paved from the City of Brentwood to the East Portal in Walnut Creek.

#### 2.4.5 Construction Staging and Work Area Limits

Equipment and vehicle staging areas would vary by maintenance activity type and location, but would be consist with the limited scale of existing maintenance practices. In general, equipment and materials staging would occur within 100 feet of each maintenance site, within EBMUD ROW. Typically, construction equipment and vehicles would be staged for no more than 2 days at a time as most maintenance activities would be small in scale and completed within 2-3 work days. The work space needed for construction staging would typically be 50 feet by 75 feet in size.

Work area limits within jurisdictional drainages and other waterbodies would vary depending on the maintenance activity, as described in Section 2.2 above, but in all cases would be small in scale at each individual maintenance site.

#### **2.4.6 Temporary Water Diversions**

Temporary water diversions may be required for in-channel maintenance activities described above, such as sediment and debris removal and bank repair. When necessary, temporary water diversions would either use cofferdams, typically less than three feet in height, or sumps, with or without pumps, to divert water away from the work area. All water would be directed to a silt control structure prior to discharge back into the channel. After the maintenance activity is complete, the channel would be restored to its original configuration.

#### **2.4.7 Site Restoration**

Following sediment removal activities, the sites are restored through regrading, to re-establish the site's original grade, and then replanting. Restoration of bank stabilization sites primarily involves the use of bio-engineering methods (e.g., installation of brush walls) to stabilize eroding streambanks through planting and seeding.

### **2.5 EBMUD Practices and Procedures**

EBMUD has incorporated into the Project certain standard practices and procedures from its Environmental Compliance Manual (including the engine idling procedure), Engineering Standard Practices, Climate Mitigation Action Plan and Climate Change Monitoring and Response Plans, and EBMUD Procedure 711, Hazardous Waste Removal, which defines hazardous waste and establishes responsibilities for removal of hazardous wastes from EBMUD facilities (See Appendix B). These standard practices are designed to address typical characteristics of EBMUD projects and are not project-specific or tailored to the unique characteristics of the Project. These standard practices, which are applicable to all EBMUD projects, reflect generally applicable EBMUD standard operating procedures.

Appendix B contains the relevant EBMUD Practices and Procedures by environmental resource topic. This table and discussion in the Initial Study detail these practices and procedures and describe their relationship to Project impacts.

### **2.6 Permits and Approvals**

**Table 2-2** lists anticipated permitting and regulatory compliance requirements that are potentially applicable for the project. Potential permitting agencies include the U.S. Army Corps of Engineers (USACE), CDFW, and the applicable Regional Water Quality Control Boards (RWQCB).



**Table 2-2: Permits and Regulatory Requirements Potentially Applicable to the Project**

<b>Regulatory Agency</b>	<b>Law/Regulation</b>	<b>Purpose</b>	<b>Permit/Authorization Type</b>
USACE – San Francisco and Sacramento Districts	Clean Water Act (CWA) Section 404	Regulates placement of dredged and fill materials into waters of the United States.	Nationwide or Individual Permit for project areas subject to jurisdiction
	Rivers and Harbors Act Section 10	Regulates work in navigable waters of the U.S.	Section 10 Compliance for project areas subject to jurisdiction
U.S. Fish and Wildlife Service (USFWS)/ National Marine Fisheries Service (NMFS)	Endangered Species Act (ESA)	USACE must consult with USFWS and NMFS if threatened or endangered species may be affected by the Project.	Biological Opinions issued in conjunction with USACE Section 404 compliance
Regional Water Quality Control Board – San Francisco Bay and Central Valley Regions	CWA Section 401	Water quality certification for placement of materials into waters of the United States.	401 Water Quality Certification is required for federal permits
	Porter-Cologne Water Quality Control Act	Regulates discharges of materials to land and protection of beneficial uses of waters of the State.	Waste Discharge Requirements (WDRs)
CDFW – Bay Delta and North Central Regions	Fish and Game Code (F&G Code) Section 1600	Applies to activities that will substantially modify a river, stream or lake. The Agreement includes reasonable conditions necessary to protect those resources.	Notification of Streambed Alteration Agreement (1602 permit)
State Historic Preservation Officer	National Historic Preservation Act (NHPA) Section 106	USACE must consult with State Historic Preservation Officer and Native American Tribes if historic properties or prehistoric archaeological sites may be affected by the Project.	Consultation in conjunction with USACE Section 404 compliance

*This page intentionally left blank.*

## **CHAPTER 3**

---

### **ENVIRONMENTAL ANALYSIS**

1. Project Title: Mokelumne Aqueduct System Routine Maintenance Project
2. Lead Agency Name and Address: East Bay Municipal Utility District  
375 11th Street  
Oakland, CA 94607
3. Contact Person: Chris Potter, Senior Civil Engineer  
(510) 287-2061
4. Project Location: The Mokelumne Aqueducts originate at EBMUD’s Pardee Reservoir in the Sierra Foothills and extends from the West Portal in Campo Seco for 82 miles through the Central Valley, along the Calaveras River and the Sacramento-San Joaquin River Delta, to the East Portal facility in the EBMUD service area in the East Bay. From the East Portal facility there are a number of East Bay aqueducts for conveying raw water to the water treatment plants and terminal reservoirs, which span an additional 18 miles through the East Bay. The Project area includes maintenance sites along the 100-mile aqueduct system alignment and adjacent waters within the 100-foot-wide EBMUD ROW.
5. Project Sponsor’s Name and Address: East Bay Municipal Utility District  
375 11<sup>th</sup> Street  
Oakland, CA 94607
6. General Plan Designation: Varies by local jurisdiction
7. Zoning: Varies by local jurisdiction
8. Description of Project: Refer to Chapter 2 of the IS/MND.
9. Surrounding Land Uses and Setting: The Project alignment is approximately 100-miles long and travels from the Sierra Foothills through rural and agricultural areas, and urban uses and cities, to the EBMUD service area in the East Bay.
10. Other Public Agencies Whose Approval is Potentially Required:
  - U.S. Army Corps of Engineers (San Francisco and Sacramento Districts)
  - San Francisco Bay RWQCB (Region 2) and Central Valley RWQCB (Region 5)
  - CDFW (Bay-Delta Region 2 and North Central Region 3)

**3.1 Environmental Factors Potentially Affected**

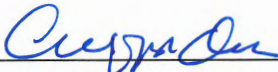
The environmental factors checked below could potentially be affected by this Project, but impacts would be mitigated to a less than significant level as indicated by the checklists on the following pages.

<input type="checkbox"/>	Aesthetics	<input type="checkbox"/>	Agriculture and Forestry Resources	<input checked="" type="checkbox"/>	Air Quality
<input checked="" type="checkbox"/>	Biological Resources	<input checked="" type="checkbox"/>	Cultural Resources	<input type="checkbox"/>	Energy
<input checked="" type="checkbox"/>	Geology/Soils	<input type="checkbox"/>	Greenhouse Gas Emissions	<input checked="" type="checkbox"/>	Hazards/Hazardous Materials
<input checked="" type="checkbox"/>	Hydrology/ Water Quality	<input type="checkbox"/>	Land Use/ Planning	<input type="checkbox"/>	Mineral Resources
<input checked="" type="checkbox"/>	Noise	<input type="checkbox"/>	Population/ Housing	<input type="checkbox"/>	Public Services
<input type="checkbox"/>	Recreation	<input type="checkbox"/>	Transportation	<input checked="" type="checkbox"/>	Tribal Cultural Resources
<input type="checkbox"/>	Utilities/ Service Systems	<input checked="" type="checkbox"/>	Wildfire	<input checked="" type="checkbox"/>	Mandatory Findings of Significance

**3.2 Environmental Determination**

On the basis of this initial evaluation:

- I find that the proposed Project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.
- I find that, although the proposed Project could have a significant effect on the environment, there will not be a significant effect in this case, because revisions in the Project have been made by or agreed to by the applicant. A MITIGATED NEGATIVE DECLARATION will be prepared.
- I find that the proposed Project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.
- I find that the proposed Project MAY have a “potentially significant impact” or “potentially significant unless mitigated” on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.
- I find that, although the proposed Project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier Environmental Impact Report pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier Environmental Impact Report, including revisions or mitigation measures that are imposed upon the proposed Project, nothing further is required.


12/4/19  
 \_\_\_\_\_  
 Clifford C. Chan, Director of Operations and Maintenance Date

### 3.3 Evaluation of Environmental Impacts and Initial Study Checklist

- 1) A brief explanation is required for all answers except "No Impact" answers that are adequately supported by the information sources a lead agency cites in the parentheses following each question. A "No Impact" answer is adequately supported if the referenced information sources show that the impact simply does not apply to projects like the one involved (e.g., the project falls outside a fault rupture zone). A "No Impact" answer should be explained where it is based on project-specific factors as well as general standards (e.g., the project will not expose sensitive receptors to pollutants, based on a project-specific screening analysis).
- 2) All answers must take account of the whole action involved, including off-site as well as on-site, cumulative as well as project-level, indirect as well as direct, and construction as well as operational impacts.
- 3) Once the lead agency has determined that a particular physical impact may occur, then the checklist answers must indicate whether the impact is potentially significant, less than significant with mitigation, or less than significant. "Potentially Significant Impact" is appropriate if there is substantial evidence that an effect may be significant. If there are one or more "Potentially Significant Impact" entries when the determination is made, an Environmental Impact Report (EIR) is required.
- 4) "Negative Declaration: Less Than Significant With Mitigation Incorporated" applies where the incorporation of mitigation measures has reduced an effect from "Potentially Significant Impact" to a "Less Than Significant Impact." The lead agency must describe the mitigation measures and briefly explain how they reduce the effect to a less than significant level (mitigation measures from "Earlier Analyses," as described in (5) below, may be cross-referenced).
- 5) Earlier analyses may be used where, pursuant to the tiering, program EIR, or other CEQA process, an effect has been adequately analyzed in an earlier EIR or negative declaration. Section 15063(c)(3)(D) (2017 CEQA Guidelines). In this case, a brief discussion should identify the following:
  - a. Earlier Analysis Used. Identify and state where they are available for review.
  - b. Impacts Adequately Addressed. Identify which effects from the above checklist were within the scope of and adequately analyzed in an earlier document pursuant to applicable legal standards and state whether such effects were addressed by mitigation measures based on the earlier analysis.
  - c. Mitigation Measures. For effects that are "Less than Significant with Mitigation Measures Incorporated," describe the mitigation measures which were incorporated or refined from the earlier document and the extent to which they address site-specific conditions for the project.

- 6) Lead agencies are encouraged to incorporate into the checklist references to information sources for potential impacts (e.g., general plans, zoning ordinances). Reference to a previously prepared or outside document should, where appropriate, include a reference to the page or pages where the statement is substantiated.
- 7) Supporting Information Sources: A source list should be attached, and other sources used or individuals contacted should be cited in the discussion.
- 8) This is only a suggested form, and lead agencies are free to use different formats; however, lead agencies should normally address the questions from this checklist that are relevant to a project's environmental effects in whatever format is selected.
- 9) The explanation of each issue should identify:
  - a. The significance criteria or threshold, if any, used to evaluate each question.
  - b. The mitigation measure identified, if any, to reduce the impact to less than significant.

## ENVIRONMENTAL IMPACT CHECKLIST

### I. Aesthetics

Except as provided in Public Resources Code Section 21099, would the Project:	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a) Have a substantial adverse effect on a scenic vista?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Substantially damage scenic resources, including but not limited to, trees, rock outcropping, and historic buildings within a state scenic highway?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) 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 point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

### DISCUSSION

- a. No Impact.** A scenic vista is generally considered a view of an area that has remarkable scenery or a natural resource that is indigenous to the area. Scenic views in the vicinity of the aqueduct system alignment include views of scenic ridges, rolling hillsides, agricultural land, ranches, rock formations, as well as the San Francisco Bay and Delta estuary systems.

Routine maintenance activities would be conducted within EBMUD ROW adjacent to the aqueducts. These activities would involve minimal use of heavy equipment and would occur only temporarily during daylight hours on weekdays. Generally, these activities would occur within channels and culverts and would be temporary in nature; these activities would not reduce the quality of views from nearby adjacent lands. In addition, the Project would not result in the construction of any new structures or facilities that would block surrounding scenic views. Therefore, implementation of the Project would not impact any scenic vistas.

- b. No Impact.** Maintenance activities would occur within the boundaries of the existing Mokelumne Aqueduct System ROW and would not be located within a state scenic highway. The aqueduct system alignment crosses Highway 4 in Contra Costa County, which is an eligible state scenic highway, but not officially designated (Caltrans 2019). In this location, the aqueducts are underground and no routine maintenance activities are anticipated to occur. Therefore, no impact would occur related to substantially damaging scenic resources within a state scenic highway.

- c. Less than Significant Impact.** The visual character and quality of the Project alignment varies as the aqueducts travels through both rural (i.e., non-urbanized) and urbanized areas. The aqueducts are

primarily located underground, except for a portion of the alignment located along the islands in the Delta that is aboveground and supported on timber, reinforced-concrete, or steel bents. For the most part, the aqueduct system alignment is not visible from public roadways or in areas that are accessible to the public. Recreational trails located adjacent to the alignment are generally limited to the urban areas in the City of Stockton and along the alignment from the Cities of Antioch to Walnut Creek. Few residences are located adjacent to the alignment in the rural areas; however, residences may abut the Project alignment as it travels through the more urban areas. Viewer groups in the vicinity of the Project area include motorists on nearby roadways; recreational users along trails; and residents whose homes are near the alignment. Although the approximately 100-mile alignment travels through a variety of land uses, maintenance activities would only occur at specific locations and not along the entire length.

During maintenance activities, temporary visual impacts would occur from the presence of personnel, equipment, staging, earthwork, and other maintenance-related activities. However, maintenance would be intermittent and temporary at each maintenance site. Visual changes at maintenance sites would result from thinning or removal of vegetation along channels and access roads, removal of sediment and debris in channels, alterations from repair or replacement of culverts, crossings, and other structures, or the presence of newly stabilized bank areas. All maintenance work would be implemented to maintain the functional and structural integrity of EBMUD facilities. Therefore, to the extent that the maintenance sites can be seen by the public, views of maintenance activities would either be fleeting or of a short duration and would be temporary. The overall visual quality of the maintained facilities would not change. Visual impacts would therefore be less than significant, and no mitigation is required.

- d. No Impact.** Routine maintenance activities would be conducted during daylight hours; thus, no nighttime lighting would be needed. The Project would not involve construction of new facilities or modifications to existing facilities that would result in new reflective surfaces or installation of lighting. Therefore, implementation of the Project would not introduce any new sources of substantial light or glare within the Project area. No impacts would occur.



## II. Agriculture and Forestry Resources

In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment Project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board. -- Would the project:	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland) to non-agricultural use?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220[g]) or timberland (as defined in Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51140 (g))	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) Result in the loss of forest land or conversion of forest land to non-forest use?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

### DISCUSSION

**a through e. No Impact.** The Project passes through areas designated as Prime Farmland, Unique Farmland, and Farmland of Statewide Importance; however, routine maintenance activities along the aqueduct system alignment would occur in access roads within the EBMUD ROW. None of these areas would be converted into non-agricultural use. As such, there would be no impact to these designated farmlands.

The Project passes through areas zoned as Agriculture (see Section XI, Land Use) and lands under a Williamson Act Contract. The Project's routine maintenance activities, however, would only occur within the existing access roads within EBMUD ROW. As such, there would be no conflict with areas zoned as Agriculture or to lands under a Williamson Act Contract.

None of the areas within the Project are currently zoned for forest land, timberland, or timberland zoned Timberland Production. There would be no conflicts or rezoning of forest lands, timberlands or timberland zoned Timberland Productions.

### III. Air Quality

Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Conflict with or obstruct implementation of the applicable air quality plan?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b) 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?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
c) Expose sensitive receptors to substantial pollutant concentrations?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
d) Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

### DISCUSSION

The Clean Air Act is implemented by the U.S. Environmental Protection Agency and sets ambient air quality limits, the National Ambient Air Quality Standards (NAAQS), for six criteria pollutants: particulate matter (PM), carbon monoxide, nitrogen oxides (NOx), ground-level ozone and lead. Of these criteria pollutants, PM and ground-level ozone pose the greatest threat to human health. The California Air Resources Board (CARB) sets California’s ambient air quality standards for criteria pollutants that are more stringent than the NAAQS.

The proposed Project passes through three air basins (i.e., the San Francisco Bay Area, San Joaquin Valley, and the Mountain Counties air basins) and the jurisdictions of three air districts. The regional agencies responsible for air quality regulation within the proposed Project area include the Bay Area Air Quality Management District (BAAQMD), San Joaquin Valley Air Pollution Control District (SJVAPCD), and the Calaveras County Air Pollution Control District (CCAPCD). These agencies regulate air quality through their planning, review, and permitting activities, and have established thresholds of significance for project emissions of criteria pollutants (**Table 3-1**, BAAQMD 2017a, SJVAPCD 2015, CCAPCD 2018, Pers. Comm. Carson 2018.). Table 3-1 provides recommended significance criteria for analysis of air quality impacts, including cumulative impacts. Although the proposed Project is a maintenance-related project (more commonly associated with operational activities), the type of work and equipment used for the proposed Project is more construction-like in nature. For this reason, both construction and operational thresholds are included in Table 3-1 below and considered in the Project’s air quality analysis. EBMUD considers these districts’ adopted thresholds of significance adequate to provide a conservative evaluation of a project’s potential air quality impacts.

**Table 3-1: Thresholds of Significance for Air Districts in the Project Area**

Air Basin	San Francisco Bay Area		San Joaquin Valley		Mountain Counties
Air District*	Bay Area Air Quality Management District		San Joaquin Valley Air Pollution Control District		Calaveras County Air Pollution Control District
<b>Construction Emissions</b>					
	Average Daily (lb/day)		(tpy)		(lbs/day)
CO			100		
NO <sub>x</sub>	54		10		150
ROG	54		10		150
SO <sub>x</sub>			27		
PM <sub>10</sub>	82 (exhaust)		15		150
PM <sub>2.5</sub>	54 (exhaust)		15		
PM <sub>10</sub> /PM <sub>2.5</sub> (Fugitive Dust)	Best Management Practices				
<b>Operational Emissions</b>					
	Avg. Daily (lb/day)	Max Annual (tpy)	Permitted Equipment & Activities (tpy)	Non-Permitted Equipment & Activities (tpy)	(lbs/day)
CO			100	100	
NO <sub>x</sub>	54	10	10	10	150
ROG	54	10	10	10	150
SO <sub>x</sub>			27	27	
PM <sub>10</sub>	82	15	15	15	150
PM <sub>2.5</sub>	54	10	15	15	
PM <sub>10</sub> /PM <sub>2.5</sub> (Fugitive Dust)	None				

<sup>1</sup> \*Responsible for section of air basin proposed project passes through.

Source: BAAQMD 2017a, SJVAPCD 2015, CCAPCD 2018, Pers. Comm. Carson 2018.

- a. Less than Significant Impact.** The proposed Project would have a significant impact if it would conflict with or impair implementation of applicable air quality plans established by the BAAQMD, SJVAPCD, CCAPCD, or local general plans.

The San Francisco Bay Area Air Basin (SFBAAB) and San Joaquin Valley Air Basin (SJVAB) are currently in state and federal non-attainment for ozone and particulate matter less than 2.5 microns in diameter (PM<sub>2.5</sub>) air quality standards, and in state non-attainment for particulate matter less than 10 microns in diameter (PM<sub>10</sub>) air quality standards (CARB 2017, USEPA 2018a, USEPA 2018b, BAAQMD 2017b, BAAQMD 2017c, SJVAPCD 2019a). Calaveras County, which is part of the Mountain Counties air basin, is in state and federal non-attainment for ozone air quality standards, and state non-attainment for PM<sub>10</sub> (CARB 2017, USEPA 2018a, USEPA 2018b).

To address these existing ambient air quality impairments, the local air districts have prepared air quality plans. The BAAQMD Final 2017 Clean Air Plan (2017 CAP), also titled “Spare the Air – Cool the Climate”, provides a comprehensive plan to improve Bay Area air quality and protect public

health (BAAQMD 2017c). The 2017 CAP defines a control strategy that the BAAQMD and its partners would implement to: 1) reduce emissions of criteria air pollutants and toxic air contaminants from all key sources, 2) reduce emissions of “super-GHGs” such as methane, black carbon and fluorinated gases, 3) decrease demand for fossil fuels (gasoline, diesel and natural gas), and 4) decarbonize the Bay Area’s energy system. The 2017 CAP serves as an update to the most recent ozone plan, the 2010 Clean Air Plan, and contains measures for reducing emissions of ozone precursors. The SJVAPCD has separate plans for addressing particulate matter and ozone and is included in the California State Implementation Plan for Carbon Monoxide (SJVAPCD 2019b). The SJVAPCD’s *2018 Plan for the 1997, 2006, and 2012 PM<sub>2.5</sub> standards* describes an attainment strategy for PM<sub>2.5</sub> that outlines emission reduction measures by the SJVAPCD and CARB, a comprehensive incentive-based strategy, and a comprehensive existing regulatory control strategy. Other SJVAPCD air quality plans include the *2007 PM<sub>10</sub> Maintenance Plan* and the *2016 Plan for the 2008 8-hour Ozone Standard*. The CCAPCD does not have a prepared air quality plan.

As described in more detail in Impact 3.b below and Appendix C, the proposed Project would involve ground disturbing activities and the use of fossil fuel-powered vehicles and equipment that would emit criteria pollutants. Emissions from these activities would not exceed the applicable annual or daily thresholds as shown in Table 3-2 below. The proposed maintenance activities are similar in scale to what has taken place historically and would occur for a short duration of time at any given location; therefore, the proposed maintenance activities would not result in any permanent changes in local populations along the aqueduct system route. In addition, the proposed Project would follow all federal, state, and local regulations related to sources of air pollutants. In addition, the exposure of sensitive receptors to short-term construction exhaust emissions would be minimized with implementation of equipment idling time restrictions and compliance with manufacturer’s specifications of equipment, as detailed in Chapter 4 of EBMUD’s Environmental Compliance Manual. Therefore, Project impacts related to exposure of sensitive receptors to substantial pollutant concentrations would be less than significant. No mitigation is required.

- b. Less than Significant Impact.** During the proposed Project’s maintenance activities, fuel combustion involved with vehicle/truck use and operating off-road equipment would release particulate matter (PM<sub>2.5</sub> and PM<sub>10</sub>) and other contaminants associated with motor vehicle operation, including carbon monoxide and ozone precursors (reactive organic gases [ROG] and NO<sub>x</sub>). These emissions were estimated using the California Emissions Estimator Model (CalEEMod) version 2016.3.2 using information from the Project Description. In a typical year of the proposed Project’s maintenance activities, it was assumed that off-road equipment use would occur up to 60 days per year, and a maximum of 633 trips per year covering an average of 12,660 miles would be generated. Types and quantities of off-road equipment would be used as described in Table 2-1 of the Project Description. The air districts in the Project area have established guidelines for determining significance for air quality analyses, which are shown in Table 3-1. Projects below these mass emission thresholds would not have a significant impact on air quality. While Project emissions could potentially contribute to the existing air basins statuses of non-attainment for ozone, PM<sub>2.5</sub>, and/or PM<sub>10</sub> as detailed above, CALEEMOD modeling results show that emissions associated with the proposed Project’s maintenance activities would not exceed any of the applicable annual or daily thresholds (Table 3-2). The CALEEMOD modeling results and assumptions are provided in Appendix C. Thus, the impact of the proposed Project would be less than significant. No mitigation is required.

**Table 3-2: Criteria Pollutant Emissions during Maintenance Activities**

Emission Type or Applicable Threshold	Annual Emissions (tons/year (tpy)) and Thresholds							
	ROG	NO <sub>x</sub>	CO	SO <sub>2</sub>	Fugitive PM10	Exhaust PM10	Fugitive PM2.5	Exhaust PM2.5
2019 Annual Emissions (tpy)	0.06	0.57	0.36	0.001	0.005	0.02	0.001	0.02
BAAQMD Max Annual (tpy)	10	10				15		10
SJVAPCD Annual (tpy)	10	10	100	27	15		15	
<b>Above Annual Threshold?</b>	No	No	No	No	No		No	
Emission Type or Applicable Threshold	Daily Emissions (pounds/day) and Thresholds							
	ROG	NO <sub>x</sub>	CO	SO <sub>2</sub>	Fugitive PM10	Exhaust PM10	Fugitive PM2.5	Exhaust PM2.5
2019 Daily Emissions (lb/day)	2.46	24.72	15.01	0.05	0.22	0.94	0.06	0.87
BAAQMD Average Daily (lb/day)	54	54	NA	NA	BMPs	82	BMPs	54
CCAPCD (lbs/day)	150	150			150			
<b>Above Daily Threshold?</b>	No	No	No	No	No		No	

**Notes:**

ROG = reactive organic gases  
 CO = carbon monoxide  
 NO<sub>x</sub> = oxides of nitrogen

PM<sub>10</sub> = particulate matter 10 microns or less in diameter  
 PM<sub>2.5</sub> = fine particulate matter 2.5 microns or less in diameter  
 SO<sub>2</sub> = sulfur dioxide

Source: CalEEMod modeling results are provided in Appendix C.

- c. Less than Significant Impact.** The aqueduct system passes within 50 feet of numerous residences, and multiple maintenance sites fall within 40-70 feet of residences near the EBMUD Trail in Walnut Creek and Delta de Anza Regional Trail in Pittsburg. However, any exposure of these sensitive receptors to pollutant emissions from maintenance activities would be infrequent, temporary, and short in duration.

Historic asbestos mines and ultramafic rock are found in the project vicinity at Lake Chabot, and the Pardee and Upper San Leandro Reservoirs. Known occurrences of ultramafic rock are more than a mile from identified maintenance sites. As such, there is no substantive risk posed by exposure of naturally-occurring asbestos given the distance between maintenance sites and ultramafic rock occurrences.

In addition, the exposure of sensitive receptors to short-term construction exhaust emissions would be minimized with implementation of equipment idling time restrictions and compliance with manufacturer's specifications of equipment, as detailed in Chapter 4 of EBMUD's Environmental Compliance Manual. Therefore, Project impacts related to exposure of sensitive receptors to substantial pollutant concentrations would be less than significant. No mitigation is required.

- d. Less than Significant Impact.** Short-term maintenance activities involving sediment removal or requiring the use of construction equipment and trucks that emit diesel- and/or gasoline-powered engine exhaust may be a potential source of objectionable odors. Once maintenance activities have been completed, these odors would cease. The proposed maintenance activities would be short in duration and infrequent at each site and would therefore not generate long-term objectionable odors affecting a substantial number of people. Objectionable odor related impacts would be less than significant. No mitigation is required.

*This page intentionally left blank*



**IV. Biological Resources**

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Have a substantial adverse impact, either directly or through habitat modifications on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations or by the California Dept. of Fish & Wildlife or U.S. Fish & Wildlife Service?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Have a substantial adverse impact on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Dept. of Fish & Wildlife or U.S. Fish & Wildlife Service?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) Have a substantial adverse impact 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?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d) Interfere substantially with the movement of any resident or migratory fish or wildlife species or with established resident or migratory wildlife corridors, or impede the use of wildlife nursery sites?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Conservation Community Plan, or other approved local, regional, or state habitat conservation plan?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

**DISCUSSION**

This biological resource impact analysis is based on the Biological Resources Assessment for the Mokelumne Aqueduct System Routine Maintenance Project, prepared by Horizon Water and Environment (July 2019a). The potential for special-status species to occur at or near the Mokelumne Aqueduct System drainage maintenance site locations (Project sites) was evaluated by determining which special-status species occur in the vicinity of the Project sites through a literature and background data review, and biological information database searches. Biologists conducted reconnaissance-level surveys of representative Project sites throughout the aqueduct system on December 13, 18, and 19, 2018, to characterize anticipated Project activities, land and aquatic cover within and near the aqueduct system, and determine suitability for the aqueduct system alignment and adjacent surrounding area to support special-status species and/or other protected biological resources. The existing Mokelumne Aqueduct System alignment spans from the San Francisco Bay (SF Bay) Area (Alameda and Contra Costa

counties), through the Sacramento-San Joaquin River Delta (eastern portion of Contra Costa County and northwestern portion of San Joaquin County to Stockton), through the Central Valley (Stockton to northeastern San Joaquin County), and the Sierra Nevada Foothills (from northeast San Joaquin County to northwest Calaveras County, near Camp Seco). The aqueduct system alignment is surrounded by a variety of land cover types including:

- agricultural land (pastures, orchards, row crops, and irrigated pastures);
- woodland (coast live oak [*Quercus agrifolia*], valley oak [*Q. lobata*], blue oak [*Q. douglasii*], blue oak-foothill pine [*Pinus sabiniana*], interior live oak [*Q. wislizeni*], and redwood [*Sequoia sempervirens*] forest);
- valley foothill riparian;
- California annual grassland;
- ruderal; and
- developed [includes landscaped vegetation].

Lacustrine (i.e., lake, pond) and riverine (i.e., perennial, intermittent, and ephemeral streams) aquatic features are typically spanned by above-ground, raised portions of the aqueduct system. Wetland features (i.e., freshwater marsh, seasonal wetland, and vernal pool) occur adjacent to the aqueduct system alignment, often due to the presence of the aqueduct system alignment as a topographically-elevated berm that impedes the flow of water against the toe of its slope.

Vegetation within upland portions of the aqueduct system alignment consists of primarily ruderal and California annual grassland, that is routinely mowed to maintain the height at or below 4 inches tall. Proposed maintenance site locations consist of drainages and other waterbodies supporting lacustrine (i.e., lake, pond) and riverine (i.e., perennial, intermittent, and ephemeral streams) aquatic features. Vegetation within these locations may include freshwater marsh, seasonal wetlands and vernal pools, woodlands (dominated by coast or interior live oak, blue oak, valley oak, or foothill pine), redwood forest, valley foothill riparian, California annual grassland, or ruderal lands, as described in the Biological Resources Assessment.

### **Special-Status Species Potential to Occur at Project Maintenance Sites**

Special-status species included those listed as endangered, threatened, rare, or proposed for listing by U.S. Fish and Wildlife Service (USFWS) or California Department of Fish and Wildlife (CDFW). California Native Plant Society (CNPS) plant lists and locally rare plant lists were also reviewed. Database searches for known occurrences of special-status species focused on a two-mile area around the overall aqueduct system alignment, which is more expansive than the Project sites themselves. When spatial data queries were not possible, U.S. Geological Survey (USGS) 7.5-minute quads in which the aqueduct system is located were searched for special-status species records. The following sources were reviewed to determine which special-status plant, wildlife, and fish species have been documented to occur in the vicinity of individual maintenance site locations:

- California Natural Diversity Database (CNDDB) records (Horizon 2019a) (CDFW 2018)
- USFWS Official Species Lists (San Francisco Bay-Delta and Sacramento regional offices) (Horizon 2019a) (USFWS 2018a)

- USFWS Critical Habitat Portal (USFWS 2018b)
- National Wetland Inventory (NWI) (USFWS 2018c)
- National Oceanic and Atmospheric Administration Essential Fish Habitat
- CNPS Inventory of Rare and Endangered Plants (Horizon 2019a) (CNPS 2019a)
- CNPS list of Rare, Unusual and Significant Plants of Alameda and Contra Costa Counties (Horizon 2019a) (CNPS 2019b)
- EBMUD special-status species observation records
- eBird records (Cornell Lab of Ornithology 2018)

**Table 3-3** below describes the special-status species with potential to occur in or near the Project sites that could be affected by Project activities. Aqueduct segment numbers, referenced in the analysis below, can be identified in the Appendix A detailed maps. The complete lists of special-status plant, wildlife, and fish species considered are documented in the Biological Resources Assessment (Horizon 2019a).

No special-status species were observed at the surveyed Project sites during the December reconnaissance-level surveys, but several special-status species have a moderate or better potential to occur given the land cover and/or presence of aquatic or wetland features present, field observations surveyed by the biologists and/or the proximity of occurrence records.

### **Approach to Impact Analysis**

The impact analysis for aquatic and surrounding land covers was based on the maintenance activity descriptions and frequency described in the Project Description, *Chapter 2*. Aquatic features were categorized by drainage channel type (i.e., natural, engineered earthen, or concrete-lined) and inundation frequency (i.e., perennial, intermittent, ephemeral, or seasonal wetland), based on field surveys and aerial photography. Surrounding vegetation cover was also assessed based on field surveys and aerial photography, and categorized by vegetation community type (e.g., freshwater marsh, valley foothill riparian, California annual grassland). The channel width at each Project site was measured in Google Earth and a subset of channel width measurements were confirmed with data collected from field surveys. Channel widths were totaled by the channel type category and inundation frequency subcategories, and the averages of each subcategory was calculated. Since Project activities entail different annual impact maxima, impact calculation methods specific to each proposed Project activity are described separately below:

- **Bank/levee repair and erosion protection:** (Culvert/crossing replacement would occur within this disturbance footprint)
  - **Stream Impacts:** The average channel widths at identified Project sites by channel type were multiplied by the maximum linear distance of proposed bank/levee repair and erosion protection activities according to the respective maxima for each channel type (i.e., 200 feet in natural channels, 300 feet in engineered earthen channels, and 500 feet in concrete channels, as described in the project description). This yielded an estimated total impact footprint for this activity annually. Refer to Table 3-5 for a quantification of existing streams within the Mokelumne Aqueduct System and Table 3-6 for estimated annual impacts from bank/levee repair and erosion protection activities within these streams.

- **Vegetation Community Impacts:** The estimated percentage of vegetation cover by community type present in each channel was based on desktop review of Google Earth images coupled with field verification at select sites. Because the presence of vegetation communities within maintained channels is very low (approximately 0.03-acre total) as compared to the acreage of channels within the Mokelumne Aqueduct System (approximately 14.51 acres total), vegetation impacts would be miniscule on an annual basis. Detailed calculations have therefore not been estimated. Refer to Table 3-4 for a summary of sensitive natural communities located within potential maintenance sites.
  - **Sediment and debris removal:** Since sediment and debris removal typically would not exceed 1,250 square feet in natural channels, 2,500 square feet in engineered earthen channels, and 6,000 square feet in concrete-lined channels on an annual basis (as described in the project description), these areas were used to determine the annual impact maxima to each channel type from this activity. Refer to Table 3-6 for estimated annual impacts from sediment and debris removal within these streams.
  - **Vegetation Management:** Vegetation management would be limited to the bed and banks of drainages and other waterbodies crossing Aqueduct System alignments. As described above under bank/levee repair and erosion protection, vegetation impacts within the ROW at drainages would be miniscule on an annual basis as a result of ongoing channel maintenance.
- a. **Less than Significant Impact with Mitigation Incorporated.** The biological inventory database searches and field surveys identified several special-status plant, invertebrate, amphibian, reptile, bird, mammal, and fish species that have a moderate or greater potential to occur at the Project sites (refer to Table 3-3 below).

**Table 3-3: Special-Status Species with Potential to Occur in the Project Sites**

COMMON NAME	SCIENTIFIC NAME	STATUS FED/CA/CRPR <sup>1</sup>	RANGE & HABITAT	OCCURRENCE POTENTIAL <sup>2</sup>	PROJECT SITE #(S) WITH POTENTIAL TO OCCUR
<b>PLANTS</b>					
Woolly rose-mallow	<i>Hibiscus lasiocarpus</i> var. <i>occidentalis</i>	-/-/1B.2	Known from records in Alameda, Butte, Contra Costa, Colusa, Glenn, Lake, Riverside, Sacramento, San Joaquin, Solano, Sutter, Tehama, and Yolo counties. Moist, freshwater-soaked river banks and low peat islands in sloughs; can occur on riprap and levees. In California, known from the Delta watershed. 0-120 meters above mean sea level (amsl). Blooms June-September.	<b>Possible.</b> Marginal habitat (river banks, riprap levees) occurs within some maintenance sites in the Sacramento-San Joaquin Delta. There are 10 CNDDDB occurrence records within 2 miles of the maintenance sites.	80 – 89, 103, 104, 108, 109, 120, 124, 125
Delta tule pea	<i>Lathyrus jepsonii</i> var. <i>jepsonii</i>	-/-/1B.2	Known from records in Alameda, Contra Costa, Fresno, Marin, Napa, Sacramento, Santa Clara, Shasta, San Joaquin, San Mateo, and Solano counties.  Freshwater and brackish marshes, usually on marsh and slough edges. Often found with cattails ( <i>Typha</i> spp.), Suisun marsh aster ( <i>Symphyotrichum lentum</i> ), California rose ( <i>Rosa</i>	<b>Possible.</b> Marginal habitat (marsh and slough edges) occurs within some maintenance sites in the Sacramento-San Joaquin Delta. There are 15 CNDDDB occurrence records within 2 miles of the maintenance sites.	80 – 89, 103, 104, 108, 109, 120, 124, 125

*Initial Study / Mitigated Negative Declaration*  
*Mokelumne Aqueduct System Routine Maintenance Project*

COMMON NAME	SCIENTIFIC NAME	STATUS FED/CA/CRPR <sup>1</sup>	RANGE & HABITAT	OCCURRENCE POTENTIAL <sup>2</sup>	PROJECT SITE # (S) WITH POTENTIAL TO OCCUR
			<i>californica</i> ), rushes ( <i>Juncus</i> spp.), and bulrushes ( <i>Schoenoplectus</i> spp.). 0-5 meters amsl. Blooms May-September.		
Mason's lilaeopsis	<i>Lilaeopsis masonii</i>	-/SR/1B.1	Known from records in Alameda, Contra Costa, Marin, Napa, Sacramento, San Joaquin, Solano, and Yolo counties. Freshwater and brackish marshes and riparian scrub. Tidal zones, in muddy or silty soil formed through river deposition or river bank erosion. 0-10 meters amsl. Blooms April-November.	<b>Possible.</b> Marginal habitat (marsh and riparian scrub) occurs within some maintenance sites in the Sacramento-San Joaquin Delta. There are 25 CNDDDB occurrence records within 2 miles of the maintenance sites.	80 – 89, 103, 104, 108, 109, 120, 124, 125
southern mudwort	<i>Limosella acaulis</i>	-/-/ (EBCNPS A2)	Known from records throughout California except from Del Norte, Siskiyou, Humboldt, Trinity, Glenn, Lake, Sutter, Santa Cruz, El Dorado, Amador, Alpine, Calaveras, Stanislaus, Tulare, Kings, Kern, Santa Barbara, Ventura, Orange, and Imperial counties. Wet muddy to sandy areas along freshwater sloughs marshes and, outside of the Sacramento-San Joaquin River Delta, other wetlands. 0-3,300 meters	<b>Possible.</b> Marginal habitat (marsh and riparian scrub) occurs within some maintenance sites in the Sacramento-San Joaquin Delta. CNDDDB occurrence records absent within 2 miles of the maintenance sites.	80 – 89, 103, 104, 108, 109, 120, 124, 125

COMMON NAME	SCIENTIFIC NAME	STATUS FED/CA/CRPR <sup>1</sup>	RANGE & HABITAT	OCCURRENCE POTENTIAL <sup>2</sup>	PROJECT SITE #(S) WITH POTENTIAL TO OCCUR
			amsl. Blooms May-October		
Delta mudwort	<i>Limosella australis</i>	-/-/2B.1	Known from records in Alameda, Contra Costa, Marin, Plumas, Sacramento, San Joaquin, and Solano counties. In the Delta in riparian scrub, freshwater marsh, brackish marsh, usually on mud banks; often with <i>Lilaeopsis masonii</i> . Probably the rarest of the suite of Delta rare plants. 0-3 meters amsl. Blooms May-August.	<b>Possible.</b> Marginal habitat (marsh and riparian scrub) occurs within some maintenance sites in the Sacramento-San Joaquin Delta. There are 2 CNDDDB occurrence records within 2 miles of the maintenance sites.	80 – 89, 103, 104, 108, 109, 120, 124, 125
<b>INVERTEBRATES</b>					
Valley elderberry longhorn beetle	<i>Desmocerus californicus dimorphus</i>	FT/-/-	Occurs only in the California Central Valley in association with blue elderberry ( <i>Sambucus nigra</i> ssp. <i>caerulea</i> ) shrubs with stems 1 inch or greater basal diameter.	<b>Possible.</b> Maintenance sites in the eastern San Francisco Bay area, Sacramento-San Joaquin Delta, and lower Sierra Nevada foothills are within the species' range and suitable elderberry shrubs could occur within some maintenance sites. There are 3 CNDDDB occurrence records in San Joaquin and Calaveras counties within 2 miles of the maintenance sites.	1-14, 16-22, 74-77, 90-91, 119 (where suitable elderberry present)

*Initial Study / Mitigated Negative Declaration*  
*Mokelumne Aqueduct System Routine Maintenance Project*

COMMON NAME	SCIENTIFIC NAME	STATUS FED/CA/CRPR <sup>1</sup>	RANGE & HABITAT	OCCURRENCE POTENTIAL <sup>2</sup>	PROJECT SITE #(S) WITH POTENTIAL TO OCCUR
<b>AMPHIBIANS</b>					
California tiger salamander	<i>Ambystoma californiense</i>	FT/ST/-	Central Valley, including Sierra Nevada foothills, up to approximately 1,000 feet amsl, and from Sonoma County south to Santa Barbara County along coast. Need underground refuges, especially ground squirrel burrows & vernal pools or other seasonal water sources for breeding.	<b>Present.</b> The species is known to occur within (observed by EBMUD biological staff) certain Central Valley and Sierra Nevada foothills maintenance sites. Suitable habitat (grassland and oak woodland near vernal pools, ponds, and seasonal wetlands) is present at the maintenance sites in the San Francisco Bay area, Central Valley, and Sierra Nevada foothills. There are 32 CNDDDB occurrence records from Contra Costa, San Joaquin, and Calaveras counties within 2 miles of the maintenance sites.	1-48, 50, 54-58, 64, 135-136, 159, 161
Foothill yellow-legged frog	<i>Rana boylei</i>	-/ST, SSC/-	Coast and coastal mountain ranges from Oregon border south to Ventura County, Sierra Nevada foothills south to Tulare County. Disjunct populations in eastern Los Angeles County and northern Sutter County. Lowlands & foothills in or	<b>Possible.</b> Suitable habitat (freshwater streams) is present within maintenance sites in the San Francisco Bay area and Sierra Nevada foothills. There are 5 CNDDDB occurrences from Alameda and Contra Costa counties within 2	1-14, 16-22, 150-152, 159, 164-165, 168, 172, 175



COMMON NAME	SCIENTIFIC NAME	STATUS FED/CA/CRPR <sup>1</sup>	RANGE & HABITAT	OCCURRENCE POTENTIAL <sup>2</sup>	PROJECT SITE # (S) WITH POTENTIAL TO OCCUR
			near permanent sources of deep water with dense, shrubby or emergent riparian vegetation	miles of the maintenance sites, but the most recent occurrence record dates from 1950s.	
California red-legged frog	<i>Rana draytonii</i>	FT/SSC/-	Coast and coastal mountain ranges from Mendocino County to San Diego County, and in the Sierra Nevada Mountains from Butte County south to Stanislaus County. Streams, freshwater pools, and ponds with emergent vegetation	<b>Possible.</b> Suitable habitat (freshwater streams and ponds) present within maintenance sites in the San Francisco Bay Area. There are 16 CNDDDB occurrence records from Alameda and Contra Costa counties within 2 miles of the maintenance sites.	1-14, 16-22, 150-152, 159, 164-165, 168, 172, 175
Western spadefoot	<i>Spea hammondi</i>	-/SSC/-	Sierra Nevada foothills, Central Valley, Coast Ranges, coastal counties in southern California. Occurs primarily in grassland habitats, but can be found in oak woodlands. Vernal pools, seasonal wetlands, and shallow streams are essential for breeding and egg-laying.	<b>Present.</b> Species known to occur near certain maintenance sites (observed by EBMUD biological staff) in the Central Valley and Sierra Nevada foothills. Suitable habitat (grassland and oak woodland near vernal pools, seasonal wetlands, and shallow streams) present within maintenance sites in the Central Valley and Sierra Nevada foothills. There are 2 CNDDDB occurrence records from Calaveras and San Joaquin counties within 2 miles of the	1-48, 50, 54-58, 64

*Initial Study / Mitigated Negative Declaration*  
*Mokelumne Aqueduct System Routine Maintenance Project*

COMMON NAME	SCIENTIFIC NAME	STATUS FED/CA/CRPR <sup>1</sup>	RANGE & HABITAT	OCCURRENCE POTENTIAL <sup>2</sup>	PROJECT SITE #(S) WITH POTENTIAL TO OCCUR
				maintenance sites.	
<b>REPTILES</b>					
Silvery legless lizard	<i>Anniella pulchra</i>	-/SSC/-	Coast, Transverse, and Peninsular ranges from Contra Costa County south to San Diego County with periodic occurrences in the San Joaquin Valley. Found in chaparral, coastal dunes, and coastal scrub areas with sandy or loose loamy soils under sparse vegetation. Prefer soils with a high moisture content.	<b>Possible.</b> Suitable habitat (sandy soil) exists at maintenance sites in the eastern portion of the San Francisco Bay area. There are 3 CNDDDB occurrence records from Contra Costa County within 2 miles of the maintenance sites.	120-127
California glossy snake	<i>Arizona elegans occidentalis</i>	-/SCC/-	Coastal and Peninsular to western Transverse ranges in southern California, north to southern Monterey County, and eastern slope of the Coast Range adjacent to the San Joaquin Valley north to eastern Contra Costa County. Generalist reported from a range of scrub and grassland habitats, often with loose or sandy soils.	<b>Possible.</b> Suitable grassland habitat with sandy or loose soils occurs at maintenance sites in the eastern San Francisco Bay area. No CNDDDB occurrence records are known from the study area.	126
Western pond turtle	<i>Actinemys (=Emys) marmorata</i>	-/SSC/-	Oregon border of Del Norte and Siskiyou Counties south along coast to San Francisco Bay, inland through Sacramento	<b>Present.</b> Species known to occur near certain maintenance sites (observed by EBMUD biological staff) in the	1-6, 9-14, 16-44, 49-58, 60-68, 74, 77-129, 132-136, 140-142, 144-154, 156-157, 159, 161, 163-

COMMON NAME	SCIENTIFIC NAME	STATUS FED/CA/CRPR <sup>1</sup>	RANGE & HABITAT	OCCURRENCE POTENTIAL <sup>2</sup>	PROJECT SITE #(S) WITH POTENTIAL TO OCCUR
			Valley, and on the western slope of the Sierra Nevada Mountains. Found in ponds, marshes, rivers, streams & irrigation ditches, usually with aquatic vegetation. Needs basking sites.	Sierra Nevada foothills. Suitable aquatic and upland nesting habitat for western pond turtles is present at maintenance sites throughout the San Francisco Bay area, Sacramento-San Joaquin Delta, Central Valley, and Sierra Nevada foothills. There are 9 CNDDDB occurrence records known from the study area.	166, 168, 170-175, 182-184
Alameda whipsnake	<i>Masticophis lateralis euryxanthus</i>	FT/ST/-	Southwestern to central Contra Costa County and western to central Alameda County. Inhabits southeast- to southwest- facing slopes and ravines where chaparral or coastal scrub form a vegetative mosaic with oak woodlands and grasses. Uses rock outcrops for refugia.	<b>Possible.</b> Suitable habitat (chaparral, scrub, grassland, and oak savanna) exists at maintenance sites in the central to western San Francisco Bay area region. There are 103 CNDDDB occurrence records known from within 2 miles of the maintenance sites within Alameda and Contra Costa counties.	160, 172, 164, 175
Coast horned lizard	<i>Phrynosoma blainvillii</i>	-/SSC/-	Sacramento Valley, including foothills, south through Transverse and Peninsular Ranges from Ventura to San Diego County in southern California; Coast Ranges south of Sonoma County;	<b>Possible.</b> Suitable sandy-substrate habitat exists at maintenance sites in the San Francisco Bay area, Central Valley, and Sierra Nevada foothills.	1-74, 79-126

*Initial Study / Mitigated Negative Declaration*  
*Mokelumne Aqueduct System Routine Maintenance Project*

COMMON NAME	SCIENTIFIC NAME	STATUS FED/CA/CRPR <sup>1</sup>	RANGE & HABITAT	OCCURRENCE POTENTIAL <sup>2</sup>	PROJECT SITE #(S) WITH POTENTIAL TO OCCUR
			<p>below 4,000 feet amsl.                      Uses a variety of habitats, most commonly sandy washes with low bushes. It needs open areas for sunning, bushes for cover, patches of loose soil for burial, &amp; abundant supply of ants &amp; other insects.</p>		
Giant garter snake	<i>Thamnophis gigas</i>	FT/ST/-	<p>Central Valley from the vicinity of Burrel in Fresno County north to near Chico in Butte County; has been extirpated from areas south of Fresno.</p> <p>Marshes, streams, wetlands, and riparian scrub, and agricultural wetlands, and rice fields. Prefers freshwater marsh and low gradient streams. Has adapted to drainage canals and irrigation ditches. Habitat consists of (1) adequate water during the snake's active season, (2) emergent herbaceous wetland vegetation for escape and foraging habitat, (3) grassy banks and openings in waterside vegetation for basking, and (4) higher elevation upland habitat for cover and refuge from flooding</p>	<p><b>Possible.</b> Suitable habitat (marsh, stream, slough, wetlands with emergent or aquatic vegetation) exists at maintenance sites in the Sacramento-San Joaquin Delta. One CNDDDB occurrence record of the species has been documented in San Joaquin County within 2 miles of the maintenance sites.</p>	74, 82-93

COMMON NAME	SCIENTIFIC NAME	STATUS FED/CA/CRPR <sup>1</sup>	RANGE & HABITAT	OCCURRENCE POTENTIAL <sup>2</sup>	PROJECT SITE #(S) WITH POTENTIAL TO OCCUR
			(USFWS 2012).		
<b>BIRDS</b>					
Tricolored blackbird	<i>Agelaius tricolor</i>	-/SSC/-	Year-round in California primarily along the Coast from Marin County south to Baja California, and throughout Central Valley and adjacent Coast Range. Highly colonial species, most numerous in Central Valley and vicinity. Largely endemic to California. Requires open water, protected nesting substrate, and foraging area with insect prey within a few kilometers of the colony. Nests in dense thickets of cattails ( <i>Typha</i> spp.), bulrush ( <i>Schoenoplectus</i> spp.), willow ( <i>Salix</i> spp.), blackberry ( <i>Rubus</i> spp.), wild rose ( <i>Rosa californica</i> ), and other tall vegetation near fresh water.	<b>Present.</b> Species known to occur near certain maintenance sites (observed by EBMUD biological staff) in the Sierra Nevada foothills. Suitable habitat (freshwater marsh) is present within maintenance sites in the Sacramento-San Joaquin Delta, Central Valley, and Sierra Nevada foothills. There are 2 CNDDB occurrence records of the species from San Joaquin County within 2 miles of the maintenance sites.	1-14, 16-22, 74, 82-93, 150-152, 159164-165,168, 172, 175
Cooper's hawk	<i>Accipiter cooperii</i>	-/-/- (MBTA)	Year-round resident of California. Breeds throughout the state. Woodland, primarily open,	<b>Possible.</b> Suitable woodland habitat occurs near maintenance sites in the San Francisco Bay	1-3, 5-11, 19-21, 33-34,74, 102, 132-133, 144-145, 150-151, 156-157, 159, 163-

*Initial Study / Mitigated Negative Declaration*  
*Mokelumne Aqueduct System Routine Maintenance Project*

COMMON NAME	SCIENTIFIC NAME	STATUS FED/CA/CRPR <sup>1</sup>	RANGE & HABITAT	OCCURRENCE POTENTIAL <sup>2</sup>	PROJECT SITE #(S) WITH POTENTIAL TO OCCUR
			interrupted or marginal quality. Primarily nests in live oak and riparian deciduous woodland, often in canyon bottoms on river floodplains.	area, Sacramento-San Joaquin Delta, Central Valley, and Sierra Nevada Foothills. No CNDDDB occurrence records occur within 2 miles of the maintenance sites.	168, 170-175, 184
Great blue heron	<i>Ardea herodias</i>	-/-/ (MBTA)	Year-round resident throughout Central Valley, San Francisco Bay, from Marin County to Yolo County, the Salton Sea, and Colorado River. Nonbreeding resident elsewhere in California. Freshwater, brackish, and marine wetlands, as well forage in flooded agricultural fields. Nests in colonies in trees located adjacent to waterbodies, rivers, estuaries, and marshes.	<b>Possible.</b> Suitable nesting habitat (trees near aquatic foraging habitat) occurs near maintenance sites in the San Francisco Bay area, Sacramento-San Joaquin Delta, Central Valley, and Sierra Nevada Foothills. No CNDDDB occurrence records occur within 2 miles of the maintenance sites.	74, 79-81, 90-93, 102-103, 107-115, 119-124, 150-152, 173, 182, 184
Short-eared owl	<i>Asio flammeus</i>	-/SSC/-	Permanent resident along the Coast from Del Norte County to Monterey County (rare in summer north of SF Bay), north of Nevada County in Sierra Nevada, plains east of the Cascades, and Mono County. Grasslands, marshes, and some agricultural lands of	<b>Possible.</b> Suitable nesting habitat (grassland) exists at maintenance sites in the Sacramento-San Joaquin Delta and Central Valley. CNDDDB occurrence records are absent from within 2 miles of the maintenance sites.	23-77, 81-125

COMMON NAME	SCIENTIFIC NAME	STATUS FED/CA/CRPR <sup>1</sup>	RANGE & HABITAT	OCCURRENCE POTENTIAL <sup>2</sup>	PROJECT SITE #(S) WITH POTENTIAL TO OCCUR
			the San Joaquin Valley.		
Burrowing owl	<i>Athene cunicularia</i>	-/SSC/-	<p>Lowlands throughout California, including the Central Valley, northeastern plateau, southeastern deserts, and coastal areas; rare along south coast.</p> <p>Yearlong resident of open, dry grassland and desert habitats, as well as in grass, forb and open shrub stages of pinyon-juniper and ponderosa pine habitats. Open, dry annual or perennial grasslands, deserts &amp; scrublands characterized by low-growing vegetation. Subterranean nester, dependent upon burrowing mammals, most notably, the California ground squirrel (<i>Spermophilus beecheyi</i>).</p>	<p><b>Present.</b> Species known to occur near certain maintenance sites (observed by EBMUD biological staff) in the Central Valley and western portion of the Sierra Nevada foothills. Suitable habitat (grassland with burrows) exists at maintenance sites in the San Francisco Bay area, Sacramento-San Joaquin Delta, and Central Valley. There are 44 CNDDDB occurrence records within 2 miles of the maintenance sites.</p>	<p>1-4, 17-34, 37-44, 49-53, 55-68, 82-83, 89-101, 116-118, 124-126</p>
Swainson's hawk	<i>Buteo swainsoni</i>	-/ST/-	<p>Lower Sacramento and San Joaquin valleys, Klamath Basin, and Butte Valley. Recent breeding in Santa Clara County and expected elsewhere in greater San Francisco Bay Area.</p>	<p><b>Possible.</b> Suitable nesting habitat (riparian woodland and tree groves) and foraging habitat (grassland and agricultural fields) exists at maintenance sites in the</p>	<p>74, 79-81, 90-93, 102-103, 107-115, 119-124, 129, 130-133, 150-152, 173, 182, 184</p>

*Initial Study / Mitigated Negative Declaration*  
*Mokelumne Aqueduct System Routine Maintenance Project*

COMMON NAME	SCIENTIFIC NAME	STATUS FED/CA/CRPR <sup>1</sup>	RANGE & HABITAT	OCCURRENCE POTENTIAL <sup>2</sup>	PROJECT SITE #(S) WITH POTENTIAL TO OCCUR
			Breeds in grasslands with scattered trees, juniper-sage flats, riparian areas, savannahs, and agricultural or ranch lands with groves or lines of trees. Requires adjacent suitable foraging areas such as grasslands, or alfalfa or grain fields supporting rodent populations.	San Francisco Bay area, Sacramento-San Joaquin Delta, and Central Valley. There are 34 CNDDDB occurrence records within 2 miles of the maintenance sites.	
Northern harrier	<i>Circus hudsonius</i> (formerly <i>cyaneus</i> )	-/SSC/-	California coast from Del Norte County south to San Luis Obispo, east of California Cascades, northern 2/3 of Central Valley, and portion of Great Basin within California. Nests in marshes and moist fields, forages over open areas.	<b>Present.</b> Species observed at certain maintenance sites in the Sacramento-San Joaquin Delta and Central Valley. Suitable nesting and foraging habitat (grasslands, marshes) exists within maintenance sites in the San Francisco Bay area, Sacramento-San Joaquin Delta, and Sierra Nevada foothills. No CNDDDB occurrence records are known from within 2 miles of the maintenance sites, but the species' taxonomy recently changed.	1-77, 79-126, 146-152
Snowy egret	<i>Egretta thula</i>	-/-/- (MBTA)	Year-round in San Francisco Bay, Sacramento-San Joaquin Delta, Central Valley, Salton Sea, and Colorado	<b>Present.</b> Species observed near certain maintenance sites in the Sacramento-San Joaquin Delta. Suitable nesting	74, 79-81, 90-93, 102-103, 107-115, 119-124, 150-152, 173, 182, 184



COMMON NAME	SCIENTIFIC NAME	STATUS FED/CA/CRPR <sup>1</sup>	RANGE & HABITAT	OCCURRENCE POTENTIAL <sup>2</sup>	PROJECT SITE #(S) WITH POTENTIAL TO OCCUR
			<p>River. Winters along the Southern California coast and migrates through the southern 2/3 of the state. Nest in colonies on thick vegetation on islands in salt and freshwater marshes and swamps. Forages in estuaries, marshes, tidal channels, shallow marine bays, agricultural fields, and other wetlands.</p>	<p>substrate (thick vegetation on islands) occurs near maintenance sites in the San Francisco Bay area, Sacramento-San Joaquin Delta, and Central Valley. No CNDDDB occurrence records occur within 2 miles of maintenance sites.</p>	
White-tailed kite	<i>Elanus leucurus</i>	-/SFP/-	<p>Lowlands west of the Sierra Nevada Mountains from Sacramento Valley south to western San Diego County (including coastal foothills and valleys). Nests in rolling foothills/valley margins with scattered oaks and river bottomlands or marshes next to deciduous woodland. Open grasslands, meadows, or marshes for foraging close to isolated, dense-topped trees for nesting and perching.</p>	<p><b>Present.</b> Species observed at certain maintenance sites in the Sacramento-San Joaquin Delta and Central Valley. Suitable foraging habitat (grassland, marsh, oak woodland) and nesting substrate (dense-topped trees) is present at maintenance sites in the San Francisco Bay area, Sacramento-San Joaquin Delta, Central Valley, and Sierra Nevada foothills. There are 2 CNDDDB occurrence records within 2 miles of the maintenance sites.</p>	1-77, 79-126, 146-152

*Initial Study / Mitigated Negative Declaration*  
*Mokelumne Aqueduct System Routine Maintenance Project*

COMMON NAME	SCIENTIFIC NAME	STATUS FED/CA/CRPR <sup>1</sup>	RANGE & HABITAT	OCCURRENCE POTENTIAL <sup>2</sup>	PROJECT SITE # (S) WITH POTENTIAL TO OCCUR
Bald eagle	<i>Haliaeetus leucocephalus</i>	FD/SE, SFP/-	Non-breeding resident throughout most of California. Within California, breeds in northern portion of state near Cascades and adjacent plains. Occurs mainly along coasts, rivers, and lakes; nests in tall trees or in cliffs, usually within 1 mile of water. Nests in large, old-growth, or trees with open branches, especially ponderosa pine. Roosts communally in winter. Feeds mostly on fish.	<b>Possible.</b> This species is known to have previously nested in the higher, more isolated areas near Los Vaqueros, San Pablo, and Briones reservoirs. Suitable foraging habitat occurs at maintenance sites in the San Francisco Bay area and Sierra Nevada foothills. One CNDDDB occurrence record is known from within 2 miles of the maintenance sites in Contra Costa County, but the species has been observed at several other locations.	1-14
yellow-breasted chat	<i>Icteria virens</i>	-/SSC/-	Breeds throughout California, except for northern Sierra Nevada and Cascades. Inhabits riparian thickets of willow and other brushy tangles near watercourses. Nests in low, dense riparian, consisting of willow, blackberry, wild grape; forages and nests within 10 feet of ground.	<b>Possible.</b> Suitable habitat (riparian thickets) exists at maintenance sites in the San Francisco Bay area, Sacramento-San Joaquin Delta, Central Valley, and Sierra Nevada foothills. No CNDDDB occurrence records are known from within 2 miles of the maintenance sites.	74-77, 90-91, 119, 172-173, 175, 184
Loggerhead shrike	<i>Lanius ludovicianus</i>	-/SSC/-	Year-round resident throughout California, except for North Coast, northern Sierra Nevada and	<b>Possible.</b> Suitable foraging habitat (open areas) and nesting substrate (trees and	1-77, 79-126, 146-152

COMMON NAME	SCIENTIFIC NAME	STATUS FED/CA/CRPR <sup>1</sup>	RANGE & HABITAT	OCCURRENCE POTENTIAL <sup>2</sup>	PROJECT SITE #(S) WITH POTENTIAL TO OCCUR
			Cascades. Broken woodlands, savannah, pinyon-juniper, Joshua tree, riparian woodlands, desert oases, scrub and washes. Prefers open country for hunting, with perches for scanning, and fairly dense shrubs and brush for nesting.	shrubs) exists at maintenance sites in the San Francisco Bay area, Sacramento-San Joaquin Delta, Central Valley, and Sierra Nevada foothills. No CNDDDB occurrence records are known from within 2 miles of the maintenance sites.	
California black rail	<i>Laterallus jamaicensis coturniculus</i>	-/ST, SFP/-	Year-round resident in the Lower Colorado River and greater San Francisco Bay Area. Inhabits freshwater marshes, wetland meadows, and the shallow margins of saltwater marshes bordering larger bays. Needs water depths of about 1 inch that do not fluctuate during the year & dense vegetation for nesting habitat.	<b>Possible.</b> Suitable habitat (marshes) exists at maintenance sites in the San Francisco Bay area and lower Sacramento-San Joaquin Delta. There are 11 CNDDDB occurrences are known from Contra Costa and San Joaquin counties within 2 miles of the maintenance sites.	82-83, 86-89, 90-104, 107-119, 122-124, 150-152
Song sparrow ("Modesto" population)	<i>Melospiza melodia</i>	-/SSC/-	Stanislaus, eastern Contra Costa, eastern Alameda, San Joaquin, Sacramento, eastern Solano, Yolo, eastern Colusa, Sutter, western Yuba, and western Placer counties. Emergent freshwater marshes, riparian willow thickets, riparian forests, and vegetated irrigation.	<b>Possible.</b> Suitable habitat (freshwater marsh and riparian vegetation) exists at maintenance sites in the Sacramento-San Joaquin Delta and Central Valley regions. There are 5 CNDDDB occurrence records known from San Joaquin County within 2 miles of the study area.	74, 79-81, 90-93, 102-103, 107-115, 119-124

*Initial Study / Mitigated Negative Declaration*  
*Mokelumne Aqueduct System Routine Maintenance Project*

COMMON NAME	SCIENTIFIC NAME	STATUS FED/CA/CRPR <sup>1</sup>	RANGE & HABITAT	OCCURRENCE POTENTIAL <sup>2</sup>	PROJECT SITE # (S) WITH POTENTIAL TO OCCUR
			Inhabits cattails, bulrush, and other sedges; also known to frequent tangles bordering sloughs.		
Black-crowned night heron	<i>Nycticorax</i>	-/-/ (MBTA)	Year-round resident in California Coast and Coast Range, Cascades, and along the Colorado River. Migrates throughout the remainder of the state. Nests colonially within a tree or cattails over or near water. Forage in freshwater, brackish, and salt marshes; rivers; mud flats; other water bodies; and wet agricultural fields.	<b>Possible.</b> Suitable nesting substrate (trees or marsh near large water bodies) exists at and near maintenance sites in the San Francisco Bay area, Sacramento-San Joaquin Delta, Central Valley, and Sierra Nevada Foothills. No CNDDDB occurrence records occur within 2 miles of the maintenance sites.	1-12, 16, 19-22, 74, 79-81, 90-93, 102-103, 107-115, 119-124, 150-152, 173, 182, 184
Osprey	<i>Pandion haliaetus</i>	-/-/ (MBTA)	Nests in northern Sierra Nevada, southern Cascades, and plains east of Cascades. Year-round in northern half of California to San Mateo Peninsula. Winters in San Joaquin Valley and central to southern California coast and along Colorado River. Migrates through deserts to southern Mono Basin. Nests in tall trees, cliffs, or human-derived platforms near water. Forages for fish over a variety of water bodies (rivers, lakes, sea,	<b>Possible.</b> Suitable nesting substrate (towers or large trees near large water bodies) exists at and near maintenance sites in the San Francisco Bay area, Sacramento-San Joaquin Delta, and Sierra Nevada Foothills. No CNDDDB occurrence records occur within 2 miles of the maintenance sites.	1-14, 90-93, 150-152, 182, 184

COMMON NAME	SCIENTIFIC NAME	STATUS FED/CA/CRPR <sup>1</sup>	RANGE & HABITAT	OCCURRENCE POTENTIAL <sup>2</sup>	PROJECT SITE #(S) WITH POTENTIAL TO OCCUR
			and marshes).		
Double-crested cormorant	<i>Phalacrocorax auratus</i>	-/-/ (MBTA)	Nests along the Colorado River, California coast north of Humboldt County and south of Los Angeles County, and San Francisco Bay. Nests colonially in trees, on human-derived structures, and on the ground near water bodies. Forages in open water for fish.	<b>Possible.</b> Suitable nesting substrate (bridges or trees near large water bodies) exists at and near maintenance sites in the San Francisco Bay area and Sacramento-San Joaquin Delta. No CNDDDB occurrence records occur within 2 miles of the maintenance sites.	90-93, 102-103, 107-115, 119-124, 150-152, 173, 182, 184
Yellow warbler	<i>Setophaga petechia</i>	-/SSC/-	Breeds along California coast (except Santa Cruz to San Mateo Peninsula), Cascades, plains east of the Cascades, and Coast Range and Sierra Nevada foothills surrounding the Sacramento Valley. Migrant throughout the rest of California. Riparian plant associations in close proximity to water. Also nests in montane shrub clusters in open conifer forests in Cascades and Sierra Nevada. Frequently found nesting and foraging in willow shrubs and thickets, and in other	<b>Possible.</b> Suitable riparian habitat occurs at maintenance sites in the Sierra Nevada foothills region, but no CNDDDB occurrences are known from within 2 miles of the maintenance sites.	1-12, 16, 19-22, 74, 79-81, 90-93, 102-103, 107-115, 119-124, 150-152, 173, 182, 184

*Initial Study / Mitigated Negative Declaration*  
*Mokelumne Aqueduct System Routine Maintenance Project*

COMMON NAME	SCIENTIFIC NAME	STATUS FED/CA/CRPR <sup>1</sup>	RANGE & HABITAT	OCCURRENCE POTENTIAL <sup>2</sup>	PROJECT SITE # (S) WITH POTENTIAL TO OCCUR
			riparian plants including cottonwoods, sycamores, ash, and alders.		
Yellow-headed blackbird	<i>Xanthocephalus</i>	-/SSC/-	Central Valley and southeastern California year-round. Winters in southern Arizona, Texas, New Mexico, and Mexico. Occurs in the Great Basin to Canada during summer. Nests in freshwater emergent wetlands with dense vegetation & deep water. Often along borders of lakes or ponds. Nests only where large insects such as <i>Odonata</i> are abundant, nesting timed with maximum emergence of aquatic insects.	<b>Possible.</b> Suitable habitat (freshwater marsh) exists at maintenance sites in the Sacramento-San Joaquin Delta and Central Valley. No CNDDB occurrence records are known from within 2 miles of the maintenance sites.	1-12, 16, 19-22, 74, 79-81, 90-93, 102-103, 107-115, 119-124, 150-152, 173, 182, 184
<b>MAMMALS</b>					
Pallid bat	<i>Antrozous pallidus</i>	-/SSC, WBWG: High Priority/-	Widespread throughout California. 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.	<b>Possible.</b> Trees at maintenance sites provide suitable roosting habitat in San Francisco Bay area, Sacramento-San Joaquin Delta, Central Valley, and Sierra Nevada Foothills regions. Lacustrine, riparian, and marsh habitats, and to some extent the adjacent ruderal habitats, provide	Any with suitable tree-roosting habitat.

COMMON NAME	SCIENTIFIC NAME	STATUS FED/CA/CRPR <sup>1</sup>	RANGE & HABITAT	OCCURRENCE POTENTIAL <sup>2</sup>	PROJECT SITE # (S) WITH POTENTIAL TO OCCUR
				foraging habitat. There are 6 CNDDDB occurrence records from Alameda and Contra Costa counties within 2 miles of the maintenance sites.	
Townsend's big-eared bat	<i>Corynorhinus townsendii</i>	-/SSC, WBWG: High Priority/-	Coastal regions from Del Norte County south to Santa Barbara County. Found throughout California in a wide variety of habitats, including woodlands, forests, chaparral, scrubs, and grasslands. Most common in mesic sites. Roosts on open surfaces in caves, abandoned mines, and buildings. Also uses bridges, rock crevices and hollow trees as roost sites. Roosting sites are limiting. This species is extremely sensitive to human disturbance.	<b>Possible.</b> Trees at maintenance sites provide suitable roosting habitat in the San Francisco Bay area and Sacramento-San Joaquin Delta regions. Lacustrine, riparian, and marsh habitats, and to some extent the adjacent ruderal habitats, provide foraging habitat. There are 2 CNDDDB occurrence records from Alameda and Contra Costa counties within 2 miles of the maintenance sites.	Any with suitable tree-roosting habitat.
Silver-haired bat	<i>Lasionycteris notivangans</i>	-/- (WBWG: Medium Priority) /-	Southern Alaska to most of the United States into northeastern Mexico. Maternity roosts are in tree cavities or under the bark of large snags. Forages for moths and other insects above tree canopy, over open meadows, and along water courses in riparian	<b>Possible.</b> Suitable maternity roost habitat exists at maintenance sites with large trees offering cavities and large snags in the San Francisco Bay area, Sacramento-San Joaquin Delta, Central Valley, and Sierra Nevada	Any with suitable tree-roosting habitat.

*Initial Study / Mitigated Negative Declaration*  
*Mokelumne Aqueduct System Routine Maintenance Project*

COMMON NAME	SCIENTIFIC NAME	STATUS FED/CA/CRPR <sup>1</sup>	RANGE & HABITAT	OCCURRENCE POTENTIAL <sup>2</sup>	PROJECT SITE #(S) WITH POTENTIAL TO OCCUR
			zones.	Foothills regions.	
Western red bat	<i>Lasiurus blossevillii</i>	-/SSC/-	Year-round range spans the Central Valley, Sierra Nevada foothills, Coast Range, and coast except for Humboldt and Del Norte counties. Cismontane woodland, lower montane coniferous forest, riparian forest and woodlands. Roosts primarily in trees, 2-40 feet above ground, from sea level up through mixed conifer forests. Prefers habitat edges and mosaics with trees that are protected from above and open below with open areas for foraging.	<b>Possible.</b> Riparian areas at the maintenance sites within the San Francisco Bay area, Sacramento-San Joaquin Delta, Central Valley, and Sierra Nevada foothills provide suitable roosting and foraging habitat for this species. One CNDDDB occurrence record is known from Contra Costa County within 2 miles of the maintenance sites.	Any with suitable tree-roosting habitat, including orchards.
Hoary bat	<i>Lasiurus cinereus</i>	-/- (WBWG: Medium Priority/-	Tree limit in Canada south to Guatemala, and from Brazil to Argentina and Chile. Coniferous forests and deciduous woodlands. Roosts are typically near clearings at the ends of branches.	<b>Possible.</b> Suitable roost habitat exists at maintenance sites near woodland and forest in the San Francisco Bay area, Sacramento-San Joaquin Delta, Central Valley, and Sierra Nevada Foothills regions.	1-12, 16, 19-22, 74, 79-81, 90-93, 102-103, 107-115, 119-124, 150-152, 173, 182, 184



COMMON NAME	SCIENTIFIC NAME	STATUS FED/CA/CRPR <sup>1</sup>	RANGE & HABITAT	OCCURRENCE POTENTIAL <sup>2</sup>	PROJECT SITE # (S) WITH POTENTIAL TO OCCUR
San Francisco dusky-footed woodrat	<i>Neotoma fuscipes annectens</i>	-/SSC/-	Terrestrial areas surrounding San Francisco Bay. Nests in a variety of habitats including riparian areas, oak woodlands, and scrub.	<b>Possible.</b> Suitable riparian and oak woodland habitat is present at maintenance sites in the San Francisco Bay area. There are 2 CNDDDB occurrence records known from Contra Costa County within 2 miles of the maintenance sites.	159, 163, 173, 175
American badger	<i>Taxidea taxus</i>	-/SSC/-	Majority of northern, western, and central United States south to Baja California. Most abundant in drier open stages of most shrub, forest, and herbaceous habitats, with friable soils. Needs sufficient food, friable soils and open, uncultivated ground. Preys on burrowing rodents. Digs burrows.	<b>Possible.</b> Suitable habitat is present at maintenance sites that lack dense vegetation and tree cover in San Francisco Bay area, Central Valley, and Sierra Nevada foothills.	1-77, 79-126, 146-152, 182-183
San Joaquin kit fox	<i>Vulpes macrotis mutica</i>	FE/ST/-	San Joaquin Valley and adjacent open foothills to the west, records extend from Kern County north to Contra Costa County. Annual grasslands or grassy open stages with scattered shrubby vegetation (saltbush scrub and oak savanna). Need loose-textured sandy soils	<b>Possible.</b> Suitable habitat is present in uplands adjacent to maintenance sites in eastern portions of Contra Costa County in the San Francisco Bay area. There are 2 CNDDDB occurrence records from the area south of Antioch within 2 miles of the maintenance sites.	120-125, 182-183

*Initial Study / Mitigated Negative Declaration*  
*Mokelumne Aqueduct System Routine Maintenance Project*

COMMON NAME	SCIENTIFIC NAME	STATUS FED/CA/CRPR <sup>1</sup>	RANGE & HABITAT	OCCURRENCE POTENTIAL <sup>2</sup>	PROJECT SITE #(S) WITH POTENTIAL TO OCCUR
			for burrowing, and suitable prey base.		
<b>FISH</b>					
Green Sturgeon, Southern Distinct Population Segment (DPS)	<i>Acipenser medirostris</i>	FT/SSC/-	Year-round off Pacific Coast from Graves Harbor, Alaska south to Monterey Bay, including San Francisco Bay and Delta. Spawn within tributaries of Sacramento and Feather Rivers.  Spawns at temperatures between 8–14 degrees Celsius. Preferred spawning substrate is large cobble, but can range from clean sand to bedrock. Occasionally reported in the San Joaquin River upstream from Stockton (Jackson and Van Eenennaam 2013).	<b>Possible.</b> Suitable migration habitat exists at maintenance sites on the Sacramento-San Joaquin Delta sloughs.	80, 81, 103, 104, 108, 109, 119 –123, 156,182-183
Sacramento perch	<i>Archoplites interruptus</i>	FT/ST/-	Native to Central Valley, Clear Lake, Alameda Creek, and Calaveras Reservoir, but introduced throughout several watershed in California. Known populations in Clear Lake and Alameda	<b>Possible.</b> Suitable habitat occurs at maintenance sites on freshwater portions of the San Joaquin River, lower Calaveras River, and their tributaries.	78, 80 – 100, 105, 108, 109, 117, 118, 124, 120, 182

COMMON NAME	SCIENTIFIC NAME	STATUS FED/CA/CRPR <sup>1</sup>	RANGE & HABITAT	OCCURRENCE POTENTIAL <sup>2</sup>	PROJECT SITE #(S) WITH POTENTIAL TO OCCUR
			Creek/Calaveras Reservoir. Adults found in vegetated sloughs, pools in slow rivers and lakes, and warm ponds and impoundments.		
Delta smelt	<i>Hypomesus transpacificus</i>	FT/SSC/-	San Francisco Bay to Sacramento-San Joaquin Delta. Freshwater streams to tidally influenced sloughs and channels.	<b>Possible.</b> Suitable habitat exists at maintenance sites along tidally influenced sloughs in the Sacramento-San Joaquin Delta.	78, 80 – 100, 103, 104, 108, 109, 118-124, 128 – 133, 140, 142, 144, 145, 182
Steelhead: Central Valley DPS (population 11); Central Coast DPS (population 8)	<i>Oncorhynchus mykiss</i>	FT/-/-; FT/-/-	Sacramento and San Joaquin river systems and tributaries/Russian River to Aptos Creek (includes San Francisco and San Pablo bays). Coastal rivers and stream from the Russian River to and including Aptos Creek, as well as all drainages of San Francisco and San Pablo bays east to Chipps Island at the confluence of the Sacramento and San Joaquin Rivers. (all DPS) Require clean, cold water with near dissolved oxygen (DO) saturation levels over loose silt-free gravel beds with water temperatures between 15 and 24° C for spawning.	<b>Present.</b> Species documented in the Mokelumne River. Suitable habitat exists at maintenance sites located along the San Joaquin River, Calaveras, and their tributaries. <b>Possible.</b> Suitable habitat exists at maintenance sites located along Pinole Creek, Pacheco Creek, Marsh Creek and their unblocked perennial tributaries.	80, 81, 103, 104, 108, 109, 120, 182 156, 157

*Initial Study / Mitigated Negative Declaration*  
*Mokelumne Aqueduct System Routine Maintenance Project*

COMMON NAME	SCIENTIFIC NAME	STATUS FED/CA/CRPR <sup>1</sup>	RANGE & HABITAT	OCCURRENCE POTENTIAL <sup>2</sup>	PROJECT SITE #(S) WITH POTENTIAL TO OCCUR
Chinook Salmon: Central Valley spring-run Evolutionary Significant Unit (ESU) (population 6); Central Valley fall/late fall-run ESU (population 13)	<i>Oncorhynchus tshawytscha</i>	FT/ST; -/SSC/-	Populations spawning in the Sacramento and San Joaquin Rivers and their tributaries. Sacramento and San Joaquin Rivers and their tributaries. (all ESUs) Require clean, cold water over loose silt-free gravel beds with water temperatures between 5 and 19° C for spawning.	<b>Possible.</b> Maintenance sites are located along the San Joaquin River and its tributaries, but naturally spawned spring-run ESU salmon are extirpated from the San Joaquin River system. Stray individuals from populations in the Sacramento River may occasionally occur in the San Joaquin River drainages (Lindley et. al 2004). <b>Present.</b> Central Valley fall/late fall-run ESU salmon are known to occur within the Mokelumne River and could occur at maintenance sites along the Calaveras and San Joaquin rivers, and their tributaries.	80, 81, 103, 104, 108, 109, 120, 182 80, 81, 103, 104, 108, 109, 120, 182
Sacramento splittail	<i>Pogonichthys macrolepidotus</i>	-/SSC/-	Endemic to the lakes and rivers of the Central Valley, but now confined to the Delta, Suisun Bay and associated marshes. Slow moving river sections, dead end sloughs. Requires flooded vegetation for spawning and foraging for young.	<b>Possible.</b> Maintenance sites along perennial drainages and streams connected to the Sacramento-San Joaquin Delta provide suitable habitat.	78, 80 – 100, 105, 108, 109, 117, 118, 124, 120, 182, 133

COMMON NAME	SCIENTIFIC NAME	STATUS FED/CA/CRPR <sup>1</sup>	RANGE & HABITAT	OCCURRENCE POTENTIAL <sup>2</sup>	PROJECT SITE #(S) WITH POTENTIAL TO OCCUR
Longfin Smelt	<i>Spirinchus thaleichthys</i>	FC/ST, SSC/-	Bays, estuaries, and nearshore environments from Lake Earl to the San Francisco Bay. Includes Suisun Bay and Marsh, San Pablo Bay, San Francisco Bay, Gulf of the Farallones, and Humboldt Bay. Eastward range limited to upstream of Rio Vista on Sacramento River, Cache Slough and Medford Island on San Joaquin River.  Mid-water to near-bottom of water column in freshwater to saltwater bays, estuaries, and nearshore environments below 22°C.	<b>Possible.</b> Suitable habitat exists in the maintenance sites on channels in the Sacramento-San Joaquin Delta.	103, 104, 108, 109, 120, 182

<sup>1</sup> **Regulatory Status Legend:**

***Federal***

FE = federally endangered  
 FT = federally threatened  
 FPE = federally proposed endangered  
 FPT = federally proposed threatened  
 FC = federal candidate for listing as threatened or endangered  
 FD = federally delisted  
 MBTA = Migratory Bird Treaty Act

***State***

SR = state rare  
 SE = state endangered  
 ST = state threatened

SFP = state fully protected  
 SSC = species of special concern  
 SC = state candidate

***WBWG (Western Bat Working Group) Priority***

(available: <http://wbwg.org/matrices/species-matrix/>)

High = species “considered the highest priority for funding, planning, and conservation actions. Information about status and threats to most species could result in effective conservation actions being implemented should a commitment to management exist. Species is imperiled or are at high risk of imperilment.”

Moderate = species warrants “evaluation, more research, and conservation actions of both the specie and possible threats. The

***Initial Study / Mitigated Negative Declaration***  
***Mokelumne Aqueduct System Routine Maintenance Project***

---

lack of meaningful information is a major obstacle in adequately assessing species' status and should be considered a threat."

***CRPR (California Rare Plant Rank)***

1A = Plants Presumed Extirpated in California and Either Rare or Extinct Elsewhere

1B = Plants Rare, Threatened, or Endangered in California and Elsewhere

2A = Plants Presumed Extirpated in California, But More Common Elsewhere

2B = Plants Rare, Threatened, or Endangered in California, But More Common Elsewhere

***EBCNPS (California Native Plant Society East Bay Chapter):***

\*A: Species in Alameda and Contra Costa counties listed as rare, threatened or endangered statewide by federal or state agencies, or by state CNPS.

A1: Species known from 2 or less botanical regions in Alameda and Contra Costa Counties, either currently or historically.

A1x: Species previously known from Alameda or Contra Costa Counties, but now believed to have been extirpated, and no longer occurring here.

A2: Species currently known from 3 to 5 regions in the two counties, or, if more, meeting other important criteria such as rare statewide, small populations, stressed or declining populations, small geographical range, limited or threatened habitat, etc.

**<sup>1</sup> "Potential to Occur" Categories Definitions:**

Possible = record is known from within 2 miles of the maintenance sites or was observed in the maintenance area, and suitable habitat is present in the maintenance area.

Not expected = record known from within 2 miles of the maintenance sites but only marginal habitat exists in the maintenance area, but the occurrence is outside of the maintenance area.

None = maintenance area is outside of species' range, record is possibly or presumed extirpated, or no marginal habitat present.

### **Special-Status Plants (*Less than Significant with Mitigation*)**

Four special-status plants have potential to occur in freshwater marsh on the margins of sloughs and streams in or near some Project sites located within the Delta. These species include:

- Woolly rose-mallow (*Hibiscus lasiocarpus*) – California Rare Plant Rank (CRPR) 1B.2 and California Native Plant Society East Bay Chapter (EBCNPS) \*A1
- Delta tule pea (*Lathyrus jepsonii* var. *jepsonii*) – CRPR 1B.2 and EBCNPS \*A2;
- Southern mudwort (*Limosella acaulis*) – and EBCNPS A2;
- Delta Mudwort (*Limosella australis*) – CRPR 2B.1; and
- Mason's lilaeopsis (*Lilaeopsis masonii*) – State Rare and CRPR 1B.1.

#### Direct Effects to Special-Status Plant Species

Clearing, grubbing, ground-disturbance (e.g., grading), and the movement of equipment could directly damage or destroy special-status plant species at Project maintenance sites where special-status plant species (including CEQA-relevant, locally rare species) occur. Though potentially significant, the likelihood for direct impacts to special-status plant species is low as the footprint for routine maintenance activities is relatively small and often repeated in the same focused locations over time. Potential direct impacts to special-status plant species would only occur in situations where maintenance activities would occur in previously undisturbed native vegetation or vegetation that hasn't been disturbed for at least three years and where the locale is known to support rare plant species.

#### Indirect Effects to Special-Status Species

Special-status plant species could be indirectly impacted through the degradation of their habitats resulting from hydrologic alteration associated with grading, or the introduction of pathogens or invasive plant species via transferred soil or plant materials from a contaminated or infested site to a newly disturbed maintenance site.

To mitigate potential direct and indirect impacts on special-status plant species to less than significant levels, EBMUD would implement MMs BIO-1 BIO-2, BIO-3, and BIO-4, described below.

**Mitigation Measure BIO-1:** A qualified biologist shall hold an annual training session for maintenance staff responsible for performing routine maintenance activities. The training will include a description of special-status species and their habitats and protective measures to ensure that such species are not adversely impacted by routine maintenance activities (e.g., pre-activity surveys, installation of exclusion fencing when special-status species identified in an area). If special-status species are known or suspected to occur at the work site, a biologist or trained maintenance staff person shall be formally appointed as a biological monitor to ensure that appropriate protective measures are implemented. Each morning prior to commencement of project work, the biological monitor shall inspect the work site, including holes and depressions, to ensure that special-status species identified as potentially present are not within the project work area.

**Mitigation Measure BIO-2:** Equipment and materials staging areas shall be located at least 30 feet from the top of bank, within paved or gravel areas, if feasible. Vegetation disturbance shall be limited to the immediate maintenance footprint and a single access pathway.

**Mitigation Measure BIO-3:** Soils imported to the maintenance work site for bank fill shall be similar in pH to native soils. Imported soils should be cleansed of pathogens and weed seeds prior to use through heating, solarization, or other appropriate methods.

**Mitigation Measure BIO-4:** If there is potential for rare plants to occur at a maintenance work site (i.e., the site supports either previously undisturbed native vegetation or vegetation disturbance has not occurred for at least three years in a location that is also suitable for rare plants known to occur in the region), a qualified botanist shall conduct pre-activity special-status plant surveys during the appropriate blooming period, prior to initiation of routine maintenance activities. Any observed sensitive plants species shall be mapped and flagged for avoidance where feasible. EBMUD shall notify CDFW or CNPS upon discovery of any sensitive plant species. If sensitive plant species are discovered, the following measures shall be implemented:

- Sensitive plant species shall be avoided or minimized by limiting ground disturbance where sensitive plants occur.
- If plant species that are listed on the federal or California Endangered Species Lists or plants ranked with 1B.1 or 1B.2 CNPS ranking cannot be avoided, EBMUD will salvage the affected plants and transplant them to a similar habitat in the Project vicinity. The re-established population should achieve a 1:1 ratio (transplanted: re-established) after 2 years. If this performance criterion cannot be met, the appropriate agencies (e.g., USFWS, CDFW) will be consulted for additional options, such as payment of an in-lieu fee to the state CNPS program.
- If any additional sensitive plant species are discovered on-site that cannot be avoided, the appropriate agencies (e.g., USFWS, CDFW) shall be consulted by EBMUD to determine the appropriate species-specific mitigation measures.
- Species-specific mitigation may include repairing, rehabilitating, or restoring the impacted area; preserving in-situ populations on-site; or by providing off-site compensation. Off-site compensation may include the permanent protection of an off-site population through a conservation easement or the purchase of mitigation banking credits at a 2:1 ratio (mitigation: impacted population).

MMs BIO-1 through BIO-4 require EBMUD to provide a worker awareness training and when needed, a biological monitor, to restrict staging areas away from special-status species, use similar fill as native soils, conduct preconstruction surveys for special-status plants, notify appropriate agencies if any sensitive plant species are found, coordinate with regulatory agencies if endangered or threatened plant species are found that cannot be avoided, and compensate for unavoidable impacts to special-status plant species; therefore, the potential for significant Project-related impacts on special-status plants would be less than significant with mitigation.

#### **Special-Status Invertebrates (*Less Than Significant with Mitigation*)**

Valley elderberry longhorn beetle (VELB) is federally threatened and has potential to occur at numerous Project sites within the Delta, Central Valley, and Sierra Nevada Foothills (eastern Contra Costa, San Joaquin, and western Calaveras counties) where elderberry (*Sambucus nigra* ssp. *caerulea*) shrubs with a basal stem diameter of one inch or greater are present.



Direct Effects to Valley Elderberry Longhorn Beetle

VELB could be directly impacted through clearing, grubbing, and ground-disturbance that physically crushes or injures individuals, or removes occupied elderberry shrubs that provide habitat for VELB.

Indirect Effects to Valley Elderberry Longhorn Beetle

VELB could be indirectly impacted by activities that degrade the health of suitable elderberry shrubs, including erosion that undermines roots, soil placement near an elderberry shrub that substantially alters the local hydrology and water available to the shrub, generation of dust that settles on leaves of the host plant, and the introduction of invasive plants or diseases that respectively outcompete or infect elderberry shrubs.

Potential direct and indirect impacts to VELB would be significant. The implementation of MM BIO-1 (annual staff training and monitoring) and MMs BIO-5 (no disturbance buffers around shrubs) and BIO-6 (preconstruction surveys and avoidance or compensation for unavoidable impacts), as described below, would avoid and minimize potential impacts to VELB and its habitat.

**Mitigation Measure BIO-5:** Within ten days prior to commencement of maintenance work, the maintenance site shall be surveyed for the presence of elderberry bushes. Within the boundaries of the EBMUD's Safe Harbor Agreement (SHA) (SHA# 81420-2009-F-0106) with the USFWS, EBMUD shall work around identified elderberry bushes and all requirements set forth by the SHA agreement shall be followed. If an elderberry bush is discovered outside of the SHA boundaries, the US Fish and Wildlife Service *Framework for Assessing Impacts to the Valley Elderberry Longhorn Beetle* (USFWS 2017) shall be followed. To protect any elderberry bush (naturally occurring or enhanced), no heavy equipment operations shall occur within 20 feet of the dripline of any elderberry bush. No equipment fueling shall occur within 165 feet of the elderberry bush.

**Mitigation Measure BIO-6:** EBMUD shall complete habitat assessments to determine the occupancy of VELB habitat within and immediately adjacent to maintenance work sites by special-status species prior to the commencement of maintenance activity at the work site. Habitat assessments shall include a desktop review site vegetation characteristics and review of current extant occurrence records (CNDDDB, USFWS Official Species Lists) followed by field review to determine if suitable habitat conditions exist.

When habitat assessments confirm the presence or potential presence of special-status species, or that habitat for special-status species exist at a work site and such species are known to exist within reasonable dispersal distance of the work area, a qualified biologist shall conduct a reconnaissance-level survey within 48 hours prior to the commencement of routine maintenance activities, including all areas where heavy equipment will be operated, such as adjacent upland access routes and staging areas. If special-status species are found, work shall be halted until the individual leaves the work area under its volition, or pending coordination with the appropriate agencies (i.e., CDFW, USFWS, NMFS) for State or federally listed species. Species that are not State or federally listed as endangered or threatened may be relocated by the qualified biologist if unable to leave on their own or found to be in danger. EBMUD shall not take or disturb any State or federally listed endangered or threatened species without applicable permission from the appropriate wildlife agency.

When habitat assessments confirm the presence or potential presence of State or federally listed species and maintenance activities will impact occupied or potentially occupied habitat, and EBMUD determines those impacts cannot be avoided, EBMUD shall consult with a qualified

biologist to identify appropriate mitigation actions to ensure that impacts to habitat are less than significant. EBMUD shall consider the following mitigation strategies for permanent and temporary impacts:

- 1) habitat restoration,
- 2) habitat enhancement,
- 3) habitat preservation, and/or
- 4) mitigation credit purchase from an agency-approved bank with suitable credits and service area coverage of the impact location at a 2:1 ratio.

Habitat restoration, preservation and enhancement areas will require the development and implementation of a habitat management plan with the following success criteria to ensure the preserved and/or enhanced area is managed as suitable habitat for the target species in perpetuity.

- Conduct biological monitoring surveys to confirm suitable habitat conditions for the target species and document habitat performance metrics (e.g., vegetation presence, cover, and maturity) for a period of 10 years.
- Perform routine eradication of invasive vegetation species to maintain the intended vegetation diversity and structural components consistent with the target species' habitat requirements.
- Restrict deeds to maintain and manage the preserve for the target species in perpetuity, with the ability to grant the preserve to a habitat conservancy, public agency, or other local habitat management entity.
- Preserve funding and maintenance reserves.
- Compensatory habitat mitigation is inclusive of other applicable habitat restoration and revegetation.

Because MMs BIO-1 and BIO-5 require staff education and monitoring, conducting preconstruction surveys for elderberry shrubs suitable for VELB, avoidance of impacts to elderberry shrubs that could provide habitat for VELB, and notification of the USFWS if any suitable elderberry shrubs are unavoidable, and MM BIO-6 requires EBMUD to provide compensatory mitigation for unavoidable impacts to special-status species habitat, Project-related impacts on VELB would be reduced to less than significant with mitigation.

#### **Special-Status Amphibians (*Less Than Significant with Mitigation*)**

Four special-status amphibian species that have potential to occur within Project maintenance sites, including California tiger salamander (*Ambystoma californiense*) (CTS), foothill yellow-legged frog (*Rana boylei*) (FYLF), California red-legged frog (*Rana draytonii*) (CRLF), and western spadefoot (*Spea hammondi*) (WSF). None of these species were observed during reconnaissance-level surveys, but CRLF are known to occur in perennial and near-perennial ponds, wetlands, and slow streams in the East Bay Hills and Sierra Nevada Foothills portions of the alignment and FYLF has the potential to occur in slow to swift perennial streams at or near Project sites in the Sierra Nevada Foothills. CTS is known to occur in wetlands within the East Bay Hills, and CTS and WSF are both known to occur in wetlands within the eastern Central Valley and Sierra Nevada Foothills portions of the alignment (refer to Table 3-3).

### Direct Effects to Special-Status Amphibians

Special-status amphibians could be directly affected by Project-related equipment placement, ground-disturbance, materials placement, or in-water work within occupied drainages or other water bodies that crushes burrows or aquatic habitat, or from the introduction of pollutants to aquatic habitat causing mortality or injury to individual frogs.

### Indirect Effects to Special-Status Amphibians

Indirect effects to special-status amphibians may include the exposure of soil that erodes and impacts water quality and breeding habitat quality within suitable drainages, introduction of pollutants to aquatic habitat leading to diminished water quality, substantial changes in the hydroperiod within such drainages, or the introduction of invasive plants that prevent movement, foraging, and breeding activities within drainages and/or surrounding non-aquatic habitat.

Maintenance activities typically would occur at a time of year when native adult and larval amphibians are normally not present (i.e., when stream flow and water levels are absent or minimal); however, potential direct and indirect impacts to special-status amphibians would be significant. MMs BIO-1 (annual staff training and monitoring), BIO-6 (preconstruction surveys and avoidance or compensation for unavoidable impacts), BIO-7 through BIO-10 (described below), HYD-1 (stabilization of exposed soils), HYD-2 (isolation of work areas with instream barriers), and HAZ-1 (establishment of Contingency Plan with procedures and countermeasures for accidental releases) (full text in Section IX., *Hazards and Hazardous Materials* and Section X., *Hydrology and Water Quality*) would avoid and/or minimize potential negative effects on water quality within features and land cover that could provide suitable habitat for these species. While it is unlikely that these species would be impacted directly by Project activities with implementation of the mitigation measures described above, Project maintenance activities could affect suitable habitat occupied by federally listed species (i.e., CTS and CRLF), which could result in significant adverse species effects. MM BIO-6 requires compensatory habitat for these species in the event that loss of occupied habitat is unavoidable.

**Mitigation Measure BIO-7:** A qualified biologist shall check the maintenance site location for all life stages of special-status amphibians (e.g., California tiger salamander, California red-legged frog, foothill yellow-legged frog, or western spadefoot), 10 days or less prior to the start of the project. In addition, all field crew personnel shall visually check for special-status amphibians under parked vehicles, equipment, or staged materials prior to moving the vehicle, equipment, or materials. Project activities shall be halted if a significant rain event occurs. In the event of a significant rain event, the site shall be cleared of special-status amphibians by a qualified biologist before work activities can resume. If at any time special-status amphibians are detected, all work shall be suspended until the individual leaves the work area under its volition, or the USFWS and/or CDFW shall be notified and consulted with prior to commencing with the maintenance activity.

**Mitigation Measure BIO-8:** To minimize adverse impacts to special-status species and their habitats, work within streams with natural (earthen or rock-lined) bottoms and/or banks shall be conducted only between June 1 and October 15. Work within concrete-lined channels shall be conducted only between April 15 and October 15. No equipment shall be operated in wetted portions of the stream (including ponded, flowing, or wetland areas) at any time except as necessary to dewater the immediate maintenance work site (surface flows only) or divert water flow around the work site.

Flow diversions shall be done in a manner that prevents pollution and/or siltation and that provides flows to downstream reaches. Flows to downstream reaches shall mimic natural flows necessary to support aquatic life. Said flows shall be of sufficient quality and quantity and appropriate temperature to support fish and other aquatic life both above and below the diversion structure. Normal flow shall be restored to the affected stream immediately upon completion of work at that location.

Coffer dam and other water diversion designs shall be submitted to CDFW for approval prior to commencement of maintenance activities. Coffer dams shall be constructed with clean river gravel or sand bags, and may be sealed with sheet plastic. Sand bags and any sheet plastic shall be removed from the stream upon project completion. Clean river gravel may be left in the stream, but the coffer dams must be breached to return the stream flow to its natural channel. The water diversion shall be constructed with the least amount of disruption to the channel.

In-channel maintenance activities shall not be initiated if maintenance work cannot be completed prior to the onset of a storm event predicted by 72-hour weather forecasts from the National Weather Service. All equipment shall be removed from the channel at least 12 hours before such an event occurs. If an unanticipated storm event occurs, EBMUD shall inspect active maintenance work sites for indications of bank erosion and/or channel sedimentation; if noticeable erosion or sedimentation has occurred, EBMUD shall implement appropriate erosion control best management practices (BMPs). Erosion control BMPs shall consist of wildlife-friendly plastic-free (including bio-degradable plastic) materials such as jute netting, coconut fiber blanket, or similar erosion control blanket.

Non-living vegetation and debris not anchored to a bank or the channel bed by sediment may be removed at any time if necessary to prevent imminent flooding. Restorative maintenance activities such as revegetation above the mean high-water level may be completed outside of the specified work period if appropriate erosion control BMPs are implemented.

**Mitigation Measure BIO-9:** Staging and storage areas for equipment, materials, fuels, lubricants and solvents shall be located outside of the stream channel and banks. Stationary equipment such as motors, pumps, generators, compressors and welders, located adjacent to the stream, shall be positioned over drip-pans. If necessary, vehicles shall be moved away from the stream prior to refueling and lubrication. Any equipment or vehicles driven and/or operated in proximity to the stream shall be checked and maintained daily to prevent the release of contaminants.

Any hazardous or toxic materials that could be deleterious to aquatic life shall be contained in watertight containers or removed from the project site. Such materials include, but are not limited to, debris soil, silt, bark, rubbish, creosote treated wood, raw cement/concrete or washings thereof, asphalt, paint or other coating material, and oil or other petroleum products. These materials shall be prevented from contaminating the soil and/or entering state or federal waters, including wetlands.

**Mitigation Measure BIO-10:** Water that has come in contact with uncured concrete shall not be allowed to enter the stream channel until the pH is between 6.5 and 8.0 pH units. Containment of leachate shall adhere to the following Best Management Practices:

- Concrete structures shall be allowed to cure (dry) for at least 28 days before coming into contact with channel flows, Flows contaminated with leachate shall be separated from the main stream flows via a diversion structure until the pH falls within the range specified above.

- If the 28-day curing period is infeasible, EBMUD shall institute a minimum 7-day curing period and apply a sealant designed for use in aquatic environments, such as Deep Seal™ or Elasto Deck™. The sealant shall be allowed to cure for a minimum of 72 hours.
- Wash-down water from concrete delivery trucks, concrete pumping equipment, and other tools and equipment shall not be allowed to enter the stream channel and should be removed from the site for treatment following construction. No dry concrete shall be placed on the banks or in a location where it could be carried into the channel by wind or runoff.

MMs BIO-1, BIO-6, BIO-7 through BIO-10, HYD-1, HYD-2, and Haz-1 require EBMUD to conduct preconstruction surveys for special-status species, avoid impacts to suitable habitat, apply species-specific avoidance and minimization measures, and provide compensatory mitigation for unavoidable impacts to occupied CRLF and/or CTS habitat; therefore, potential Project-related impacts on special-status amphibians (including CTS, FYLF, CRLF, and WSF) would be reduced to less than significant with mitigation.

It should be noted that replacement of existing culverts with larger culverts would provide potential beneficial effects for special-status amphibians, including:

- restoring more natural hydraulic patterns (flow velocity, hydroperiod) to affected drainages; thereby allowing up- and downstream vegetative characteristics (resulting from the more natural hydraulic characteristics) to establish, which would increase habitat value for native species and reduce/eliminate habitat for non-native species (e.g., American bullfrog);
- enhancing aquatic and semi-aquatic amphibian movement and habitat connectivity;
- preventing erosion and scour, as well as subsequent downstream sedimentation, caused from restricted water flow; and
- reducing the need for future culvert maintenance and replacement activities.

### **Special-Status Reptiles (*Less than Significant with Mitigation*)**

There are six special-status reptile species that have potential to occur within the Project sites, which are silvery legless lizard (*Anniella pulchra pulchra*) (SLL), California glossy snake (*Arizona elegans occidentalis*) (CGS), western pond turtle (*Actinemys (=Emys) marmorata*) (WPT), Alameda whipsnake (*Masticophis lateralis euryxanthus*) (AWS), Coast horned lizard (*Phrynosoma blainvillii*) (CHL), and giant garter snake (*Thamnophis gigas*) (GGS). None of these species were observed during the reconnaissance-level surveys, but WPT is known to occur within perennial aquatic habitat throughout the alignment and AWS are known to occur within chaparral habitat and surrounding areas in the East Bay Hills. The SLL and CGS could respectively occur within sparsely vegetated areas with sandy soil and scrub and grassland with sandy soils in the East Bay Hills. CHL could occur within Project sites with sandy soil in all regions of the alignment, except in the Delta. GGS has potential to occur within sloughs and slow drainages in the Delta (refer to Table 3-3).

#### Critical Habitat for Alameda Whipsnake

No Project sites are located within Critical Habitat for AWS. Two Project sites (164 and 175) provide marginally suitable habitat for Alameda whipsnake primarily due to the proximity of Critical Habitat; however, they are partially separated by portions of adjoining development. These Project sites are generally disturbed and support grassland or ruderal vegetation mowed to maintain vegetation height

less than four inches tall. Further, the Project sites near Critical Habitat do not include all the primary constituent elements for the Alameda whipsnake. Primary constituent elements for the Alameda whipsnake Critical Habitat include: (1) scrub/shrub communities with a mosaic of open and closed canopy, (2) woodland or annual grassland plant communities contiguous to lands containing scrub/shrub communities with a mosaic of open and closed canopy, and (3) lands containing rock outcrops, talus and small mammal burrows within or adjacent to scrub/woodland/grassland communities. The aqueduct system alignment is adjacent to scrub habitat and known occupied AWS habitat, therefore AWS could occur within these Project maintenance sites.

#### Direct Effects to Special-Status Reptiles

Special-status reptile species could be directly affected by being crushed or injured through equipment placement, ground-disturbance, streambed work, or materials placement. WPT and GGS could be directly impacted through the introduction of pollutants into suitable aquatic habitat that results in immediate toxicity of individuals or direct mortality.

#### Indirect Effects to Special-Status Reptiles

Indirect effects on special-status reptiles may include compaction of soil that removes suitable habitat, the introduction of invasive plants that prevents the species' use of otherwise suitable habitat, removal of vegetation that reduces the abundance of prey, or (for WPT and GGS) reduced or polluted water quality from the introduction of pollutants.

Potential direct and indirect impacts to special-status reptiles would be significant. MMs BIO-1 (annual staff training and monitoring), BIO-6 (preconstruction surveys and avoidance or compensation for unavoidable impacts), BIO-9 (proper containment of hazardous or toxic construction materials), BIO-10 (containment of concrete leachate), HYD-1 (stabilization of exposed soils), HYD-2 (isolation of work areas with instream barriers), and HAZ-1 (establishment of Contingency Plan with procedures and countermeasures for accidental releases) (full text in Section IX., *Hazards and Hazardous Materials* and Section X., *Hydrology and Water Quality*) would avoid and/or minimize potential negative effects on water quality within features and land cover that could provide suitable habitat for these species. While it is unlikely that these species would be impacted directly by Project activities with implementation of the mitigation measures described above, Project maintenance activities could potentially result in significant adverse effects on the occupied habitats that support special-status reptile species (i.e., AWS and GGS). MM BIO-6 requires compensatory habitat for these species in the event that loss of occupied habitat is unavoidable. MMs BIO-1, BIO-6, BIO-9, BIO-10, , HYD-1, HYD-2, and HAZ-1 require EBMUD to conduct preconstruction surveys for special-status species, avoid impacts to suitable habitat, apply species-specific avoidance and minimization measures, and provide compensatory mitigation for unavoidable impacts to occupied AWS and/or GGS habitat; therefore, potential Project-related impacts on special-status reptiles (including SSL, CGS, WPT, AWS, CHL, and GGS) would be less than significant with mitigation.

It should be noted that replacement of existing culverts with larger culverts would provide potential beneficial effects for special-status reptiles, including:

- restoring more natural hydraulic patterns (flow velocity, hydroperiod) to affected drainages; thereby allowing up- and downstream vegetative characteristics (resulting from the more natural hydraulic characteristics) to establish, which would increase habitat value for native species and reduce/eliminate habitat for non-native species (e.g., American bullfrog);
- enhancing reptile movement and habitat connectivity;

- preventing erosion and scour, as well as subsequent downstream sedimentation, caused from restricted water flow; and
- reducing the need for future culvert maintenance and replacement activities.

### **Special-Status Birds (*Less than Significant with Mitigation*)**

Special-status bird species with potential to occur on or near Project maintenance sites include Cooper's hawk [*Accipiter cooperii*], great blue heron [*Ardea alba*], northern harrier [*Circus hudsonius*], snowy egret [*Egretta thula*], white-tailed kite [*Elanus leucurus*], short-eared owl [*Asio flammeus*], yellow-breasted chat [*Icteria virens*], loggerhead shrike [*Lanius ludovicianus*], song sparrow [*Melospiza melodia*] [Modesto population], double-crested cormorant (*Phalacrocorax auratus*), black-crowned night heron [*Nycticorax nycticorax*], yellow warbler [*Setophaga petechia*], yellow-headed blackbird [*Xanthocephalus xanthocephalus*], tricolored blackbird (*Agelaius tricolor*), California black rail (*Laterallus jamaicensis cotinivulus*), burrowing owl (*Athene cunicularia*), Swainson's hawk (*Buteo swainsonii*), osprey (*Pandion haliaetus*), and bald eagle (*Haliaeetus leucocephalus*). None of these species were observed during the reconnaissance-level surveys, but burrowing owl is known to occur in grassland within and adjacent to the alignment east of Stockton and in the Sierra Nevada Foothills and bald eagle and osprey are known to occur in near reservoirs and lakes in the East Bay Hills and Sierra Nevada Foothills. Species other than burrowing owl have broad distributions and have potential to occur elsewhere near the Project sites (refer to Table 3-3). Northern harrier could nest and forage within grassland throughout the alignment and song sparrow could nest and forage in grassland within the Central Valley. White-tailed kite could forage in grasslands and nest in trees, and short-eared owl and loggerhead shrike could occur within grassland throughout the alignment. Cooper's hawk could occur within woodlands throughout the alignment. Yellow warbler could occur within riparian habitat in the Sierra Nevada Foothills and yellow-breasted chat could occur within riparian thickets throughout the alignment. Swainson's hawk could nest in riparian trees and forage over open areas throughout the alignment. Species that could occur within Project maintenance sites in or near freshwater marsh include tricolored blackbird in the Delta, Central Valley, and Sierra Nevada Foothills; yellow-headed blackbird in the Delta and Central Valley; California black rail in the San Francisco Bay and Delta; and double-crested cormorant, great blue heron, snowy egret, and black-crowned night heron throughout the alignment.

#### Direct Effects to Special-Status Birds

Special-status birds could be directly affected by impacts to their active nests, including destruction of eggs or occupied nests, direct mortality of young, and the abandonment of nests with eggs or young birds prior to fledging as a result of ground disturbance by heavy equipment or vegetation removal.

#### Indirect Effects to Special-Status Birds

Indirect effects to special-status species may include the loss or degradation of nests (i.e., reduced nest fitness) from Project-related noise and vibration, and the loss or degradation of future nesting or foraging habitat or reduced prey abundance through vegetation removal, soil compaction, or the introduction of invasive plants.

Special-status birds could be affected by Project-related noise and vibration, ground disturbance, vegetation removal, or experience deleterious effects stemming from reduced nest fitness loss. However, MMs BIO-1 (annual staff training and monitoring), BIO-11 (nesting bird surveys during the nesting season), BIO-12 (avoidance of work within 0.5-mile of Swainson's hawk active nests), and BIO-13 (burrowing owl surveys and mitigation plan implementation) would avoid and/or minimize potential impacts on these species.

**Mitigation Measure BIO-11:** Maintenance work or tree removal shall be conducted between September 1 and January 31, outside of the nesting bird season, where feasible. However, if maintenance work or tree removal is scheduled to occur during the nesting bird season, between February 1 and August 31, a qualified biologist (as determined by a combination of academic training and professional experience in biological sciences and related resource management activities) shall conduct reconnaissance-level surveys for nesting birds no more than one week prior to routine maintenance activities. Surveys shall include upland access routes and equipment and materials staging areas in addition to each work site.

If this survey finds evidence of nesting birds, work in the immediate area shall be postponed until September 1 and an avoidance buffer shall be implemented to avoid nest disturbance. The avoidance buffer is based on the nest location, topography, cover and species' tolerance to disturbance and is determined by a qualified biologist upon consultation with CDFW or USFWS. If an avoidance buffer is not achievable, a qualified biologist shall monitor the nest(s) to document that no take of the nest (nest failure) has occurred. Active nests cannot be taken or destroyed under the Migratory Bird Treaty Act and, for raptors, under the CDFW Code. If it is determined that construction activity is resulting in nest disturbance, work should cease immediately and CDFW should be contacted. If a lapse in project-related work of 5 days or longer occurs, another focused survey and if required, consultation with CDFW and USFWS, shall be required before project work can be reinitiated.

If preconstruction surveys indicate that nests are inactive or potential habitat is unoccupied during the maintenance work period, no further action is required. Trees and shrubs within the footprint that are determined to be unoccupied by special-status birds or that are located outside the no-disturbance buffer for active nests may be removed. Nests initiated during work (while significant disturbance from maintenance activities persist) may be presumed to be unaffected, and only a minimal buffer would be necessary.

In order to protect nesting birds and other breeding wildlife species, mowing, disking, and/or burning of leaves shall only occur from July 1st through March 1st. If burrowing owls are observed or known to occur in the area, CDFW shall be contacted for appropriate protection measures.

**Mitigation Measure BIO-12:** Between February 15th and August 15th, project activities are prohibited within 0.5 miles of a nesting Swainson's hawk without consultation with CDFW under the California Endangered Species Act (CESA).

**Mitigation Measure BIO-13:** A qualified biologist shall conduct a pre-construction take avoidance survey for the burrowing owl prior to initiating maintenance-related ground disturbance activities in or near grassland habitats. In areas where owl presence is not found, construction may proceed without further mitigation. If western burrowing owl occupancy onsite is confirmed during pre-construction take avoidance surveys, EBMUD shall develop and implement a CDFW-approved Burrowing Owl Monitoring and Mitigation Plan in coordination with CDFW.

Since Swainson's hawk and burrowing owl forage over open areas of low to no vegetation, Project activities would not remove suitable foraging habitat for these species. Suitable freshwater marsh vegetation nesting habitat of tricolored blackbird, California black rail, and other marsh associated birds could be temporarily removed from small areas within the Project sites, but this vegetation is expected to regenerate within one year and effects would be temporary. Similarly, grassland temporarily removed from small areas in Project sites is expected to regenerate within one year and



effects to the habitat of grassland-associated birds would be temporary. Suitable nest trees of bald eagle could be removed if they are within a Project site, but other suitable nest trees near water are expected to provide alternative nesting options. Because MMs BIO-1, BIO-11, BIO-12 and BIO-13 conduct preconstruction surveys for special-status birds, avoid impacts to active nests (including nesting colonies) and suitable occupied habitat, and apply species-specific avoidance and minimization measures, potential Project-related impacts on special-status birds (including TCBB, CBR, BUOW, SWHA, and BAEA) would be less than significant with mitigation.

#### **Other Nesting Birds (*Less than Significant Impact*)**

Avian species that are protected under the Migratory Bird Treaty Act (MBTA) have potential to nest within and/or near numerous Project sites throughout the aqueduct system, including Cooper's hawk, great blue heron, northern harrier, white-tailed kite, short-eared owl, yellow-breasted chat, loggerhead shrike, song sparrow (Modesto population), double-crested cormorant, yellow warbler, and yellow-headed blackbird. Suitable nesting habitat for various raptors, as well as other migratory bird species, is present on or near the Project sites. Disruption of nesting birds could occur as a result of increased human activity (e.g., due to the use of heavy equipment and human traffic) during the breeding season (approximately February 1<sup>st</sup> through August 31<sup>st</sup>). Bird species may use trees, shrubs, man-made structures or the ground for nesting habitat. Potential direct and indirect effects to other nesting birds and potential nesting habitat would be the same as those effects described under "Special-status Bird Species" above.

Suitable nest trees of other bird species (e.g., white-tailed kite) could be removed if they are within a Project site, but other suitable nest trees in the vicinity are expected provide other suitable nesting options.

As described above, MM BIO-11 requires preconstruction nesting bird surveys if work is scheduled to occur during the nesting bird season (February 1 and August 31) and delineation of species-specific avoidance buffer zones; thus, impacts to migratory birds (including 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 avoided. Therefore, potential Project-related impacts on nesting birds (not listed above under *Special-Status Birds*) would be less than significant with mitigation.

#### **Special-Status Mammals (*Less than Significant with Mitigation*)**

Special-status mammal species with potential to occur near and/or within portions of the aqueduct system alignment include five bats (pallid bat [*Antrozous pallidus*], Townsend's big-eared bat [*Corynorhinus townsendii*], silver-haired bat [*Lasionycteris notivangans*], western red bat [*Lasiurus blossevillii*] and hoary bat [*Lasiurus cinereus*]), San Francisco dusky-footed woodrat (*Neotoma fuscipes annectens*) (SFDFWR), American badger (*Taxidea taxus*), and San Joaquin kit fox (*Vulpes macrotis mutica*) (SJKF). Bat species have potential to roost within trees and structures near the aqueduct system alignment. SFDFWR has potential to occur within woodlands in the East San Francisco Bay Hills. American badger has potential to occur within open treeless areas throughout the alignment. San Joaquin kit fox has potential to occur within grassland within a small portion of the alignment at the eastern edge of Contra Costa County. None of these species were observed during the reconnaissance-level surveys, but they are known from previous observation and CNDDDB records where their ranges overlap with portions of the alignment.

#### Direct Effects to Special-Status Mammals

Special-status mammal species could be directly affected through individual mortality or injury caused by heavy equipment, materials placement, vegetation removal, and ground disturbance; or

through reduced roost, nest, or den disturbance from Project-related noise and vibration generated by heavy equipment.

#### Indirect Effects to Special-Status Mammals

Special-status mammal species could be indirectly affected by the loss of suitable habitat stemming from soil compaction or the introduction of invasive plant species, habitat alteration or degradation that reduces prey abundance, or persistent pollutant bioaccumulation.

Potential direct and indirect effects to special-status mammals would be significant. MMs BIO-1 (annual staff training and monitoring) and BIO-6 (pre-construction surveys and avoidance or compensation for unavoidable impacts) would avoid and/or minimize potential negative effects these species and on suitable habitat for these species. MM BIO-14 requires roosting bat surveys and avoidance (if found), ultimately avoiding impacts to active roosts. In addition, the implementation of MMs BIO-15 and BIO-16 would respectively avoid potential impacts to SFDFWR, American Badger, and SJKF if present.

**Mitigation Measure BIO-14:** Maintenance work shall be conducted between August 1 and February 28 to avoid the bat maternity period, where feasible. However, if maintenance work occurs between August 1 and February 28, a preconstruction survey for roosting bats shall be conducted by a qualified biologist within two weeks prior to construction to ensure that no roosting bats are disturbed during maintenance activities.

If roosting surveys are inconclusive, 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 an active work area, a qualified biologist shall conduct focused day- and/or night-emergence surveys as appropriate.

If active maternity roosts or day roosts are found in areas that would be removed or modified as part of maintenance work, activities shall commence before maternity colonies form (before March 1) or after young are flying (after July 31). Disturbance-free buffer zones (determined by a qualified biologist in coordination with CDFW) shall be observed during the maternity roost season (March 1 through July 31) for any active maternity colony identified during the surveys to protect maternity roosts.

If a non-breeding bat roost is found in a structure anticipated for modification or removal, the individual(s) shall be safely evicted, under the direction of a qualified biologist in such a way that ensures individuals 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 no-disturbance buffer for active roosting sites may be removed. Roosting initiated during construction is presumed to be unaffected, and no buffer would be necessary.

**Mitigation Measure BIO-15:** EBMUD shall implement the following avoidance or minimization measures for the San Francisco dusky-footed woodrat:

- A preconstruction survey shall be performed by a qualified biologist within seven days prior to the start of ground-disturbing activities to identify the locations of active San Francisco dusky-footed woodrat nests within the Project boundary. Any woodrat nests detected would be mapped and flagged for avoidance by the qualified biologist.

- If active nests are determined to be present, avoidance measures shall be implemented first. Because San Francisco dusky-footed woodrats are year-round residents, avoidance mitigation is limited to restricting Project activities to avoid direct impacts to San Francisco dusky-footed woodrats and their active nests to the extent feasible. A minimum ten-foot buffer should be maintained between Project construction activities and each nest to avoid disturbance. In some situations, a smaller buffer may be allowed if, in the opinion of a qualified biologist, removing the nest would be a greater impact than that anticipated as a result of Project activities.
- If an unoccupied woodrat nest is found within the Project site and it cannot be avoided, the nest should be disassembled by hand by a qualified biologist. The nest materials should be relocated off site outside of the wildlife exclusion fencing to prevent rebuilding.
- If occupied nests are found within the Project site, and a litter of young is found or suspected, the nest shall be left alone for two to three weeks before a recheck to verify that young are capable of independent survival before proceeding with nest dismantling. Dismantling shall be done by hand, allowing any animals to escape either along existing woodrat trails or toward other available habitat.
- EBMUD shall notify CDFW of any nests, unoccupied or occupied, before they are dismantled.

**Mitigation Measure BIO-16:** If a possible San Joaquin kit fox or American badger den is found during implementation of pre-activity surveys, EBMUD shall implement the following avoidance or minimization measures for San Joaquin kit fox and American badger:

- Project activities shall not occur within 100 feet of a potential den (defined per 2011 USFWS Guidance as a subterranean hole within the species' range possessing sufficient entrance dimensions but evidence is insufficient to conclude that it is being used by a kit fox) during the natal period (February 1 to September 30).
- Project activities shall not occur within 200 feet of a known den (defined per 2011 USFWS Guidance as any natural den or built structure used by San Joaquin kit fox based on past data collected), or natal or pupping den (defined per 2011 USFWS Guidance as any den used, currently or previously, by kit foxes to rear pups typically with tracks, scat, and prey remains) during the natal period (February 1 to September 30).

MMs BIO-1, BIO-6, BIO-14, BIO-15, and BIO-16 require pre-activity surveys, avoidance measures and buffer zones for active nests/dens, avoidance of SFDWR individuals and potential SJKF and badger dens during the natal period, potential impacts would be avoided and/or reduced to these species to less than significant levels. While Project activities could affect suitable habitat for federally listed species (i.e., SJKF), such activities are not anticipated to result in the permanent removal of habitat for such species. If the permanent loss of SJKF habitat (i.e., conversion to hardscape) is unavoidable, the implementation of MM BIO-6 requires compensatory habitat for this species.

### **Special-Status Fish Species (*Less than Significant Impact*)**

Seven special-status fish species have potential to occur within drainages crossed by the aqueduct system alignment, including green sturgeon (*Acipenser medirostris*) (Southern Distinct Population Segment [DPS]), Sacramento perch (*Archoplites interruptus*), Delta smelt (*Hypomesus*

*transpacificus*), steelhead (*Oncorhynchus mykiss*) (Central Valley DPS and Central Coast DPS), Chinook salmon (*Oncorhynchus tshawytscha*) (Central Valley spring-run Evolutionary Significant Unit [ESU] and Central Valley fall/late fall-run ESU), Sacramento splittail (*Pogonichthys macrolepidotus*), and longfin smelt (*Spirinchus thaleichthys*). These species have potential to occur within the Sacramento-San Joaquin River Delta region and associated tributaries. None of these species were observed during the reconnaissance-level surveys, but they are known from previous observations and CNDDDB records within and near the alignment.

#### Direct Effects to Special-Status Fish

Special-status fish species could be directly affected by Project-related noise and vibration and streambed work altering migration patterns, eliminating or degrading occupied habitat, stranding during dewatering activities, crushing individuals or eggs, or the introduction of pollutants resulting in individual mortality.

#### Indirect Effects to Special-Status Fish

Indirect effects to special-status fish species may include vegetation removal resulting in less shaded aquatic habitat and increased water temperatures, the introduction of pollutants or invasive plants into aquatic habitat that results in degradation water quality reducing habitat quality or prey abundance.

Potential direct and indirect effects to special-status fish would be significant. MMs BIO-1 (annual staff training and monitoring), BIO-6 (preconstruction surveys and avoidance or compensation for unavoidable impacts), BIO-8 (dewatering and flow diversion requirements), BIO-9 (proper containment of hazardous or toxic construction materials), BIO-10 (containment of concrete leachate), BIO-17 (fish relocation during dewatering), HYD-1 (stabilization of exposed soils), HYD-2 (isolation of work areas with instream barriers), and HAZ-1 (establishment of Contingency Plan with procedures and countermeasures for accidental releases) (full text in Section IX., *Hazards and Hazardous Materials* and Section X., *Hydrology and Water Quality*) would avoid and/or minimize potential negative effects these species and on suitable habitat for these species.

**Mitigation Measure BIO-17:** In areas subject to dewatering, EBMUD shall check daily for stranded aquatic life as the water level drops. All reasonable efforts shall be made to capture and move all stranded aquatic life observed in the dewatered areas. Capture methods may include fish landing nets, dip nets, buckets and by hand. Captured aquatic life shall be released immediately in the body of water closest to the work site.

Because MMs BIO-1, BIO-6, BIO-8 through BIO-10, BIO-17, HYD-1 (stabilization of exposed soils), and HYD-2 (isolation of work areas with instream barriers) would avoid and/or minimize habitat disturbance and potential negative effects on water quality within suitable habitat for special-status fish habitat, impacts to special-status fish would be avoided and/or minimized. While it is unlikely that these species would be impacted directly by Project activities with implementation of the mitigation measures described above, Project maintenance activities could potentially result in significant adverse effects on suitable habitat for federally listed species (i.e., green sturgeon [southern DPS], Sacramento perch, Delta smelt, steelhead [Central Valley DPS and/or Central Coast DPS], Chinook salmon Central Valley spring-run ESU, and longfin smelt). MM BIO-6 requires compensatory habitat for these species in the event that loss of occupied habitat is unavoidable. Through the implementation of the MMs listed above, potential Project-related impacts on special-status fish would be less than significant with mitigation.

It should be noted that replacement of existing culverts with larger culverts would provide potential beneficial effects for special-status fish, including:

- restoring more natural hydraulic patterns (flow velocity, hydroperiod) to affected drainages;
- enhancing fish movement and habitat connectivity;
- preventing erosion and scour, as well as subsequent downstream sedimentation, caused from restricted water flow; and
- reducing the need for future culvert maintenance and replacement activities.

**b. Less than Significant with Mitigation.** The majority of the aqueduct system alignment is generally disturbed and, as such, it supports primarily grassland and ruderal vegetation communities. Due to ongoing regular maintenance, only small patches of freshwater marsh, valley foothill riparian, and seasonal wetland occur on the peripheries of drainage crossings within the Project area, mostly within natural channels. These three vegetation communities are considered sensitive natural communities by CDFW. Other sensitive natural communities occur adjacent to and outside of the aqueduct system alignment, but routine vegetation maintenance of the alignment precludes these communities from occurring within the alignment. Project maintenance activities could potentially impact freshwater marsh, valley foothill riparian, and seasonal wetland as shown in Table 3-4 below.

**Table 3-4: Sensitive Natural Communities Occurring in the Aqueduct System Channels**

Channel Type	Freshwater Marsh (square feet)	Valley Foothill Riparian (square feet)	Seasonal Wetland (square feet)
Natural Channels	440.25	227.26	230.58
Engineered Earthen Channels	281.68	62.48	16.12
Concrete-lined Channels	24.84	0.6	---
<b>Total (square feet)</b>	<b>746.77</b>	<b>290.34</b>	<b>246.70</b>
<b>Total (acres)</b>	<b>0.017</b>	<b>0.007</b>	<b>0.006</b>
Note: Values provided for sensitive natural communities are approximate based on desktop review and field verification. Actual values may vary.			

As quantified in Table 3-4, potential impacts to these sensitive natural communities would be very small in extent, minor in nature and consist largely of repairs aimed at maintaining the status quo within each channel type (i.e., no substantial changes in amount/quality of habitat would occur). Impacts would be further minimized through the implementation of MMs BIO-1 (annual staff training and monitoring), BIO-2 (limiting vegetation disturbance), BIO-3 (condition of import soils), BIO-8 (dewatering and flow diversion requirements), BIO-9 (proper containment of hazardous or toxic construction materials), BIO-10(containment of concrete leachate), BIO-18 through BIO-22 (described below), HYD-1 (stabilization of exposed soils), HYD-2 (isolation of work areas with instream barriers), and HAZ-1 (establishment of Contingency Plan with procedures and countermeasures for accidental releases) (full text in Section IX., *Hazards and Hazardous Materials* and Section X., *Hydrology and Water Quality*).

**Mitigation Measure BIO-18:** Any trees which must be cut shall be cut at ground level, leaving the root mass in place to maintain bank stability. Any live native trees greater than 4 inches DBH

removed shall be replaced at a 3:1 ratio, and exposed/disturbed areas shall be revegetated per MMs BIO-21, and BIO-22 below.

**Mitigation Measure BIO-19:** All exposed/ disturbed areas and access points within the stream zone left barren of vegetation following maintenance activities shall be revegetated with a blend of erosion control grass seeds using only native grass species. The seed mix shall be certified weed-free. Seeded areas shall be mulched. All other areas of disturbed soil which drain towards the stream channel shall be seeded with native erosion control grass seeds. Revegetation shall be completed immediately (within two weeks) after maintenance activities cease or before a significant rain event. Seeding placed after October 15 must be covered with broadcast straw, jute netting, coconut fiber blanket or similar erosion control blanket. Erosion control blankets with plastic monofilament or woven plastic strands, including biodegradable plastics, shall not be used.

**Mitigation Measure BIO-20:** To ensure a successful revegetation effort, all plants shall be monitored and maintained as necessary for five years. The following success criteria shall apply:

- All plantings shall have a minimum of 80% survival at the end of 5 years.
- Plants shall attain 70% cover after three years and 75% coverage after 5 years.
- If the survival and/or cover requirements are not meeting these goals, EBMUD is responsible for replacement planting, additional watering, weeding, invasive exotic eradication, or any other practice, to achieve these requirements. Replacement plants shall be monitored with the same survival and growth requirements for five years after planting.

Revegetation monitoring shall be conducted annually for a period of five (5) years to determine whether these goals have been met, and an annual report shall be provided to CDFW regarding revegetation status.

**Mitigation Measure BIO-21:** All live native trees greater than 4 inches DBH removed as a result of proposed maintenance activities shall be replaced at a 3:1 ratio (replacement trees : removed trees) to mitigate for permanent net loss of canopy cover. Replacement trees shall consist of 5-gallon saplings and shall be native species adapted to the lighting, soil and hydrological conditions at the replanting site. If replanting within the work area is infeasible due to slope steepness or other physical constraints, replacement trees may be planted at an alternate location along the stream corridor.

**Mitigation Measure BIO-22:** When riprap is placed for bank slope protection on a previously vegetated bank, it shall not be grouted or mortared. Interstitial spaces between rocks shall be backfilled with clean native soils or imported fill and planted with trees, shrubs, or other vegetation to minimize habitat loss. If revegetation of the riprap is not feasible, EBMUD shall plant compensatory vegetation at an off-site location at a 3:1 ratio.

Only rocks and boulders free of organic material and soil that could carry weeds or pathogens from other areas shall be used for the project. Riprap shall be properly keyed into the bank and be of sufficient size to remain in place and withstand the highest velocity of water anticipated within the stream channel.

MM BIO-8 requires that EBMUD not operate equipment within the wetted portions of a stream, which is typically where such sensitive vegetation communities occur. MM BIO-22 requires that

EBMUD shall not install grout or mortar in riprap bank slope installation sites where feasible to allow natural revegetation. If riprap must be fully hardscaped (i.e., grouted or mortared), MM BIO-22 also requires that EBMUD compensate for the loss of vegetation at a 3:1 ratio (compensation to impact). Freshwater marsh and seasonal wetland vegetation that is not permanently impacted is expected to regenerate within one year following the short-duration and limited impact of Project activities at a given site. MM BIO-21 requires that EBMUD replace any native trees greater than 4 inches DBH removed (e.g., within valley foothill riparian) at a 3:1 ratio, which would mitigate impacts to valley foothill riparian vegetation. Therefore, impacts to sensitive natural communities would be less than significant with mitigation.

- c. **Less Than Significant with Mitigation.** Federally-protected wetlands and waters of the U.S. occur within the aqueduct system alignment at many of the Project maintenance sites. Implementation of Project activities could impact perennial, intermittent, and ephemeral streams with natural, engineered-earthen, and concrete-lined channels. These features are generally waters of the U.S. and/or state. **Table 3-5** below details the total estimated streams present within the 100-mile aqueduct system by channel type.

**Table 3-5: Streams within the Aqueduct System by Channel Type**

Channel Type	Total Area (acres)	Subcategory Percentage of Channel Type
<b><i>Natural Channels</i></b>	<b><i>10.05</i></b>	
Perennial	7.78	77.4%
Intermittent	1.28	12.7%
Ephemeral	0.45	4.4%
Seasonal Wetland	0.55	5.5%
<b><i>Engineered Earthen Channels</i></b>	<b><i>4.00</i></b>	
Perennial	3.09	77.3%
Intermittent	0.37	9.3%
Ephemeral	0.45	11.1%
Seasonal Wetland	0.09	2.3%
<b><i>Concrete-lined Channels</i></b>	<b><i>0.46</i></b>	
Perennial	0.35	75.6%
Intermittent	0.11	24.4%
<b>Total</b>	<b>14.51</b>	
Note: Values provided for channel types are approximate based on desktop review and field verification. Actual values may vary.		

Potential impacts would be limited in scale and duration, and are expected to only temporarily affect waters of the U.S. and/or state. Impacts would be avoided to the extent possible and typically limited to infrequent situations where bank stabilization was necessary. **Table 3-6** below details the

anticipated average annual impacts to natural, engineered-earthen, and concrete-lined channels affected by proposed Project maintenance activities.

**Table 3-6: Average Annual Impacts Anticipated from Project Maintenance Activities**

<b>Channel Type</b>	<b>Sediment &amp; Debris Removal<sup>1, 2</sup> (square feet/acres)</b>	<b>Bank Level Repair &amp; Erosion Protection<sup>1, 3</sup> (linear feet/acres)</b>
<b><i>Natural Channels</i></b>	<b><i>1,250 / 0.029</i></b>	<b><i>200 / 0.343</i></b>
Perennial	967.5 / 0.022	155 / 0.331
Intermittent	158.75 / 0.004	25 / 0.009
Ephemeral	55 / 0.001	9 / 0.001
Seasonal Wetland	68.75 / 0.002	11 / 0.002
<b><i>Engineered Earthen Channels</i></b>	<b><i>2,500 / 0.057</i></b>	<b><i>300 / 0.143</i></b>
Perennial	1,932.5 / 0.044	232 / 0.131
Intermittent	232.5 / 0.005	28 / 0.008
Ephemeral	277.5 / 0.006	33 / 0.002
Seasonal Wetland	57.5 / 0.001	7 / 0.001
<b><i>Concrete-lined Channels</i></b>	<b><i>6,000 / 0.138</i></b>	<b><i>500 / 0.206</i></b>
Perennial	4,536 / 0.104	378 / 0.177
Intermittent	1,464 / 0.034	122 / 0.028
<b>Total</b>	<b>9,750 / 0.224</b>	<b>1,000 / 0.692</b>
<p><sup>1</sup> Impact values estimated based on subcategory percentages provided in Table 3-5. For instance, perennial natural channel impacts calculated as 77.4% of all natural channel impacts, and so on. This approach represents a reasonable approximation of average annual impacts; however, actual impacts in any given year will vary depending on the priorities and needs at the time.</p> <p><sup>2</sup> Impact values based on respective maxima for each channel type (i.e., 1,250 feet in natural channels, 2,500 feet in engineered earthen channels, and 6,000 feet in concrete channels).</p> <p><sup>3</sup> Impact values based on respective maxima for each channel type (i.e., 200 feet in natural channels, 300 feet in engineered earthen channels, and 500 feet in concrete channels).</p>		

MM BIO-8 establishes authorized work windows that limit work to occur between June 1 and October 15 in streams with natural (earthen or rock-lined) bottoms and/or banks and between April 15 and October 15 in concrete-lined channels, when streams are dry or flow is at its lowest. MM BIO-8 also prohibits EBMUD from operating equipment in wetted portions of streams. MM BIO-8 also requires EBMUD to install flow diversions (e.g., clear water diversions) and coffer dams to maintain water quality and flow around the affected portion of a Project site to minimize disruption to the channel. Most activities at Project sites would have a less than significant effect, as fill would not be added to waters of the U.S and/or state. However, Project activities may result in a significant impact in situations where bank/levee repair is necessary to maintain EBMUD infrastructure and the ultimate addition of fill in the form of riprap or clean soil is necessary. In such situations, EBMUD may need to seek applicable regulatory permits through coordination with the U.S. Army Corps of Engineers and/or the Regional Water Quality Control Board, consistent with MM BIO-25 below.



**Mitigation Measure BIO-23:** Prior to the implementation of any Project that shall result in a net “loss” of waters of the U.S. and/or State, EBMUD shall coordinate with and obtain permits from the U.S. Army Corps of Engineers and the Regional Water Quality Control Board as appropriate. Compensatory mitigation for the loss of waters of the U.S. and/or State shall occur at a minimum 1:1 ratio for permanent impacts. Compensatory mitigation options may include restoration, enhancement, and preservation on- or off-site, or the purchase of mitigation credits at an approved mitigation bank.

As described above, the majority of Project activities would avoid substantial impacts on waters of the U.S. and/or waters of the state. With the implementation of MM BIO-23 in applicable situations where the addition of fill to waters of the U.S. and/or State is unavoidable, this impact would be less than significant with mitigation because compensation or permanent impacts would be provided in consultation with the appropriate regulatory agencies.

- d. Less than Significant Impact.** Existing vegetation within the aqueduct system alignment continues to be routinely maintained to aide in leak detection and largely supports grassland and ruderal vegetation. Streams and other waterways represent important wildlife migration corridors as various species utilize these areas for connections to uplands, cover, water, and prey opportunities generally migrate along streams and other waterways. Numerous streams and waterways occur throughout the alignment including an unnamed tributary to Bear Creek, Paddy Creek, Mosher Creek, Calaveras River, San Joaquin River, Whiskey Slough, Middle River, Old River, Indian Slough, Marsh Creek, unnamed intermittent streams, Kirker Creek, Contra Costa Canal, Seal Creek, Greyson Creek, Reliez Creek, Lafayette Creek, Moraga Creek, Walnut Creek, San Leandro Creek, San Pablo Creek, several canals, and other minor drainages. However, varying degrees of human development (e.g., residential, commercial, and industrial) and transportation infrastructure (e.g., roads and highways) interrupt and fragment the natural land cover within and adjacent to the aqueduct system alignment, limiting the value of many of these streams and waterways within the alignment as wildlife migration corridors.

The aqueduct system alignment is routinely mowed to maintain vegetation at or below four inches tall, and it typically consists of grassland and ruderal vegetation. Vegetation outside of the alignment is variable and can consist of developed, agricultural land, ruderal, woodland, grassland, and valley foothill riparian cover, as well as sporadic aquatic (i.e., streams) and wetland features. Wildlife that prefers open habitat may occasionally use the alignment, but these species are expected to also utilize relatively more abundance grassland and other open cover outside of the alignment. Woodland is located outside of and adjacent to portions of the aqueduct system alignment and riparian vegetation in the alignment is limited to relatively small areas where the aqueduct system crosses aquatic features. Riparian vegetation and adjacent aquatic features are particularly important migratory routes for wildlife species, but continued routine maintenance of upland vegetation within the aqueduct system mean that small thin segments of riparian vegetation occur within the alignment compared to the surrounding areas. Wildlife is expected to cross the aqueduct system alignment between larger, more contiguous areas of riparian vegetation outside of the alignment, but it is not expected to remain within the alignment. Due to the comparably larger, more contiguous natural vegetation outside of the alignment, the aqueduct system is not expected and not known to support wildlife nursery sites.

Streams crossed by the aqueduct system provide suitable habitat and movement routes for native fish species between the San Francisco or San Pablo bays and upstream reaches in the East San Francisco Bay Area, Central Valley, and Sierra Nevada Foothills. Fish are known to routinely migrate through several of the larger perennial streams.

Project activities would occur infrequently at any one stream or waterway location within the existing aqueduct system alignment; therefore, Project activities within the Project alignment would not

substantially interfere with the movement of wildlife species or the use of established wildlife corridors. The Project would not 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. The impact would be less than significant. No mitigation is required.

- e. **Less than Significant Impact.** Although EBMUD is not subject to building and land use zoning ordinances (such as tree ordinances) for projects involving the transmission of water (Government Code Section 53091), EBMUD strives to consider and work with host jurisdictions and neighboring communities during project planning and to conform to local environmental protection policies, where feasible and not contrary to its public purpose and responsibilities.

Numerous regional, county, and city ordinances and policies exist for the protection of biological resources. Examples include ordinances and local zoning that specify setbacks for wetlands, streams, and lakes and regulate the removal of trees. General plans in Alameda, Contra Costa, San Joaquin, and Calaveras counties; and the cities of Oakland, Moraga, Orinda, Lafayette, Pleasant Hill, Concord, Pittsburgh, Antioch, Brentwood, and Stockton include multiple conservation goals covering vegetation and wildlife resources within their respective jurisdictions. Alameda, Contra Costa, San Joaquin, and Calaveras counties; and the cities of Oakland, Moraga, Orinda, Lafayette, Pleasant Hill, Concord, Pittsburgh, Antioch, Brentwood, and Stockton also regulate the removal of protected trees within their respective jurisdictions.

The Project would not conflict with any of the applicable guiding principles in the documents listed above as maintenance activities would consist of low intensity work completed over short durations. Furthermore, impact discussions a), b) and d) above detail implementation of MMs BIO-1 through BIO-23, which would ensure that impacts to rare and endangered species and valuable wildlife habitats and corridors would be less than significant.

For these reasons, any significant impacts related to potential conflicts with local policies or ordinances regarding biological resources would be less than significant. No mitigation is required.

- f. **No Impact.** The East Contra Costa County Habitat Conservation Plan (HCP), San Joaquin County Multi-Species Habitat Conservation and Open Space Plan (SJMSCP), and the EBMUD Low Effect East Bay HCP (Watershed Lands HCP) occur within the Project area and include programs to maintain water quality, biodiversity (including multiple special-status species), forestry, livestock grazing, agricultural operations, fire and fuel management, and recreation. Approximately 26 miles of the Mokelumne Aqueduct System alignment lies within the East Contra Costa County HCP, approximately 38 miles of the alignment lies within the SJMSCP, and approximately 1 mile of the alignment lies within the EBMUD Watershed Lands HCP.

EBMUD is subject to the federal and state laws and regulations governing endangered species impacts and obtains its own species “take” authorizations when necessary, as illustrated in EBMUD’s Watershed Lands HCP. As such, the Project would not conflict with an approved or adopted HCP, NCCP, or other local regulation pertaining to biological resources. There would be no impact.

**V. Cultural Resources**

<b>Would the project:</b>	<b>Potentially Significant Impact</b>	<b>Less Than Significant With Mitigation Incorporated</b>	<b>Less Than Significant Impact</b>	<b>No Impact</b>
a) Cause a substantial adverse change in the significance of a historical resource pursuant to Section 15064.5?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Cause a substantial adverse change in the significance of a unique archaeological resource as defined in Section 15064.5?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) Disturb any human remains, including those interred outside of formal cemeteries?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**DISCUSSION**

The cultural resources impact analysis is based upon a report titled *Cultural Resources Assessment for the Mokelumne Aqueduct System Routine Maintenance Project*, prepared by Horizon Water and Environment, LLC (July 2019). This section presents data on the previously recorded cultural resources within the Project area, and discusses mitigation approaches to reduce or eliminate significant impacts to cultural resources.

Cultural resources include prehistoric archaeological sites; historic-era archaeological sites; tribal cultural resources; and historic buildings, structures, landscapes, districts, and linear features. Archaeological sites include places where Native Americans lived or carried out activities during the prehistoric period. Prehistoric and historic-era sites contain artifacts, cultural features, subsistence remains, and human burials. Tribal cultural resources are addressed in Section XVIII., Tribal Cultural Resources.

**Approach to Analysis**

**Architectural Resources**

Due to the nature of the routine maintenance activities proposed, such as sediment and debris removal, vegetation management, and routine maintenance of existing infrastructure, no potential adverse change is expected to any historical architectural resource because no material alteration of the existing built environment is proposed for the purposes of the routine maintenance, nor are any introductions of new maintenance activities or changes in the physical setting proposed. As a result, the proposed Project would not cause a substantial adverse change to an architectural or built environment resource and, therefore, impacts to built environment resources are not considered in this impact analysis.

**Archaeological Resources**

Previously recorded archaeological sites do occur within the Mokelumne Aqueduct System alignment and some sites also intersect with identified maintenance locations. Few of these sites have been revisited since their initial recordation, nor have many been evaluated for the California Register of Historic Resources (CRHR) in accordance with Section 15064.5(a)(2-3) of the CEQA Guidelines, using the criteria outlined in the Section 5024.1 of the California Public Resources Code.

Furthermore, given the geographic scale of the Project area, the substantial number of stream crossings where ground-disturbing maintenance activities could occur, and the unknown timing and location of specific maintenance activities in any given year, a number of previously unrecorded archaeological resources may exist. Additionally, in future years, other previously recorded resources could be identified

through project-specific record searches that are not currently within the EBMUD database. This impact analysis provides an assessment of the potential for effects on important cultural resources that could result from maintenance activities.

Mitigation measures are identified to ensure maintenance activity impacts to archaeological resources are reduced to less than significant levels.

**Archival Search**

EBMUD maintains an Archaeological Resources Geographic Information System (GIS) database for the EBMUD service area that is updated annually with the results of records searches within the jurisdictions of three Information Centers of the California Historical Resources Information System that cover the Project area: the Northwest Information Center, the North Central Information Center, and the Central California Information Center. The purpose of maintaining this database is to identify the presence of any previously recorded archaeological resources within the service area in order to guide strategies for the protection of archaeological resources if present in or near maintenance sites. The EBMUD GIS covers the EBMUD Ultimate Service Boundary (USB) in the East Bay Area and a ½-mile buffer zone around the centerline of the aqueduct system alignment. Also, the EBMUD GIS has identified 200-foot buffer zones around identified archaeological resources where, if maintenance work is proposed, further investigation may be warranted. It is important to note that the entirety of the aqueduct system has not been surveyed for archaeological resources; therefore, the database does not contain information about the presence of archaeological sites along some stretches. Hence, there is the possibility of additional, currently unknown, sites within the Project area, as previously discussed.

Approximately 20 recorded cultural resources occur within 200 feet of an identified maintenance site (see **Figure 2-2** and Appendix A for maintenance site locations). Of those 20 resources, six are archaeological in nature. These maintenance sites and their surrounding area are considered of higher sensitivity given the proximity to a previously recorded archaeological resource and given their proximity to a water source. **Table 3-7** summarizes the results of the records search for archaeological resources.

**Table 3-7: Recorded Archaeological Resources within 200-feet of Aqueduct System Stream Crossings**

Resource Name <sup>1</sup>	Notes	Resource Type	Age	Significance/ Notes
MOK-5	Asian ceramics and assorted glass	Archaeological Site	Historic	Not Evaluated
Habitation Site	Dense concentration of artifacts	Archaeological Site	Prehistoric	Not Evaluated
Penn Mine Historic Mining District	Mining District	Mine	Historic	Considered Eligible under CEQA
Anaclario Site	Burial site and midden soils	Archaeological Site	Prehistoric	Not Evaluated; likely destroyed
Chris Crow Mound	Midden soils	Archaeological Site	Prehistoric	Not Evaluated
Carrick Homestead Site	Assorted artifacts	Archaeological Site	Historic	Not Evaluated
<sup>1</sup> The locations of individual archaeological resources are confidential.				

### **Archaeological Survey**

The six areas of higher sensitivity were subjected to an intensive archaeological pedestrian survey on February 19<sup>th</sup> and 25<sup>th</sup>, 2019, by two qualified archaeologists who meets the U.S. Secretary of the Interior's professional standards in archaeology (48 Federal Register 44738-44739; Appendix A to 36 CFR 61). During the pedestrian survey, each potential maintenance site area was inspected for the presence of archaeological materials, including prehistoric and historic-era habitation debris (e.g., stone tools or tool manufacturing debris, glass fragments, tin cans), prehistoric features (e.g., hearths, house pits), and historic-era structural remains (e.g., house foundations, wells).

- a. No Impact.** Due to the nature of the routine maintenance activities proposed, such as sediment and debris removal, vegetation management, and routine maintenance of existing infrastructure, no potential adverse change is expected to any historical resource of the built environment because no material alteration of the existing built environment is proposed for the purposes of the routine maintenance. Furthermore, no historical resources that are archaeological in nature are known to be located along the aqueduct. As a result, the proposed Project would not cause a substantial adverse change to a historic resource. There would be no impact to known historical resources.

Historical resources that are archaeological in nature may be accidentally discovered during Project maintenance activities; archaeological resources are discussed further in item 3.5.3(b) below.

- b. and c. Less than Significant with Mitigation.** Based on the results of the archaeological survey conducted at the six recorded resource locations, no substantial archaeological deposits associated with the previously recorded resources were identified. However, archaeological remains may be buried with no surface manifestation. If archaeological remains are accidentally discovered that are determined eligible for listing in the CRHR, or determined to be a unique archaeological resource, or a Tribal Cultural Resource (TCR), and Project activities would affect them in a way that would render them ineligible for such listing, a significant impact would result. Should previously undiscovered archaeological resources be found, implementation of Mitigation Measure CR-1 would ensure that impacts on CRHR-eligible archaeological sites, unique archaeological sites, or TCRs accidentally uncovered during maintenance activities are reduced to a less-than-significant level by immediately halting work if materials are discovered, evaluating the finds for CRHR eligibility, and implementing appropriate mitigation measures, as necessary. Implementation of Mitigation Measure CR-1 would reduce impacts related to accidental discovery of archaeological resources to a level that is less than significant with mitigation.

**Mitigation Measure CR-1:** All EBMUD maintenance personnel shall attend a cultural resources training course. The training program will be completed in person or by watching a video conducted by a qualified archaeologist. The program will discuss cultural resources awareness within the project work limits, including the responsibilities of maintenance personnel, applicable mitigation measures, confidentiality, and notification requirements. Prior to accessing or performing maintenance work, all EBMUD personnel shall sign an attendance sheet by the qualified archaeologist 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"; and shall comply with all project environmental requirements.

In the event that potential cultural resources are discovered at a maintenance site, all maintenance activities shall immediately cease at the location of discovery and within 100 feet of the discovery. EBMUD will retain a qualified archaeologist to inspect the findings within 24 hours of discovery. If it is determined that maintenance activities 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], maintenance activities 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.

No evidence of human remains has been recorded or observed within the maintenance locations analyzed. Although the majority of the aqueduct system ROW has been previously disturbed by the aqueduct maintenance, there remains the possibility that Project maintenance activities could impact human remains, although this is considered unlikely. Should any such remains be discovered during construction, the California Health and Safety Code Section 7050.5 requires that work immediately stop within the vicinity of the finds and that the county coroner of where the remains are found be notified to assess the finds. Implementation of Mitigation Measure CR-2 would ensure that the Project would not result in any substantial adverse effects on human remains uncovered during the course of maintenance by requiring that, if human remains are uncovered, work must be halted and the applicable county coroner must be contacted. Adherence to these procedures and provisions of the California Health and Safety Code would reduce potential impacts on human remains to less than significant with mitigation.

**Mitigation Measure CR-2:** In the event that human remains are discovered, all maintenance activities shall immediately cease at the location of discovery and within 100 feet of the discovery. 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.

With the implementation of MMs CR-1 and CR-2 which require implementation of archaeological resources procedures that address the inadvertent discovery of cultural resources and human remains and follows statutory law, the Project's impacts related to cultural resources would be less than significant with mitigation

### **Consideration of Maintenance Activity Work Cycle**

As described in the Project Description, maintenance activities would be conducted throughout the year as required to maintain the functional and structural integrity of aqueduct system facilities. Maintenance site locations would vary from year to year. It is possible that additional archaeological resources, not currently known at the time of this IS/MND analysis, could be recorded in future years that would overlap with proposed maintenance locations in a given year. Review of the EBMUD GIS database, which is annually updated, would reveal potential overlaps. All overlapping recorded archaeological resources would need to be reevaluated in accordance with Section 15064.5(a)(2-3) of the CEQA Guidelines, using the criteria outlined in the Section 5024.1 of the California Public Resources Code, in order to determine eligible for listing on the (CRHR or the National Register of Historic Places (NRHP) and the significance of any impacts that could result from the identified maintenance activity. Implementation of Mitigation Measures CR-3 and CR-4 would ensure that future maintenance-related impacts would be less than significant with mitigation.

**Mitigation Measure CR-3:** Prior to initiating maintenance activities in a given year, EBMUD shall review the Archaeological Resources GIS database for all locations where ground-disturbing maintenance activities within previously undisturbed soils (excluding sediment

removal areas in drainages) are anticipated. A qualified archaeologist shall conduct a review and assessment of those maintenance sites that overlap with newly recorded resources within the last year to determine the potential for affecting significant cultural resources. If a location identified for maintenance activities that require ground disturbance has not previously been surveyed for archaeological resources, a qualified archaeologist shall conduct a field review to determine if surficial evidence of a resource is present. Further archival record search and literature review (including a review of the Sacred Lands Inventory of the Native American Heritage Commission) shall be conducted, as appropriate.

Identified cultural resources that may be impacted by a proposed maintenance activity shall be evaluated for eligibility for listing on the CRHR, or as a unique archaeological site or TCR, if they can't be avoided by maintenance activities. Cultural resources that are eligible for the CRHR are considered to be significant cultural resources, as are unique archaeological sites and TCRs. Cultural resources that are identified within Project areas subject to federal approval, permits, or funding shall also be evaluated for eligibility for listing on the NRHP. Cultural resources determined to be eligible for listing on the NRHP are automatically eligible for listing on the CRHR and are considered to be significant cultural resources.

A cultural resources report summarizing the results of the assessment and indicating appropriate management actions for individual maintenance sites (e.g., no action, monitoring during construction, presence/absence testing for subsurface resources; data recovery, etc.) shall be developed. The management actions shall be implemented to avoid significant effects to cultural resources.

**Mitigation Measure CR-4: Archaeological Data Recovery.** If it is infeasible to avoid impacts on archaeological sites that have been determined to be eligible for listing on the CRHR or the NRHP, additional research including, but not necessarily limited to, archaeological excavation shall be conducted (California Code of Regulations [CCR] Section 15126.4 (b)(3)(C)). This work shall be conducted by a qualified archaeologist and shall include preparation of a research design; additional archival and historical research; archaeological excavation; analysis of artifacts, features, and other attributes of the resource; and preparation of a technical report documenting the methods and results of the investigation in accordance with the California Office of Historic Preservation *Guidelines for Archaeological Research Design* (1991). The purpose of this work is to recover a sufficient quantity of data to compensate for damage to or destruction of the resource. The procedures to be employed in this data recovery program shall be determined in consultation with responsible agencies and interested parties, as appropriate. Where necessary, EBMUD would seek Native American input and consultation.

**VI. Energy**

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Result in potentially significant environmental impacts due to wasteful, inefficient, or unnecessary consumption of energy resources during project construction or operation?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b) Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

**DISCUSSION**

Energy resources are regulated through a variety of federal, state, and local regulations. At the federal level, the United States Environmental Protection Agency (USEPA) and the National Highway Traffic Safety Administration (NHTSA) have developed regulations to improve the efficiency of cars, and light-, medium-, and heavy-duty vehicles. Energy resource-related regulations, policies, and plans at the state level, require the regular analysis of energy data and developing recommendations to reduce statewide energy use, and setting requirements on the use of renewable energy sources. In addition, California’s 2017 Climate Change Scoping Plan, which details the state’s strategy for achieving the state’s greenhouse gas (GHG) targets, includes energy-related goals and policies. It contains measures and actions that may pertain to the proposed Project relating to vehicle efficiency and transitioning to alternatively-powered vehicles (CARB 2017). Many of the general plans for the cities and counties that overlap the proposed Project area contain goals, policies, and strategies related to energy resources. In addition, as discussed in Section VIII., *Greenhouse Gas Emissions*, some cities and counties in the Project area have adopted or drafted climate action plans (CAPs) or GHG emission reduction plans which involve energy-related measures.

EBMUD has adopted a Sustainability Policy (Policy 7.05 Sustainability and Resilience) with the goal of providing drinking water and wastewater services through sustainable operations and construction activities that avoid, minimize or mitigate adverse effects to the economy, environment, employees, and the public (EBMUD 2019). As part of the implementation of this policy, EBMUD minimizes its energy use and annually generates over 200,000 megawatt hours of energy through hydropower, solar power, and biogas production (EBMUD 2012). In addition, EBMUD has a carpool program and a vehicle fleet with hybrid cars and trucks powered by renewable diesel (EBMUD 2012, EBMUD 2018). EBMUD also has an established District-wide engine idling procedure as published in Chapter 4 of the Environmental Compliance Manual. The District maintains its equipment in accordance with the manufacturer’s specifications. EBMUD continues to investigate opportunities to develop other renewable energy sources (EBMUD 2018).

**a, b. Less than Significant Impact.** The proposed Project’s maintenance activities would require the consumption of energy (fossil fuels) for construction equipment, worker vehicles, and hauling trucks. These maintenance activities would generally be a continuation of existing similar activities, with a similar level of energy use by construction equipment and vehicles. These activities are necessary to protect critical drinking water infrastructure. The proposed Project would be implemented in compliance with EBMUD’s Sustainability Policy and Environmental Compliance Manual. **Table 3-8** shows the estimated annual fuel use from construction equipment, worker vehicles, and truck trips. The calculations used to develop these estimates are presented in Appendix C.



**Table 3-8: Project Fossil Fuel Use**

Source Type	Diesel Fuel Use (gallons)	Gasoline Fuel Use (gallons)
Off-road Construction Equipment <sup>1</sup>	22,106	
Worker Vehicles <sup>2</sup>		958
Hauling Vehicles <sup>3</sup>	409	
<sup>1</sup> Fuel use for off-road construction equipment was estimated using a fuel use factor from CARB's off-road in-use engine emissions model of 0.347 pound of diesel per horsepower-hour and diesel fuel density of 7.37 pounds per gallon. <sup>2</sup> Fuel use for construction worker vehicles was estimated using fuel use estimates from EMFAC with an estimated rate of 21.7 gallons per mile. <sup>3</sup> Fuel use for hauling vehicles was estimated using fuel use estimates from EMFAC with an estimated rate of 5.5 gallons per mile.		

Since the proposed Project is necessary to protect critical water infrastructure and would implement practices to ensure energy is used efficiently, the Project would not result in the wasteful, inefficient, or unnecessary consumption of energy or conflict with a state or local plan for renewable energy or energy efficiency. Therefore, this impact would be less than significant. No mitigation is required.

*This page intentionally left blank*

## VII. Geology and Soils

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
ii) Strong seismic ground shaking?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
iii) Seismic-related ground failure, including liquefaction?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
iv) Landslides?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b) Result in substantial soil erosion or the loss of topsoil?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) Be located on strata or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
d) Be located on expansive soil as defined in Table 18-1-B of the Uniform Building Code 1994, creating substantial direct or indirect risks to life or property?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
e) Have soils incapable of supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
f) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

### DISCUSSION

- a. (i. and ii.). Less than Significant Impact.** The Project alignment travels through the Bay Area, which is considered a seismically active region with many known active faults. The aqueduct system alignments cross through one known Alquist Priolo fault zone, the Concord Fault, in the City of Concord (California Department of Conservation [CDOC] 2018). Therefore, the potential for seismic shaking to occur within the Project area is very high, especially for the portion of the alignment within the Bay Area.

Although the aqueduct system alignment would experience strong seismic ground shaking from rupture of a known earthquake fault, the Project does not involve new construction or maintenance activities at facilities that are temporarily or permanently occupied by people. Thus, the Project would not directly or indirectly expose people to substantial adverse effects associated with fault rupture and strong seismic ground shaking beyond the existing conditions. Impacts would be less than significant and no mitigation is required.

- a. (iii.) Less than Significant Impact.** The factors known to influence liquefaction potential include soil type, relative density, grain size, confining pressure, depth to groundwater, and the intensity and duration of seismic ground shaking. The majority of the aqueduct system alignment is not located within an area susceptible to liquefaction. However, the portion of the aqueduct system alignment that travels across the Sacramento-San Joaquin River Delta is within an area susceptible to liquefaction (CDOC 2018). As described above, the Project would adhere to applicable California Building Code (CBC) requirements to reduce the potential for structure damage associated with seismic hazards, including liquefaction. Because the Project involves conducting routine maintenance activities at existing facilities and does not involve the construction of new structures that would directly or indirectly expose people to substantial adverse effects including liquefaction, impacts would be less than significant and no mitigation is required.
- a. (iv.) Less than Significant Impact.** Seismically induced landslides and other slope failures are common occurrences during or soon after earthquakes in areas with significant ground slopes. The aqueduct system alignment does not travel through any identified seismic landslide zones (CDOC 2018). The closest seismic landslide zones are located within the Berkeley and Oakland Hills, within the EBMUD service area. However, the aqueduct system alignment travels through hillside areas, potentially susceptible to small, localized landslides. In addition, the Project involves conducting routine maintenance activities within creeks and channel banks that may also be susceptible to slides. However, maintenance activities would not increase the potential for landslides to occur, rather, maintenance activities would prevent bank failures and slides from occurring. Further, the Project would adhere to applicable California Building Code requirements to reduce the potential for damage associated with landslides and ensure protection of public health and property. Therefore, impacts would be less than significant and no mitigation is required.
- b. Less than Significant with Mitigation.** The Project would involve ground-disturbing activities including sediment and debris removal; vegetation management; maintenance and repair or replacement of culverts, road crossings, and other structures; and bank and levee repair and erosion control. These ground disturbing activities may result in increases risk of erosion and sedimentation due to sediment loading into the channel, sediment-laden water at work sites entering the channel, or disturbance of new areas during activities. Erosion or sediment loading into the channel also could occur if maintenance activities do not revegetate exposed soils or restore low-flow channels as closely as possible to their original location and form.

As described in the Project Description, EBMUD restores site grades and replants areas where sediment removal activities have occurred. Bio-engineering methods (e.g., brush walls, or other plantings and seeding) are used at bank stabilization sites to stabilize eroding streambanks. In addition, MMs BIO-18 (limiting vegetation disturbance to the minimum necessary), BIO-19 (revegetation of exposed and disturbed areas), and HYD-1 (implementation of erosion control BMPs) would further prevent short-term erosion and loss of topsoil by minimizing the area of disturbance and implementing erosion control BMPs. In the long term, proposed maintenance activities would result in beneficial effects by reducing erosion from actively eroding or slumping channel and levee banks. Overall, with implementation of maintenance restoration practices and MMs mentioned above, Project impacts would be reduced to less than significant with mitigation.

- c. Less than Significant Impact.** Proposed maintenance activities would be conducted in some areas that are considered unstable. However, the Project includes removing sediment and debris, managing vegetation, maintaining and repairing or replacing culverts, road crossings, and other structures, and stabilizing banks and levees with erosion control to improve conveyance, control runoff along roads and within channels, and minimize erosion. Thus, implementation of the Project would protect EBMUD facilities from becoming unstable and reduce the risk of landslides, erosion, subsidence, or road collapse due to misdirected runoff. Further, maintenance activities would adhere to applicable California Building Code requirements to maintain public health and safety. Therefore, impacts associated with unstable geologic units would be less than significant and no mitigation is required.
- d. Less than Significant Impact.** Expansive soils contain types of clay minerals that occupy considerably more volume when they are wet or hydrated than when they are dry or dehydrated. Volume changes associated with changes in the moisture content of near-surface expansive soils can cause uplift or heave of the ground when they become wet or, less commonly, cause settlement when they dry out. The aqueduct system alignment crosses through a variety of soil types, some of which are considered expansive. However, because the Project would adhere to applicable California Building Code requirements as well as does not involve the construction of new structures that would increase the risk to life and property due to expansive soils within the Project area, impacts would be less than significant and no mitigation is required.
- e. No Impact.** The Project does not include construction of or connections to septic tanks or alternative wastewater disposal systems. Therefore, no impacts would occur related to the soil's capability to adequately support the use of septic tanks or alternative wastewater disposal systems.
- f. Less than Significant with Mitigation.** The possibility of a paleontological discovery is unlikely because most maintenance activities occur in areas that have been modified from their natural condition, and therefore do not contain geologic material with a high likelihood of containing paleontological resources. In addition, maintenance activities largely consist of above ground maintenance or channel sediment and debris removal and would not require significant excavation. However, the Project could accidentally impact unknown paleontological resources during ground-disturbing activities. Unknown and accidental paleontological discoveries during maintenance-related activities have the potential to result in significant impacts paleontological resources. Should previously undiscovered paleontological resources be found, implementation of Mitigation Measure GEO-1 would reduce impacts to a less-than-significant level by immediately halting work if materials are discovered, evaluating the significance of the find, and implementing appropriate mitigation measures, as necessary. Implementation of Mitigation Measure GEO-1 would reduce this impact to a level that is less than significant with mitigation.

**Mitigation Measure GEO-1:** If items of paleontological interest are accidentally discovered during maintenance, work shall be immediately suspended at, and within 100 feet of the discovery site. 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 (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 maintenance activities could damage a paleontological resource as defined by the Society of Vertebrate Paleontology guidelines (Society of Vertebrate Paleontology 2010), maintenance activities 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 maintenance activity can resume.

*This page intentionally left blank*

### VIII. Greenhouse Gas Emissions

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
g) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
h) Conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

### DISCUSSION

- a. Less than Significant Impact.** The proposed Project would directly generate greenhouse gas (GHG) emissions during maintenance activities from the combustion of fossil-fuels by construction equipment, trucks hauling materials, and worker vehicles.

As discussed in Section III., *Air Quality*, the proposed Project spans three air basins and would fall under the jurisdiction of the Bay Area Air Quality Management District (BAAQMD), San Joaquin Valley Air Pollution Control District (SJVAPCD), and the Calaveras County Air Pollution Control District (CCAPCD). In addition, the proposed Project would be located within multiple cities and towns, which have not identified quantitative thresholds of significance for GHGs separate from those of the local air districts. Thus, EBMUD considers the relevant air districts’ significance thresholds adequate to provide a conservative evaluation of a project’s potential greenhouse gas impacts. The BAAQMD has an operational GHG threshold of 1,100 metric tons of carbon dioxide equivalents per year (MTCO<sub>2</sub>e/yr) (BAAQMD 2017). The SJVAPCD has adopted a best management practices (BMP) threshold for GHG emissions based on an achievable in practice analysis of improvement over a business-as-usual scenario or 29 percent improvement (SJVAPCD 2019). However, at this time there is not an approved BMP for this type of project nor has suitable data to establish a business-as-usual scenario been provided by the SJVAPCD. The SJVAPCD threshold has also not been updated to reflect the SB 32 2030 goal. The CCAPCD has not adopted thresholds of significance for the analysis of GHG emissions (Calaveras County 2018); therefore, the published California air district mass emissions thresholds were reviewed and considered in developing an appropriate threshold. The applicable threshold for the proposed Project was determined to be the BAAQMD’s 1,100 MTCO<sub>2</sub>e/yr.

Maintenance-related emissions were estimated using the California Emission Estimator Model (CalEEMod) version 2016.3.2, which uses estimates from CARB’s models for off-road vehicles and EMFAC2014. Project construction assumptions, including equipment usage and schedule, used for this analysis are based on input from the Project design team and Chapter 2, *Project Description*. As discussed in Section III., *Air Quality*, the assumptions used for the modeling are: off-road equipment use occurring up to 60 days per year, a maximum of 633 trips per year covering an average of 12,660 miles would be generated. Projects could be anywhere along the Mokelumne Aqueduct System alignment but typical/average round trip would be about 20 miles. This is the scenario modeled for greenhouse gas emissions discussed below.

Estimated emissions associated with the Project’s maintenance activities would be 96 MTCO<sub>2</sub>e/yr in 2019 and are expected to decrease in future years as fleets introduce more efficient and/or alternatively-powered vehicles in line with state regulations. Therefore, emissions from maintenance

activities would be substantially below the applicable threshold discussed above. Additionally, as described in Appendix B, the proposed Project activities are covered by EBMUD's Climate Mitigation Action Plan and Climate Change Monitoring and Response Plans, which guide mitigation of EBMUD GHG emissions that contribute to climate change (EBMUD 2019). Further, although not required to reduce the significance of this impact, EBMUD has established District-wide engine idling procedure as published in Chapter 4 of the Environmental Compliance Manual

Therefore, since the proposed Project's GHG emissions would be below the applicable thresholds, this impact would be less than significant. No mitigation is required.

- b. Less than Significant Impact.** The State of California implemented Assembly Bill (AB) 32 to reduce GHG emissions to 1990 levels by 2020. Senate Bill (SB) 32 codified an overall goal for reducing California's GHG emissions to 40 percent below 1990 levels by 2030. Executive Orders (EOs) S-3-05 and B-16-2012 further extend this goal to 80 percent below 1990 levels by 2050. In 2018, EO B-55-18 signed by California Governor Edmund G. Brown set a goal of statewide carbon neutrality by 2045 and net negative emissions thereafter.

To meet these statewide goals, the California Air Resources Board (CARB) prepared a plan (the *Scoping Plan for Achieving California's 2030 Greenhouse Gas Target* (2017 Scoping Plan)) that identifies how the State can achieve the 2030 climate target (40 percent GHG reduction from 1990 levels), and make substantial progress toward the additional future goals. The 2017 Scoping Plan (CARB 2017) mentions water as a key focus area and calls for effective regional integrated planning that maximizes efficiency and conservation efforts in the water sector. In addition, the 2017 Scoping Plan calls for measures that reduce GHG emissions and maintain water supply reliability. The proposed Project is consistent with the 2017 Scoping Plan's water focus area in that this Project would improve the structural and functional integrity of the Mokelumne Aqueduct System and associated EBMUD pipelines and reservoirs. The proposed Project is not of a type or size that would be required to report GHG emissions to CARB.

In addition to the statewide GHG policies and plans, there are plans prepared by the applicable air districts and/or local municipalities that would be applicable to the proposed Project. Applicable plans to the proposed Project would include the 2017 Bay Area Clean Air Plan, the SJVAPCD Climate Change Action Plan, the Contra Costa County Climate Action Plan, the Alameda County Community Climate Action Plan, and climate actions plans for a number of the cities and towns containing maintenance sites. These climate action plans establish GHG reduction goals, and policies, programs, and actions to achieve those goals, including water use efficiency and conservation. The proposed Project's maintenance activities would not conflict with any of the identified goals or policies in the applicable local climate action plans, and would be considered consistent with these plans because the Project is an essential public service and protects the efficient use of water.

Furthermore, in 2008, EBMUD incorporated a climate change strategy into its Strategic Plan focusing on climate change monitoring, mitigation of emissions, and guiding investment decisions with climate change in mind. EBMUD prepared a Climate Change Monitoring and Response Plan in 2010 and updated it in 2014 to identify potential climate change threats, prepare adaptation strategies, and guide mitigation of EBMUD GHG emissions. EBMUD has goals of 1) reducing direct GHG emissions 50 percent by 2040 as compared to baseline GHG emissions in year 2000, and 2) being carbon free for indirect emissions by 2040. In 2017, GHG emissions generated by EBMUD were 20,884 MTCO<sub>2e</sub>, which were 54 percent below 2000 GHG emission levels (EBMUD 2018).

In summary, the proposed Project consists of necessary and established maintenance activities that protect critical water infrastructure and would not generate an increase in EBMUD's GHG emissions.



As discussed above, GHG emissions from the proposed Project would decline in future years as vehicle and equipment fleets are updated with alternatively fueled or more efficient models. Thus, emissions generated by the proposed Project would not be expected to have a substantial contribution to the ongoing impact on global climate change. Therefore, for the above-described reasons, the proposed Project would not conflict with a plan, policy or regulation adopted for the purpose of reducing the emission of GHGs. This impact would be less than significant. No mitigation is required.

*This page intentionally left blank*

**IX. Hazards and Hazardous Materials**

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the likely release of hazardous materials into the environment?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and as a result, would it create a significant hazard to the public or the environment?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
f) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
g) Expose people or structures, either directly or indirectly, to the risk of loss, injury or death involving wildland fires?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**DISCUSSION**

**a. and b. Less than Significant with Mitigation.** Proposed maintenance activities would be temporary in any one location, and generally would be confined to small areas at drainages, including culverts, road crossings, and other facilities, and areas proposed for sediment and debris removal, vegetation management, and bank stabilization. Maintenance activities would largely be conducted with hand-held tools (i.e., shovels, rakes, hand saws, etc.) or mechanical equipment (weed cutter, chainsaws, excavators, etc.), dependent upon the maintenance needs. Larger sediment and debris removal, bank stabilization repairs, and vegetation management activities may require the use of heavy equipment, such as excavators or bobcats.

Hazardous materials, including fuels and lubricants used in excavation and transportation equipment and vehicles, would be present during maintenance activities. Hazardous materials would be transported to and from the maintenance sites; however, they would be removed once maintenance

activities are complete. Hazardous materials would not be stored permanently at any of the maintenance sites. Nonetheless, if hazardous materials were accidentally released during use or transport, a significant impact on humans or the environment could result. To mitigate potential impacts associated with accidental spills to less than significant, EBMUD would implement MMs BIO-8, BIO-9, BIO-10 and HAZ-1.

**Mitigation Measure HAZ-1:** Prior to the start of maintenance activities, EBMUD shall establish a Contingency Plan detailing the procedures and countermeasures that will be implemented when an accidental release of hazardous materials occurs in order to prevent the release from entering navigable waters. The Contingency Plan shall include a list of the hazardous substances typically used for maintenance activities, including petroleum products, and countermeasures that shall be taken to prevent spills, monitor hazardous substances, and provide immediate response to spills. Spill response measures shall address notification of the appropriate agencies including phone numbers; spill-related worker, public health, and safety issues; spill control, and spill cleanup. All EBMUD maintenance staff shall be familiar with Contingency Plan procedures and countermeasures for preventing and controlling the spilling of known hazardous substances used on the jobsite or staging areas.

In addition, ground-disturbing maintenance activities and debris removal activities may encounter existing hazardous materials, such as discarded oil, batteries, and paint cans. Hazardous debris is often found in stream channels, particularly those next to roadways. If not removed from the streams in a proper manner, the hazardous materials would continue to degrade the quality of water and surrounding environment. EBMUD Procedure 711, included in Appendix B, comprises of standard EBMUD procedures for removing found hazardous waste from EBMUD facilities to ensure material is properly characterized, and handled and disposed.

Implementation of MMs BIO-8, BIO-9, BIO-10 HAZ-1 and adherence to EBMUD Procedure 711 would reduce impacts related to the use, transport, disposal, or accidental release of hazardous materials to the public or environment to less than significant with mitigation.

- c. **Less than Significant with Mitigation.** Several schools, such as University of the Pacific, Cleveland Elementary School, and Brookside School, are located within 0.25 mile of the aqueduct system alignment. Proposed maintenance activities may involve the use and transport of hazardous materials (fuel and lubricants) to and from maintenance sites. Fuels and lubricants are considered hazardous materials that may adversely affect children at schools if the materials are handled improperly or accidentally released or children are inadvertently exposed to hazardous emissions.

To mitigate potential impacts associated with improper handling or accidental release of hazardous materials to less than significant, EBMUD would implement MM HAZ-1, which requires preparation of a Spill Prevention Response Plan, and adhere to EBMUD Procedure 711, which includes procedures for removing hazardous waste from EBMUD facilities to ensure material is properly characterized, and handled and disposed. Additionally, because the estimated number of trips for maintenance equipment carrying fuel and lubricants to any one location would be low due to the infrequency of maintenance that would be required at any one location each year, students at schools would not be exposed to high levels of hazardous emissions. In conclusion, potential impacts associated with hazardous emissions or the use of hazardous materials within one-quarter mile of a school would be less than significant with mitigation.

- d. **Less Than Significant Impact.** The entire aqueduct system alignment was checked against regulatory databases including the Department of Toxic Substances online EnviroStor Database (Department of Toxic Substance Control [DTSC] 2019) and the State Water Resources Control

Board's (SWRCB) online GeoTracker Database (SWRCB 2015a), which are compiled pursuant to Government Code Section 65962.5, for known hazardous material sites. One identified hazardous materials site, a gasoline leak, was identified within the aqueduct system alignment in the City of Pleasant Hill. However, the gasoline leak was detected and the case has been closed since 1988; the site no longer poses a potential hazard to the public or environment (SWRCB 2015b). In addition, no routine maintenance activities are proposed in this location.

Further, because most of the proposed routine maintenance sites have been previously disturbed, there is a very low potential for previously unknown hazardous material sites or hazardous material contamination to be discovered during ground disturbing maintenance activities. In the event that hazardous materials are discovered, EMBUD Procedure 711, which includes standard EBMUD procedures for removing hazardous waste from EBMUD facilities, would ensure the material is properly characterized, handled and disposed. Therefore, adherence to EMBUD Procedure 711 would ensure that the Project would result in a less than significant impact related to hazardous materials sites creating a significant hazard to the public or the environment. No mitigation is required.

- e. **Less than Significant Impact.** The closest airport to the aqueduct system alignment is the Buchanan Field Airport, located less than one mile west of the aqueduct system alignment in the City of Concord. Although maintenance activities would occur within 1 mile of the airport, maintenance activities are intermittent and temporary at each maintenance site; thus, maintenance crews would only temporarily be exposed to noise from the Buchanan Airport, and noise levels would not be considered excessive in comparison to noise levels within urban areas. Further, as a routine maintenance project, the Project would not construct any structures that would result in an airport safety hazard. Therefore, this impact would be less than significant. No mitigation is required.
- f. **Less than Significant Impact.** Emergency response and evacuation plans are generally the responsibility of the county and evacuation routes are located along designated public roads. Hindrance of access on public roads would cause significant impacts. Proposed maintenance activities would primarily occur within EBMUD ROW on private roads. However, in some locations, maintenance sites are accessed via public roads. Maintenance activities, particularly road and culvert maintenance and repair or replacement work, could temporarily impede access on the roads adjacent to maintenance sites. However, maintenance activities would be intermittent and limited to a few hours a day at each site; full closures of roadways would not be required. Because no full closures are required and disruptions would be temporary, the Project would not significantly impair implementation of or physically interfere with an adopted emergency response plan or evacuation plan. This impact would be less than significant. No mitigation is required.
- g. **Less than Significant with Mitigation.** The aqueduct system alignment traverses through both urban and rural areas. The California Department of Forestry and Fire Protection (Cal Fire) identifies fire hazard severity zones for local and state responsibility areas. The fire hazard model considers wildland fuels, topography, weather, frequency of fires, and production of embers. The eastern portion of the aqueduct system alignment near Pardee Reservoir is within both high and very high fire hazard severity zones. Much of San Joaquin County (the central portion of the alignment) has not been zoned for fire hazard. The western portion of the aqueduct system alignment traverses through very high, high, and moderate fire hazard severity zones. Thus, wildland fire is a potential risk along the aqueduct system alignment. The use of maintenance equipment could pose a wildland fire risk in the Project area. The time of greatest fire risk would be during vegetation management activities when maintenance crews and equipment are close to vegetative fuels that could be highly flammable. EBMUD would implement MM WILD-1 (refer to Section XX, *Wildfire*) which requires that sites be supplied and maintained with adequate firefighting equipment and access for firefighting at sites is maintained. In addition, all work would comply with applicable federal, local, and state

fire-prevention regulations, including the California Fire Code. Therefore, through implementation of MM WILD-1 and adherence to applicable fire code regulations, Project impacts related to hazards resulting from wildland fires would be less than significant with mitigation.

## X. Hydrology and Water Quality

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Substantially alter the existing drainage pattern of the site 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:				
i) Result in substantial erosion or siltation on- or off-site;	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ii) Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site;	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
iii) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
iv) Impede or redirect flood flows?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
e) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

### DISCUSSION

- a. Less than Significant with Mitigation.** Proposed routine maintenance activities, including sediment and debris removal; maintenance or replacement of culverts, road crossings and other structures; vegetation management, and bank and levee stabilization and erosion control has the potential to violate water quality standards or degrade water quality. Specific aspects of maintenance work that would pose a water quality threat are discussed below.

Ground-disturbing Activities. Proposed maintenance activities involve ground disturbing activities, such as sediment and debris removal, culvert repair or replacement, and bank and levee repairs that could expose soils and increase the potential for soil erosion and transport of sediment downstream. During a storm event, soil erosion could occur at an accelerated rate. Sediment releases may increase

turbidity, which could cause an increase in water temperature and a corresponding decrease in dissolved oxygen levels. Though ground disturbing activities would be short-term and temporary, discharge of sediment to surface waters could adversely impact water quality, endanger aquatic life, and/or result in a violation of water quality standards. To mitigate impacts on water quality associated with erosion and sedimentation, EBMUD would implement MMs HYD-1 and BIO-8 which require implementation of erosion control BMPs. Erosion control BMPs would stabilize exposed soils in the work area and prevent sediment from entering downstream waterbodies.

**Mitigation Measure HYD-1:** All exposed soils within the work area shall be stabilized immediately following the completion of earthmoving activities to prevent erosion into the stream channel. Erosion control BMPs, such as silt fences, straw hay bales, gravel or rock-lined ditches, water check bars, and broadcasted straw will be used. Monofilament based erosion control blankets will not be used within the stream zone or riparian areas. Erosion control BMPs shall be monitored during and after each storm event for effectiveness. Modifications, repairs, and improvements to Erosion control BMPs shall be made as needed to protect water quality. Silt laden runoff will not be allowed to enter the stream or be directed to an area that may enter the stream at any point.

All non-biodegradable silt barriers (e.g., plastic silt fencing, netting surrounding coil logs or rolls) shall be removed after areas have stabilized with erosion control vegetation (usually after the first growing season).

Dewatering Activities. Bank stabilization activities may require dewatering of channels if water is present during maintenance activities. Drilling and installing the plastic drainpipes into the channel bank to direct the streamflow would disturb the streambed and banks, which could result in increased turbidity in the water column and migration of sediment to areas downstream. Temporary instream fences and other barriers would be installed within the channel to minimize the potential for sediment to migrate downstream. However, if not monitored and maintained, temporary instream fences or other barriers in the channel could fail, releasing sediment, sand, gravel, and water into the work site and downstream, increasing turbidity. These issues could exceed water quality standards during in-water maintenance work. However, implementation of MM HYD-2 would minimize impacts on water quality by prescribing measures to ensure that sediment is not transported unnecessarily during dewatering activities.

**Mitigation Measure HYD-2:** When work in streams with water is unavoidable, streamflow shall be diverted around the work area by construction of temporary instream fences or other barriers. The following measures shall be implemented to minimize impacts to water quality associated with dewatering activities:

- The area to be dewatered shall encompass the minimum area necessary to perform the maintenance activity.
- Construction of instream barriers shall begin in the upstream area and continue in a downstream direction, and the flow shall be diverted only when construction of instream barriers is complete.
- Instream barriers shall be installed both upstream and downstream, not more than 100 feet from the extent of the work areas.
- Streamflows shall be allowed to travel by gravity flow around or through the work site through pipes.



- A qualified biologist shall be present to ensure that fish and other aquatic vertebrates are not stranded during construction and implementation of channel dewatering.
- Downstream flows adequate to prevent fish or vertebrate stranding shall be maintained at all time during dewatering activities.
- Diverted and stored water shall be protected from maintenance activity-related pollutants, such as soils, equipment lubricants, and fuels.
- If necessary, discharged water shall pass over some form of energy dissipater to prevent erosion of the downstream channel. Silt bags will be attached to the end of discharge hoses and pipes to remove sediment from discharged water.
- When maintenance is completed, the temporary instream barrier shall be removed as soon as possible but no later than 48 hours after work is completed. Impounded water shall be released at a reduced velocity to minimize erosion, turbidity, and harm to downstream habitat.
- When diversion structures are removed, to the extent practicable, the ponded flows shall be directed into the low-flow channel within the work site to minimize downstream water quality impacts.
- The area disturbed by installation of instream structures shall be restored at the completion of the maintenance activity.

Hazardous Materials. Proposed maintenance activities would primarily be conducted by hand or with small gas-powered tools such as weed cutters and chainsaws. However, larger sediment and debris removal, bank stabilization repairs, and vegetation management activities may require the use of excavators and bulldozers. Hazardous materials, including fuel and lubricants, are used in excavation and transportation equipment and vehicles and would be present during maintenance activities. Accidental releases either directly or indirectly into the stream channel could occur and significantly degrade sediment and water in and around the work site. Fine sediments contained within stream channels are particularly apt at absorbing pollutants such as petroleum products. Water in the channels can transport pollutants downstream and carry them through the soil into underlying groundwater, affecting a larger area. Thus, accidental release of maintenance-related hazardous materials would potentially result in a significant impact on surface and groundwater quality. To mitigate potential impacts to water quality associated with the use of hazardous materials, EBMUD would implement MMs BIO-8 (dewatering and flow diversion requirements), BIO-9 (proper containment of hazardous or toxic construction materials), BIO-10 (containment of concrete leachate), and HAZ-1 (preparation of a contingency plan for accidental releases of hazardous materials).

In addition, any onsite trash and debris observed by maintenance crews would be removed from the site following the completion of activities. Maintenance and debris removal activities could encounter hazardous materials, such as discarded oil, batteries, and paint cans. Hazardous debris is often discarded in stream channels, particularly within channels next to roadways. If not removed from the streams in a proper manner, the hazardous materials would continue to degrade the quality of water and surrounding environment. EBMUD Procedure 711, included in Appendix B, comprises of standard EBMUD procedures for removing found hazardous waste from EBMUD facilities to ensure material is properly characterized, and handled and disposed to avoid impacts to water quality.

In conclusion, potential impacts on surface and groundwater quality from accidental spills of hazardous materials during maintenance would be avoided through implementation of MMs BIO-8, BIO-9, BIO-10, and HAZ-1 and adherence to EBMUD Procedure 711. Impacts on surface and groundwater quality would be less than significant with mitigation.

Vegetation Management Effects on Water Temperature. Proposed vegetation maintenance activities would involve trimming, mowing, pruning, and removal of weeds and grasses, woody and herbaceous plants within the bed and banks of drainages or other waterbodies crossing the aqueduct alignment, fallen trees, dead trees in danger of falling in or across channels, or trunks or limbs in the bed or bank of channels or on immediately adjacent access roads and shoulders. Where vegetation management is implemented alongside waterbodies, the canopy shading the water may be diminished, increasing channel exposure to sunlight. If shading is completely removed from a channel, for example, increased exposure to sunlight may cause water temperatures to increase and exceed Basin Plan water quality objectives (e.g., increase of 5 degrees Fahrenheit (°F) above background conditions). However, vegetation management activities would be selective and targeted and would only be conducted where necessary to maintain flow conveyance capacity, prevent loss of habitat and erosion, and control invasive vegetation. Therefore, vegetation management activities would not permanently affect water quality nor exceed water quality objectives, and impacts would be less than significant.

Conclusion. Implementation MMs HYD-1, HYD-2, BIO-8, BIO-9, BIO-10, and HAZ-1 and adherence to EBMUD Procedure 711 would minimize the potential for proposed maintenance activities to substantially degrade surface water and groundwater quality or violate water quality standards or waste discharge requirements. In the long-term, these maintenance activities would improve the natural flow in channels, stabilize actively eroding streambanks and levees, thus reducing bank erosion and sediment loading effects, and upgrade EBMUD facilities that are not functioning properly, resulting in long-term improvements to water quality. Overall, impacts would be less than significant with mitigation.

- b. No Impact.** Proposed maintenance activities would not affect existing groundwater wells and pumping facilities, and no new wells or pumps would be installed as part of the Project. The proposed maintenance activities would not involve any actions that would substantially deplete groundwater supplies or affect the aquifer volume or groundwater table level. Further, because channel bottoms are effective groundwater recharge locations in a groundwater basin, maintenance activities may improve groundwater recharge functioning by removing sediment and debris from channel bottoms. Therefore, no impact related to groundwater supply or recharge would occur.
- c.(i) Less than Significant with Mitigation.** During ground disturbing activities, soil would be exposed, and there would be an increased potential for soil erosion and transport of sediment downstream. Potential erosion and sedimentation impacts during maintenance activities would be reduced through implementation of MM HYD-1 (stabilization of exposed soils) and BIO-8 (restriction of equipment operations in wetted portions of streams and within 12-hours of predicted storm events), which require implementation of erosion control BMPs to stabilize exposed soils in the work area and prevent sediment from entering downstream waterbodies.

Proposed maintenance activities include sediment and debris removal, vegetation management, maintenance and repair or replacement of culverts, road crossings, and other structures, bank and levee repair and erosion protection, and related activities within existing drainage patterns in the Project area's channels and drainages. Without maintenance, sediment accumulation and erosion would increase and degrade site conditions such that flooding could occur, particularly along access roads. Additionally, erosive forces could redirect runoff such that new drainage pathways could be created and cause further damage to access roads, EBMUD facilities, and water quality.

Implementation of these routine maintenance activities would prevent runoff flows from causing erosion and siltation and would direct runoff to culverts and drainages to protect water quality. Therefore, with implementation of MM HYD-1 and BIO-8, impacts would be less than significant with mitigation.

- c. (ii)(iii). Less than Significant Impact.** The Project would involve sediment and debris removal, vegetation management, maintenance and repair or replacement of culverts, road crossings, and other structures, bank and levee repair and erosion protection, and related activities within existing drainage patterns in the Project area's channels and drainages. Without maintenance, sediment accumulation and erosion would increase and degrade site conditions such that flooding could occur, particularly along access roads. Additionally, erosive forces could redirect runoff such that new drainage pathways could be created and cause further damage to access roads, EBMUD facilities, and water quality. The Project would implement routine maintenance activities to prevent runoff flows from causing flooding or exceeding EBMUD facilities. Maintenance activities would ensure that runoff is properly directed to culverts and drainages, and that culverts are properly sized to convey storm flows, which would protect water quality. Implementation of the Project would not create or contribute runoff that would exceed the capacity of existing EBMUD facilities. This impact would be less than significant. No mitigation is required.
- c. (iv) No Impact.** The Project would not involve the construction of new structures that would impede or redirect flood flows. To the contrary, the Project would reduce the potential for flooding by providing sediment and debris removal, vegetation management, maintenance and repair or replacement of culverts, road crossings, and other structures, and bank and levee repair and erosion protection. Therefore, implementation of the Project would not result in any impacts related to placing structures that would impede or redirect flood flows.
- d. No Impact.** Proposed maintenance activities would occur along and within channels and creeks within the 100-year flood hazard zone; however, the Project would not involve the construction of new structures that would increase the risk of inundation by flooding. To the contrary, the Project would reduce the risk of flooding and impacts to water quality by providing sediment and debris removal; vegetation management; maintenance and repair or replacement of culverts, road crossings, and other structures; and bank and levee repair and erosion protection. Therefore, implementation of the Project would result in a beneficial effect by ensuring that EBMUD facilities are operating properly, thus reducing the risk of flooding.

Tsunamis are generated ocean wave trains generally caused by tectonic displacement of the sea floor associated with shallow earthquakes, sea floor landslides, rock falls, and exploding volcanic islands. The Project area is located outside of the tsunami inundation zone (CDOC 2018). The Project would not be at risk of inundation by a tsunami.

Seiching is a phenomenon that occurs when seismic ground shaking induces standing waves (seiches) inside water retention facilities (e.g., reservoirs and lakes). Such waves can cause retention structures to fail and flood downstream properties. The aqueduct system travels for approximately 100 miles from the Pardee Reservoir through the Central Valley, along the Calaveras River and the Sacramento-San Joaquin River Delta, to the East Portal facility in the EBMUD service area in the East Bay. There is a potential for seiches to occur in the Pardee Reservoir and other lakes and waterbodies adjacent to the aqueduct system alignment. However, conducting routine maintenance activities would not increase the risk inundation by seiches. Project implementation would not result in impacts related to releasing pollutants due to Project inundation within a flood hazard, tsunami, or seiche zone.

- e. **No Impact.** The aqueduct system alignment is within the jurisdiction of both the San Francisco Bay (Region 2) and Central Valley (Region 5) RWQCB. Each RWQCB has developed a Water Quality Control Plan (Basin Plan) that designates beneficial uses and water quality objectives for waters of the State, including surface waters and groundwater. Basin Plans also include implementation programs to achieve water quality objectives. As described above, implementation of MMs would ensure that proposed maintenance activities would not permanently affect water quality nor exceed water quality objectives or affect designated beneficial uses. On the contrary, proposed maintenance activities would improve water quality and flow conveyance by providing sediment and debris removal, vegetation management, culvert and crossing repair or replacement and maintenance, and eroding bank and levee repair.

The 2014 Sustainable Groundwater Management Act (SGMA) requires governments and water agencies in high and medium priority basins to stop overdraft and balance groundwater basin pumping and recharge. The state's groundwater basins were classified into priorities based on components identified in the California Water Code. Development of Sustainable Groundwater Management Plans are only required for basins classified as medium or high priority (California Department of Water Resources [DWR] 2019b). The majority of the aqueduct system alignment does not cross through any basins that are prioritized as medium or high; however, as the aqueduct system alignment enters EBMUD service area in Alameda County, the underlying groundwater basin, Santa Clara Valley East Bay Plan, is classified as medium priority (DWR 2019a). As discussed above in X(b), proposed maintenance activities would not require pumping or extraction of groundwater.

In conclusion, proposed maintenance activities would not conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan. No impacts would occur.

**XI. Land Use and Planning**

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Physically divide an established community?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Cause a significant environmental impact due to conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

**DISCUSSION**

- a. No Impact.** Current land use designations of the Project alignment within Calaveras County are Resource Production, Rural Transition, and EBMUD ROW with zoning of Public Service, Agricultural Preserve, General Agriculture/Recreation, Rural Residential, Recreation, Unclassified, and Residential Agricultural. In San Joaquin County, land use designations are generally Open Space, Agricultural, Residential, Public, and Commercial, with zoning generally of General Agriculture, Limited Agriculture, Rural Residential, Public Facilities, General Commercial, Low Density Residential, Medium Density Residential, and High Density Residential. In Contra Costa County, land use designations are generally Public, Recreation, Agricultural, Open Space, Single Family Residential, Multiple Family Residential, Mixed Use, and Commercial, with zoning of Light Industrial, Heavy Industrial, Single Family Residential, Multiple Family Residential, General Agricultural, Heavy Agricultural, and Area Wide Planned Unit. In Alameda County, land use designations are Hillside Residential and Resource Conservation Area with zoning of Hillside Residential, Resource Conservation, and Open Space.

The Project consists of routine maintenance activities that are restricted to EBMUD access roads, the aqueduct system alignment, adjacent waters within the 100-foot-wide EBMUD ROW, and public access roads (in a few areas). Maintenance activities would occur in and along the aqueduct system, and within the EBMUD ROW and access roads. The Project would not permanently affect access to any of the surrounding land uses, nor physically divide an established community; therefore, no impacts would occur.

- b. No Impact.** Pursuant to Government Code Sections 53091(d) and (e), EBMUD is not subject to the building and zoning ordinances of local jurisdictions for projects involving the production, generation, storage, treatment, or transmission of water. Nonetheless, EBMUD strives to consider the regulations and ordinances of local jurisdictions during construction where feasible and not contrary to its public purpose and responsibilities.

Although there are temporary impacts associated with the routine maintenance activities, these impacts would occur within the access roads and EBMUD ROW. The routine maintenance activities would be conducted to improve the quality and condition of the access roads and aqueduct to maintain water conveyance through the aqueduct. The existing aqueduct system and the location of routine maintenance activities along the aqueduct system and EBMUD ROW would not result in new development, and there would be no significant changes to the existing land use.

Furthermore, the routine maintenance activities would not conflict with any of the goals and policies set forth in any of the county and city general plans applicable to the Project. As such, there would be no impact.

*This page intentionally left blank*

**XII. Mineral Resources**

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

**DISCUSSION**

**a & b. No Impact.** The Project involves conducting routine maintenance activities at existing sites along the aqueduct system alignment. No active mines are located along the aqueduct system alignment where maintenance activities would occur (CDOC 2016). Although mineral resource areas may be located in proximity to maintenance sites, the Project would not involve any activities or acquire land that could directly affect the availability of a mineral resource. Therefore, no impact would occur.

*This page intentionally left blank*



**XIII. Noise**

Would the project result in:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) 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?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Generation of excessive groundborne vibration or groundborne noise levels?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
c) For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

**DISCUSSION**

The proposed Project would generate temporary noise associated with equipment and vehicle use during maintenance activities (e.g., vegetation clearing, excavation, and material transportation), which would cease once maintenance work is complete.

Noise from the operation of construction equipment could potentially affect sensitive receptors (e.g., residents, recreational users, schools, daycares, medical facilities, religious facilities) in the Project vicinity. The nearest sensitive receptors to known maintenance locations are residents and recreational users. The nearest sensitive receptors to maintenance locations and their approximate distances from the proposed Project’s locations are summarized here. The nearest residences along the Delta de Anza Regional Trail (on Alberts Avenue, Impala Court, Wedgewood Drive, and Wedgewood Court) and the EBMUD Trail (on Sunnyvale Avenue) are located 40-70 feet from sites where maintenance activities would take place. Recreational trails, including the Delta de Anza Regional Trail, EBMUD Trail, Pipeline Trail, and Lafayette/Moraga Regional Trail run along the aqueduct system alignment and through multiple maintenance site locations. Brighter Beginnings Health Center, Los Medanos College, Rancho Medanos Junior High School, and the Church of Jesus Christ of Latter-day Saints are located near the Delta de Anza Trail and are within 80-300 feet of known maintenance sites. In Bay Point, Temple USA and Riverview Middle School are located 500 and 700 feet respectively from maintenance sites. Unity of Walnut Creek and St. Stephen Catholic church are located 400 and 700 feet respectively from maintenance sites in Walnut Creek. In Lafayette, a maintenance site along the Pipeline Trail is roughly 200 feet from Happy Days Learning Center and Springbrook Pool and 500 feet from First Steps Learning Center and Acalanes High School. Other sites are approximately 700 feet from the Temple Isaiah of Contra Costa County and 350 feet from MH Stanley Middle School.

**Laws, Regulations, and Policies**

Maintenance activities would occur within three counties and twelve towns/cities. **Table 3-9** below provides information on specific noise criteria from general plans and noise ordinance of jurisdictions containing maintenance sites. EBMUD is exempt from building and land use zoning ordinances for

projects involving the transmission of water (Government Code Section 53091). Although ordinances do not strictly apply to EBMUD projects, it is the practice of EBMUD to work with host jurisdictions and neighboring communities during project planning and to conform to local environmental protection policies to the extent possible. For this project, noise regulations and standards of Contra Costa County, San Joaquin County, Calaveras County, Oakland, Moraga, Orinda, Lafayette, Walnut Creek, Concord, Antioch, Pittsburg, Pleasant Hill, Brentwood, or Stockton may be considered when maintenance activities occur within these jurisdictions.

In addition to these local criteria, EBMUD considered the Federal Transit Administration (FTA) *Transit Noise and Vibration Impact Assessment Manual* that recommends noise and vibration criteria for evaluating daytime construction equipment-related noise impacts in outdoor areas. The FTA (2018) recommends noise thresholds of 90 dBA Leq and 100 dBA Leq for residential and commercial/industrial areas, respectively (FTA 2018). For construction vibration impacts, the FTA guidelines use an annoyance threshold of 80 VdB for infrequent events (fewer than 30 vibration events per day) and a damage threshold of 0.5 inches per second (in/sec) PPV for reinforced-concrete, steel or timber buildings (FTA 2018).

**Table 3-9: General Plan and Noise Ordinance Standards**

	<b>Specific Noise Criteria</b>
Contra Costa County	The Contra Costa County Noise Element: The standard for outdoor noise levels in residential areas is a DNL of 60 dB. Construction activities shall be concentrated during the hours of the day that are not noise-sensitive for adjacent land uses and should be commissioned to occur during normal work hours of the day to provide relative quiet during the more sensitive evening and early morning periods.
San Joaquin County	The San Joaquin County Noise Element lists maximum non-transportation noise level performance standards for noise-sensitive uses of 70 dB during the daytime and 65 dB during nighttime hours. Noise sources associated with construction are exempt as long as activities do not take place before 6:00 am or after 9:00 pm on any day.
Calaveras County	The Calaveras County Noise Ordinance limits exterior noise levels in residential areas to 60 dBA during the daytime and 50 dBA at night. Construction activities between 7:00 a.m. and 6:00 p.m. are exempt. The Calaveras County Noise Element lists a maximum of 60 Ldn at single-family residential land uses.
Moraga	The Moraga Noise Control Ordinance places limits on the use of construction equipment in and around residential zones between 5 p.m. and 8 a.m.
Antioch	The Antioch Noise Ordinance limits the operation of construction equipment: 1) on weekdays prior to 7:00 a.m. and after 6:00 p.m., 2) on weekdays within 300 feet of an occupied dwelling space, prior to 8:00 a.m. and after 5:00 p.m., and 3) on weekends and holidays prior to 9:00 a.m. and after 5:00 p.m.
Concord	The City of Concord’s Municipal Code exempts public projects and utilities from noise standards and restrictions. Additionally, construction is allowed between the hours of 7:30am and 6:00 pm on weekdays, and between 8:00 am and 5:00 pm on weekends.
Pittsburg	The Pittsburg Municipal Code states that “No construction event or activity occurring on any site adjoining a lot located in an R, residential PD or GQ district shall generate loud noises in excess of 65 decibels measured at the property line, except between the hours of 8:00 a.m. and 5:00 p.m.”
Pleasant Hill	The Pleasant Hill Noise Ordinance limits the use of construction equipment before 7:30 a.m. and after 7:00 p.m. on weekdays and before 9:00 a.m. and after 6:00 p.m. on weekends.
Walnut Creek	The Walnut Creek Noise Ordinance places limits on some types of maintenance and construction work on weekends and holidays and before 7:00 a.m. and after 6:00 p.m. on weekdays.

Stockton	The Stockton Municipal Code states, “Operating or causing the operation of tools or equipment on private property used in alteration, construction, demolition, drilling, or repair work between the hours of 10:00 p.m. and 7:00 a.m., so that the sound creates a noise disturbance across a residential property line, except for emergency work of public service utilities.”
Brentwood	The Brentwood municipal code established exterior noise levels for different land uses with additional noise limits based on noise duration. Construction and maintenance work are limited to Monday through Friday, 7:00 a.m. to 3:30 p.m. or until 5:30 p.m. with approval from the city. Construction activity performed by an agency of government is exempt from these standards provided that all equipment is operated in accordance with manufacturer’s specifications and is equipped with all noise reducing equipment in proper condition.
Oakland	For temporary construction activities, the City of Oakland Planning Code established maximum allowable receiving noise level standards at residential receptors of 80 dBA on weekdays from 7:00 a.m. to 7:00 p.m. and 65 dBA weekends from 9:00 a.m. to 8:00 p.m. Construction outside of these times is subject to stricter nighttime standards.
Orinda	Orinda’s Noise Ordinance limits construction to 8:00 a.m. to 6:00 p.m. weekdays, 10:00 a.m. to 5:00 p.m. on Saturdays.
Lafayette	The Lafayette Noise Ordinance contains special provisions for construction and maintenance activities occurring between 8:00 a.m. and 8:00 p.m. weekdays and between 10:00 a.m. and 6:00 p.m. Sundays and holidays. Those activities are allowed during those times if the noise level at the nearest affected property does not exceed 80 dBA or if no piece of equipment is louder than 83 dBA at a distance of 50 feet. Construction activities between 10:00 p.m. and 7:00 a.m. on weekdays, and any time on Sunday or holidays are subject to more stringent noise limits.

*Sources: Contra Costa County 2010, San Joaquin County 2016, Calaveras County 2019, Moraga 2019, Antioch 2019, Concord 2019, Pittsburg 2019, Pleasant Hill 2019, Walnut Creek 2019, Stockton 2019, Brentwood 2019, Oakland 2017, Orinda 2019, Lafayette 2019.*

Upon consideration of local jurisdictions and FTA noise significance criteria, the Project noise analysis uses the FTA standard since EBMUD is exempt from local building and zoning ordinances and the local ordinances vary greatly.

**a. Less than Significant with Mitigation.** The FTA has established guidance on noise and vibration impact assessments for construction equipment (FTA 2018). To roughly estimate anticipated construction noise levels at nearby sensitive receptor locations, the FTA recommends that the noisiest two pieces of equipment be used in these noise estimations along with the following assumptions:

- full power operation for a full one hour,
- there are no obstructions to the noise travel paths,
- typical noise levels from construction equipment are used, and
- all pieces of equipment operate at the center of the project site.

Using these simplifying assumptions, the noise levels at specific distances can be obtained using the following equation:

$$L_{eq}(equip) = EL_{50ft} - 20\log_{10}(D/50)$$

Where:

$L_{eq}(equip)$  = the noise emission level at the receiver at distance D over 1 hour.

EL<sub>50ft</sub> = noise emission level of a particular piece of equipment at reference distance of 50 feet.

D = the distance from the receiver to the piece of equipment in feet.

In order to add the two noisiest pieces of equipment together, the following equation applies:

$$L_{total} = 10 \log_{10} (10^{\frac{L_1}{10}} + 10^{\frac{L_2}{10}})$$

Where:

L<sub>total</sub> = The noise emission level of two pieces of equipment combined

L<sub>1</sub> = The noise emission level of equipment type 1

L<sub>2</sub> = The noise emission level of equipment type 2

Based on reference guides, typical noise levels for the proposed Project’s two noisiest construction equipment were used to estimate the distance to multiple noise thresholds and noise levels at the nearest known sensitive receptors (FTA 2018, FHWA 2019). The values used for the reference noise level at 50 feet and at the nearest sensitive receptor are shown in **Table 3-10**, below.

**Table 3-10: Predicted Noise Levels for Construction Equipment**

Equipment Type	Noise Level at 50 feet (dBA)	Distance to 70 dBA (ft)	Distance to 80 dBA (ft)	Distance to 90 dBA (ft)	Noise Level at Nearest Sensitive (Residential) Receptor, 40 feet (dBA)
Excavator	85	281	89	28	87
Dump trucks	84	251	79	25	86
<b>Combined</b>	<b>87.5</b>	<b>377</b>	<b>119</b>	<b>38</b>	<b>89.5</b>

Source: FTA 2018, FHWA 2019

In the absence of any additional noise controls, operation of these two pieces of equipment together would generate noise levels above the FTA 90 dBA threshold at distances below 38 feet, which would be a potentially significant impact for receptors within these distances. Based on this analysis, maintenance-related noise impacts may exceed established thresholds in the cities of Oakland and Lafayette when such activities are in close proximity to sensitive residential receptors; however, maintenance-related noise impacts at individual sites along the aqueduct system alignment would be temporary and of a short duration (one to two days typically) on any nearby sensitive receptors. Estimated noise levels are also conservative and represent the noisiest potential combination of equipment operating in tandem, which would not be a frequent occurrence. Therefore, any exceedances would not be substantial. Further, implementation of MM NOI-1 relating to work hours and noise controls would minimize potential impacts to sensitive receptors.

**Mitigation Measure NOI-1:** EBMUD shall implement the following noise-reducing practices to minimize disturbances to residential areas surrounding work sites:

- Work or activity of any kind shall be limited to the hours from 8:00 a.m. to 5:00 p.m. Monday through Friday. Activities in residential areas shall not occur on Saturdays, Sundays, or EBMUD observed holidays except during emergencies, or with advance notification of surrounding residents.

- Advanced notification about the estimated duration of the activity shall be provided at least one week prior to the start of maintenance adjacent properties within 40 feet of the proposed Project’s sites where heavy equipment shall be used.
- Powered equipment (vehicles, heavy equipment, and hand equipment such as chainsaws) shall be equipped with adequate mufflers. Best available noise control techniques (e.g., 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 when feasible) shall be used. Enclosure opening or venting shall face away from sensitive receptors.
- EBMUD shall use hydraulically or electrically powered equipment 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 ten dB). External jackets on the tools themselves shall be used, where feasible, which could achieve a reduction of five dB.

Maintenance activities under the proposed Project are similar in scale and frequency to those that have taken place historically. Work at each maintenance site would be temporary, infrequent, and short in duration. Further with implementation of MM NOI-1, the proposed Project would comply with the established hours allowed under the relevant county or municipality’s standards. Therefore, noise impacts resulting in a substantial temporary or permanent periodic increase in ambient noise levels would be less than significant with mitigation.

- b. Less than Significant Impact.** The vibration threshold for buildings occurs at a PPV of 0.5 (inch/second) for reinforced concrete, steel, or timber buildings. The human annoyance threshold is 80 VdB. Vibration and ground-borne noise levels were estimated following methods described in the FTA *Transit Noise and Vibration Impact Assessment Manual* (FTA 2018) to determine the peak particle velocity (PPV) that would potentially impact buildings and the vibration velocity in decibels (VdB) for human annoyance. For the purposes of this analysis, it was assumed that the Project’s construction equipment would have similar vibration sound levels as a dump truck. **Table 3-11** below shows relevant parameters for the construction equipment that would be used for the proposed Project and the distance to sensitive receptors necessary to be below vibration thresholds.

**Table 3-11: Construction Equipment and Vibration Distance**

Equipment	PPV at 25 ft	Distance to 0.5 in/sec PPV Threshold	Noise Vibration Level at 25 ft	Distance to 80VdB Noise Vibration Threshold
Dump trucks / Loaded Trucks	0.076 in/sec	7.1 feet	86 VdB	39.6 feet

The nearest residence is approximately 40 feet from a maintenance site. No buildings are located within the building vibration threshold distance from any maintenance sites. Some sensitive receptors are located close to but immediately outside of the annoyance threshold distance from individual maintenance sites. These residents could temporarily experience some vibration-related noise but not

at a significant level that exceeds the annoyance threshold. Therefore, Project impacts from exposure to or generation of excessive ground-borne vibration or ground-borne noise levels would be less than significant. No mitigation is required.

- c. **Less than Significant Impact.** Four maintenance sites are within two miles of Buchanan Field in the City of Concord, which is a public use airport. Two of those sites are near, but not in, areas indicated as “Historic Areas of Highest Noise Sensitivity Based on Complaint Volume” in the Buchanan Field Noise Program Overview (Contra Costa County 2016). These sites are not covered by the off-airport land use plan and are not within the existing or future 65 CNEL contours provided in the Buchanan Field Master Plan (Contra Costa County 2008). Additionally, the Sandhill Heliport, a private airport, is located roughly 1-2 miles north of three maintenance sites. At any given sensitive receptor, any overlap in noise impacts from the airport and from maintenance activities associated with the proposed Project would be infrequent, temporary, and short in duration. Therefore, this impact would be less than significant and no mitigation is required.

**XIV. Population and Housing**

<b>Would the project:</b>	<b>Potentially Significant Impact</b>	<b>Less Than Significant With Mitigation Incorporated</b>	<b>Less Than Significant Impact</b>	<b>No Impact</b>
a) Induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

**DISCUSSION**

- a. **No Impact.** The Project involves routine maintenance of existing aqueduct system facilities and does not include any new development or infrastructure components, nor does it include construction of any new residences or create a need for new housing or businesses. Additionally, the routine maintenance activities would not require staff to relocate permanently to the Project area. Therefore, the Project would not directly or indirectly induce unplanned substantial growth in the area, and there would be no impact on population growth.
  
- b. **No Impact.** Routine maintenance activities for the Project would occur along the aqueduct system alignment, access roads, and adjacent waters within the 100-foot-wide EBMUD ROW. These activities would not displace existing people or housing and there would not be a need for construction of replacement housing elsewhere. There would be no impact.

*This page intentionally left blank*



**XV. Public Services**

<b>Would the project:</b>	<b>Potentially Significant Impact</b>	<b>Less Than Significant With Mitigation Incorporated</b>	<b>Less Than Significant Impact</b>	<b>No Impact</b>
a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
i) Fire protection?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
ii) Police protection?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
iii) Schools?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
iv) Parks?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
v) Other public facilities?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

**DISCUSSION**

**a.(i.-v.) No Impact.** The Project involves conducting routine maintenance activities at existing facilities and would not result in the construction of new structures that would induce population or employment growth. Thus, the Project would not generate additional needs for fire protection, police protection, schools, parks, or other public facilities. Maintenance workers are likely to commute from within the region and would likely be part of the existing labor supply. Therefore, implementation of the Project would not generate a need for any new public services; no impact would occur.

*This page intentionally left blank*

**XVI. Recreation**

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

**DISCUSSION**

- a. **No Impact.** As described in Section XIV., Population and Housing, the Project would not induce population growth in the region. As such, the Project would not impact on recreation demand related to population growth.
  
- b. **Less than Significant Impact.** While the Project would not create any new recreational facilities, maintenance activities could temporarily disturb existing multi-use trails located adjacent to maintenance sites along the aqueduct system alignment within the EBMUD ROW. These trails are generally limited to the urban areas in the City of Stockton and between the Cities of Antioch and Walnut Creek. Disturbances to trails would be temporary and would be limited to the period during which maintenance would be conducted. Maintenance activities resulting in secondary nuisance effects (i.e., air quality, noise, traffic, and aesthetics) were addressed in other sections of this document and were found to be less than significant. In addition to secondary effects, trail users could experience temporary disruptions during the period of active maintenance due to trail closures. However, these closures would be temporary and would be localized to a specific maintenance site. In addition, trail users could use adjacent city streets to avoid the active maintenance areas. Therefore, maintenance activities would not result in significant alterations in the availability of public trails, and would not require the construction or expansion of recreational facilities. Thus, potential effects on recreational facilities would be less than significant.

*This page intentionally left blank*

## XVII. Transportation

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Conflict with a program plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b) Would the project conflict or be inconsistent with CEQA Guidelines Section 15064.3, subdivision (b)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
c) Substantially increase hazards to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) Result in inadequate emergency access?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

### DISCUSSION

- a. Less than Significant Impact.** The Project may result in temporary traffic impacts by adding vehicle traffic to area roadways during maintenance activities. Maintenance-related traffic would primarily consist of daily commute trips by maintenance workers and periodic delivery and removal of materials to and from the maintenance sites. The number of workers and vehicles would vary by maintenance activity, phase, and material needs. However, the number of additional vehicles on local roadways generated by maintenance crews at any given location would be small, intermittent, and limited in duration. Once maintenance is complete, the Project would not generate any additional vehicle trips or cause long-term effects.

Maintenance activities and staging areas would be located within the EBMUD ROW behind locked gates and accessible to EBMUD staff only. The temporary closure of public roadways or traffic lanes would not occur as part of routine maintenance activities.

As described in Section XVI., *Recreation*, maintenance activities may result in temporary disruptions to pedestrian and bicyclists due to trail closures. However, these closures would be temporary and would be localized to a specific maintenance site. In addition, trail users would still be able to use adjacent city streets to avoid the active maintenance areas. Therefore, impacts to pedestrians and bicycle facilities would be less than significant.

Overall, impacts on traffic from maintenance activity mobilization, temporary closures, local circulation systems, and bicycle and pedestrian facilities would be less than significant and no mitigation is required.

- b. Less than Significant Impact.** Vehicle miles traveled associated with implementation of the Project would be limited to maintenance-related vehicle trips from crews traveling to each maintenance site along the existing EBMUD ROW from existing EBMUD facilities, and would be similar to vehicle miles traveled in the past as part of ongoing aqueduct maintenance activities. In addition, vehicle trips generated during maintenance activities would be small, intermittent, and limited in duration; thus, the Project would not result in a significant increase in vehicle miles traveled over the existing condition. Therefore, the Project would be consistent with CEQA Guidelines Section 15064.3, subdivision (b). This impact would be less than significant and no mitigation is required.

- c. No Impact.** As a routine maintenance project, the Project would not introduce any new roadways or introduce a land use that would conflict with existing uses surrounding the Project area. Maintenance activities would be temporary and intermittent at each maintenance site and mostly would occur within EBMUD ROW. Therefore, no impact would occur related to substantially increasing hazards from a geometric design feature or incompatible use.
- d. Less than Significant Impact.** Proposed maintenance activities would mostly occur with EBMUD ROW and off of public roadways. In some locations, maintenance sites are accessed by and adjacent to public roads. Maintenance activities, particularly road and culvert maintenance and repair or replacement work, would temporarily impede access on the roads being maintained. However, these activities would be intermittent and limited to a few hours a day at each maintenance site; full roadway closures would not be required. Because no full closures are required and disruptions would be temporary, the Project would not significantly interfere with emergency access as emergency roadway access. Project impacts related to emergency access would be less than significant and no mitigation is required.

**XVIII. Tribal Cultural Resources**

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Would the project cause a substantial adverse change in the significance of a tribal cultural resource, 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, and that is:				
i) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k), or	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
ii) 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 Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of the Public Resource Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**DISCUSSION**

The tribal cultural resources (TCR) impact analysis is based upon consultations with tribes who have a traditional and cultural affiliation with the Program area, as discussed below, as well as information provided in the *Cultural Resources Assessment for the Mokelumne Aqueduct Routine Maintenance Agreement Renewals*, prepared by Horizon Water and Environment, LLC (March 2019).

Section 21074(a) of the PRC defines TCRs as sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American tribe.

**Approach to Analysis**

The Program area crosses through the ancestral lands of numerous California indigenous tribes. From east to west, these include the Northern Sierra Miwok, Plains Miwok, Northern Valley Yokuts, Bay Miwok, and the Ohlone. If Native American tribes with a traditional and cultural affiliation with a given geographic area have requested notice from EBMUD regarding projects in that geographic area, pursuant to PRC Section 21080.3.1, EBMUD must provide notice. EBMUD has not received any requests from tribes for project notifications under PRC Section 21080.3.1(b)(1). However, EBMUD contacted the Native American Heritage Commission (NAHC) on November 12, 2018 for a search of the Sacred Lands files for significant Native American resources within the Project area and a list of tribes with a traditional and cultural affiliation with Contra Costa, San Joaquin, Amador, and Calaveras counties. The NAHC

***Initial Study / Mitigated Negative Declaration***  
***Mokelumne Aqueduct System Routine Maintenance Project***

responded on December 3, 2018, noting that significant resources had been recorded in the Sacred Lands files in Contra Costa County, and with a list of fifteen tribes that are affiliated with the Program area. EBMUD subsequently sent letters regarding the project, via certified return receipt, to all of the tribes in the NAHC list on December 14, 2018 (**Table 3-12**). All correspondence between EBMUD, the NAHC, and notified tribes is documented in the Cultural Resources Assessment for the Mokelumne Aqueduct System Routine Maintenance Project (Horizon 2019b).

**Table 3-12: Native American Correspondence**

<b>Tribe</b>	<b>Name</b>	<b>Project Letter Mailing Date</b>	<b>Comments</b>
Amah Mutsun Tribal Band of Mission San Juan Bautista	Irenne Zwierlein, Chairperson	December 14, 2018	No response from tribe
Buena Vista Rancheria of Me-Wuk Indians	Rhonda Morningstar Pope, Chairperson	December 14, 2018	No response from tribe
Calaveras Band of Mi-Wuk Indians	Charles Wilson, Chairperson	December 14, 2018	No response from tribe
Calaveras Band of Mi-Wuk Indians	Debra Grimes, Cultural Resources Specialist	December 14, 2018	No response from tribe
California Valley Miwok Tribe	(No name provided by NAHC but letter receipt signed for by Sylvia Burley, Chairperson)	December 14, 2018	No response from tribe
California Valley Miwok Tribe AKA Sheep Rancheria of Me-Wuk Indians of CA	(No name provided by NAHC but letter receipt signed for by Lawrence Wilson, Jr.)	December 14, 2018	No response from tribe
Ione Band of Miwok Indians	Sara Dutschke Setchwaelo, Chairperson	December 14, 2018 January 8, 2019	No response from tribe
Indian Canyon Mutsun Band of Costanoan	Ann Marie Sayers, Chairperson	December 14, 2018	No response from tribe
Jackson Rancheria of Miwok Indians	Adam Dalton, Chairman	December 14, 2018	No response from tribe
Muwekma Ohlone Indian Tribe of the San Francisco Bay Area	Charlene Nijmeh, Chairperson	December 14, 2018	No response from tribe
North Valley Yokuts Tribe	Katherine Erolinda Perez, Chairperson	December 14, 2018	No response from tribe
Ohlone Indian Tribe	Andrew Galvin	December 14, 2018	No response from tribe



Tribe	Name	Project Letter Mailing Date	Comments
United Auburn Indian Community of the Auburn Rancheria (UAIC)	Gene Whitehouse, Chairperson	December 14, 2018	Tribe requested consultation and existing cultural resources reports and record search data on January 17, 2019. EBMUD sent the requested materials on February 6, 2019 and followed up with an email dated April 29, 2019. UAIC subsequently submitted mitigation measures on sensitivity awareness and inadvertent discoveries to be included in the environmental document.
Washoe Tribe of Nevada and California	Darrel Cruz, THPO	December 14, 2018	No response from tribe
Wilton Rancheria	Raymond Hitchcock, Chairperson	December 14, 2018	The tribe did not request consultation, but said that they would like to be notified if Native American artifacts or human remains are discovered.

To date, two tribes have responded to EBMUD. The Wilton Rancheria requested that work be stopped if Native American artifacts or human remains are encountered during construction and that the tribe be notified, and the UAIC proposed mitigation measures regarding sensitivity awareness and inadvertent discoveries. These requests were incorporated into Mitigation Measures CR-1 and CR-2.

The tribes identified by the NAHC as being affiliated with the project area did not identify any TCRs, nor has EBMUD otherwise identified any TCRs in the Project area.

**a.(i.) No Impact.** No Tribal Cultural Resources that are listed, or eligible for listing in the California Register of Historical Resources are known within the Program area, and none were identified by the Tribes EBMUD contacted (see above). As a result, there will be no impact to known TCRs under this category.

Tribal Cultural Resources that are eligible for listing in the California Register of Historical Resources may be as unanticipated archaeological discoveries during project construction. Impacts to these resources are discussed under item **a.(ii)**, below.

**a.(ii.) Less than Significant with Mitigation.** Although no TCRs have been identified in the Project area, it is possible that Native American archaeological remains or Native American human remains that could be determined to be TCRs could be discovered during construction, as such resources are not always visible on the ground surface. If such resources are identified, they would be treated according to Mitigation Measure CR-1 or Mitigation Measure CR-2, respectively, as described in Section V, “Cultural Resources.” Implementation of these mitigation measures would result in a less-than-

significant impact with regard to TCRs because work would immediately be halted if archaeological or human remains were uncovered during maintenance activities. If archaeological materials are discovered, the materials would be evaluated and treated by archaeological professionals before work would be allowed to resume. The County coroner would immediately be contacted if human remains are uncovered, and the requirements of California Health and Safety Code Section 7050.5 would be followed, including the involvement of Native American representatives, if appropriate. As a result, this impact would be less than significant with mitigation.

As described in the Project Description, maintenance activities would be conducted throughout the year as required to maintain the functional and structural integrity of aqueduct system facilities. Maintenance site locations would vary from year to year. It is possible that additional TCRs, not currently known at the time of this IS/MND analysis, could be recorded in future years that would overlap with proposed maintenance locations in a given year. Review of EBMUDs Archaeological Resources GIS database, which is annually updated, would reveal potential overlaps with archaeological resources that might also be considered TCRs. Implementation of Mitigation Measures CR-3 and CR-4 would ensure that future maintenance-related impacts of TCRs that are archaeological resources would be less than significant with mitigation because they (1) call for archaeological survey of maintenance locations that previously have not been surveyed, which would allow for the identification of previously undocumented cultural resources that could be TCRs and (2), if such resources were determined to be significant through CRHR evaluation or consultations with tribes with a traditional and cultural affiliation with the location, the TCRs could potentially be treated through data recovery.

**XIX. Utilities and Service Systems**

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Require or result in the relocation or construction of new or expanded water, wastewater treatment, or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Result in a determination by the wastewater treatment provider which serves or may serve the project, that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
e) Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

**DISCUSSION**

- a. **No Impact.** The Project includes sediment and debris removal; vegetation management; maintenance and repair or replacement of culverts, road crossings, and other structures; and bank and levee repair and erosion protection. These maintenance activities involve repairing and replacing facilities that are not functioning properly in order to maintain flow conveyance, thus, reducing the risk of flooding, and minimizing the potential for erosion and sedimentation to occur, which reduces impacts to water quality. In the long-term, the Project would result in a beneficial effect by maintain the functional and structural integrity of EBMUD-owned facilities. The Project does not include any uses, features, or facilities that would increase the need or demand for water or wastewater treatment, or generate additional storm water flows. Further, the Project would not relocate or construct new electric power, natural gas, or telecommunication facilities. Therefore, the Project would not result in any impacts to water, wastewater treatment, storm water drainage, electric power, natural gas, or telecommunications facilities.
  
- b. **No Impact.** As a routine maintenance project, the Project does not propose any uses that would require the need for additional water. Therefore, implementation of the Project would result in no impacts to water supplies.
  
- c. **No Impact.** The Project would not generate wastewater and thus, would not result in the need for additional wastewater treatment capacity. Therefore, implementation of the Project would result in no impacts to wastewater treatment capacity.

- d. No Impact.** The proposed maintenance activities involve sediment and debris removal from channels, bridges and culverts. In most instances, removed sediment and debris would be placed in surrounding upland areas within EBMUD ROW. Thus, because material would be re-used onsite in most instances, maintenance activities would not create substantial waste requiring disposal at a local landfill. Therefore, no impacts to solid waste would occur from implementation of the Project.
- e. No Impact.** As described in Response XIX(d), the Project would re-use most, if not all material on-site with EBMUD ROW. Therefore, the Project would not conflict with federal, state, or local statutes and regulations related to solid waste.

**XX. Wildfire**

If located in or near state responsibility areas or lands classified as very high fire severity zones, would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Substantially impair an adopted emergency response plan or emergency evacuation plan?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b) Due to slope, prevailing winds, or other factors, exacerbate wildfire risks, and thereby expose project occupants to, pollutant concentrations from wildfire or the uncontrolled spread of a wildfire?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power line or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d) Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

**DISCUSSION**

The Project alignment traverses through state responsibility areas identified by the California Department of Forestry and Fire Protection (Cal Fire) as very high, high, and moderate fire hazard severity zones. In the eastern portion of the alignment near Pardee Reservoir, the aqueduct system alignment travels through both high and very high hazard severity zones. Most of the central portion of the alignment as it heads east through San Joaquin County does not traverse through a hazard severity zone. The western portion of the aqueduct system alignment traverses through very high, high, and moderate fire hazard severity zones.

- a. **Less than Significant Impact.** Emergency response and evacuation plans are generally the responsibility of the county and evacuation routes are located along designated public roads. Although the routine maintenance activities would primarily occur within the EBMUD ROW and on private access roads that are secured by gates, some maintenance sites would be accessed via public roads. Maintenance activities, particularly road and culvert maintenance and repair or replacement work, may temporarily impede access along the roads being maintained. These activities would be temporary and limited to a few hours a day; no full road closures would be required. Because no full closures are required and disruptions would be temporary, the Project would not impair implementation of or physically interfere with an adopted emergency response plan or evacuation plan. Impacts would be less than significant and no mitigation is required.
- b. **Less than Significant with Mitigation.** Due to the aqueduct system alignment traversing through very high severity zones wildfire risks could be exacerbated due to the Project’s maintenance activities. Routine maintenance activities could increase the risk of starting fires due to the increased presence of vehicles, equipment, and human activity in or adjacent to very high fire severity zones. In particular, heat or sparks from construction vehicles or equipment have the potential to ignite dry wildland fuels. Routine maintenance activities occurring next to or in wildland fuels pose a fire risk

and could thereby expose EBMUD staff to wildfire pollutants. Additionally, activities occurring in or next to wildland fuels pose a fire risk that could result in the uncontrolled spread of wildfire.

EBMUD is required to comply with all federal, local, and state fire-prevention regulations, including the California Fire Code. The California Fire Code includes wildfire protection requirements for wildland-urban interface areas<sup>1</sup>. Chapter 49 of the California Fire Code discusses provisions for hazardous vegetation and fuel management, and defensible space. The California Fire Code also includes the minimum requirements for fire protection equipment, and access for firefighting for construction and demolition projects. In addition, EBMUD would implement MM WILD-1 to further mitigate all potential impacts associated with wildfire risk during maintenance activities.

**Mitigation Measure WILD-1:** The following measures shall be implemented to reduce the potential for and spread of a wildfire:

- All maintenance sites shall be supplied and maintained with adequate fire-fighting equipment capable of extinguishing incipient fires.
- All earthmoving and portable equipment with internal combustion engines shall be equipped with a spark arrestor to reduce the potential for igniting a wildfire. Such equipment shall be maintained to ensure proper functioning of spark arrestor.
- Combustible materials shall be removed from the maintenance site once maintenance is complete.
- Approved access for firefighting shall be maintained during maintenance work.

Implementation of MM WILD-1 and compliance with the California Fire Code and all other applicable federal, local, and state fire prevention regulations would reduce exacerbating wildfire risks because MM WILD-1 and applicable fire regulations greatly reduce, if not prevent, the conditions by which maintenance activities could lead to the spread of wildfire ; therefore, impacts would be less than significant with mitigation.

- c. Less than Significant with Mitigation.** Vegetation management, including trimming, mowing, pruning, and removal of weeds, grasses, woody and herbaceous plants, fallen trees, trunks or limbs would occur within the EBMUD ROW at stream crossings. Vegetation management activities would be conducted by using hand tools and equipment and also by mechanical removal using heavier equipment. Vegetation management activities could temporarily exacerbate the fire risk by using equipment (e.g., excavator or Bobcat with mowing attachments) that could cause a fire in adjacent wildland fuels. EBMUD would implement MM WILD-1 to ensure that adequate fire-fighting equipment is supplied at each maintenance site and access for firefighting is maintained. Additionally, EBMUD would comply with applicable federal, local, and state fire-prevention regulations, including the California Fire Code. Thus, impacts associated with ongoing vegetation management impacts on the environment would be reduced to less than significant with mitigation.

---

<sup>1</sup> A wildland-urban interface fire area is defined as a geographical area identified by the state as a “Fire Hazard Severity Zone” in accordance with the Public Resources Code, Sections 4201 through 4204, and Government Code, Sections 51175 through 51189, or other areas designated by the enforcing agency to be at a significant risk from wildfires (California Fire Code 2016, page 402).

- d. Less than Significant Impact.** Because the aqueduct system alignment is located in and near state responsibility areas and lands classified as very high severity zones, vegetation management activities that occur as part of the routine maintenance activities could expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability and drainage changes. However, the extent of vegetation management in and around drainage crossings would be small in size; therefore, managed areas would be less likely to be prone to slope instability or landslides due to fire exposure. Impacts as a result of routine maintenance activities (vegetation management) would be less than significant. No mitigation is required.

*This page intentionally left blank*



**XXI. Mandatory Findings of Significance**

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

**DISCUSSION**

- a. **Less than Significant with Mitigation.** As discussed through this Initial Study checklist, significant but mitigable impacts were identified for biological resources, cultural resources, and hydrology and water quality resources. With implementation mitigation measures identified in this IS/MND, the Project would not have the potential to substantially reduce the habitat of fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory. With implementation of the above-described mitigation measures, this impact would be less than significant with mitigation.
  
- b. **Less than Significant Impact.** The CEQA Guidelines (Section 15130) require a discussion of the cumulative impacts of a Project. Cumulative impact analysis accounts for the combined impacts associated with two or more projects in a given area. The following cumulative analysis evaluates the potential cumulative impacts from the Project in combination with other past, present, and probable future projects in the area. 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. Based on the cumulative impacts analysis provided below, the Project would not result in any significant cumulative environmental impacts.

### **Cumulative Projects**

The Project alignment is approximately 100 miles in length, extending from Pardee Reservoir in the east, to the East Portal facility in the EBMUD service area in the East Bay. Approximately 170 individual maintenance sites have been identified within the Project alignment. Due to its length and the number of individual maintenance sites, a list of current and future projects occurring within close proximity to the Project alignment has not been established; however, the types of cumulative projects that can be expected regionally is described below.

The eastern portion of the Project alignment in Calaveras County is characterized as primarily undeveloped land, with a mix of recreational and agricultural uses between Pardee Reservoir to the city of Stockton. In the city of Stockton, the alignment is adjacent to mostly developed parcels consisting of a mix of residential and commercial uses. West of Stockton, the alignment traverses across predominantly agricultural areas as it crosses over the Sacramento-San Joaquin River Delta. The western portion of the alignment is mostly developed with a mix of urban uses (residential, commercial, industrial) and some adjacent agricultural and recreational areas in the cities of Brentwood, Antioch, Pittsburg, Bay Point, Concord, Pleasant Hill, Walnut Creek, and Lafayette to the East Portal facility in East Bay.

Proposed routine maintenance activities would occur entirely within EBMUD ROW. Although other projects may occur adjacent to or in close proximity to the proposed maintenance activities, they would not occur within the aqueduct system alignment within EBMUD ROW. Other projects occurring in Calaveras County primarily consist of water and sewer infrastructure and transmission pipeline improvement and replacement projects. Projects occurring within San Joaquin County, including the city of Stockton consist of a mix of infrastructure, transportation, residential, and commercial projects. Due to the urbanized nature of the western end of the alignment in the East Bay, a larger number of residential, infrastructure, transportation, and commercial projects are currently being constructed or are proposed.

### **Impacts Avoided**

The Project would have no impact on the following resources and would therefore not contribute to potential cumulative impacts on these resources:

- Agriculture and Forestry Resources
- Land Use and Planning
- Mineral Resources
- Population and Housing
- Public Services
- Utilities and Service Systems

### **Cumulative Impacts**

#### ***Aesthetics (Less than Significant Impact)***

The proposed routine maintenance activities would be conducted entirely within the EBMUD ROW adjacent to the aqueducts and occur temporarily at each site. Temporary visual impacts would occur from the presence of personnel, equipment, staging, earthwork, and other maintenance-related activities; however, for the most part these activities would not be visible by the public due to the limited size and scale of maintenance activities in isolated locations in the EBMUD ROW. When

visible, these activities would either be fleeting or of a short duration to not result in significant visual impacts. It is not anticipated that cumulative projects would occur in the same viewshed as the Project. The Project's contribution to a cumulative impact would be less than considerable, and thus less than significant.

***Air Quality (Less than Significant Impact)***

Although the Project would emit criteria pollutants through the use of construction equipment and ground-disturbing activities, air quality emissions would be below the air quality basins' established thresholds. Because the Project would not exceed thresholds for any criteria pollutant in the air districts in which the Mokelumne Aqueduct System occurs, the Project's contribution to a cumulative impact would be less than considerable, and thus less than significant.

***Biological Resources (Less than Significant Impact with Mitigation)***

The Project likely would occur in similar habitats to some of the cumulative projects. While the majority of the potential cumulative projects are anticipated to occur within disturbed or developed areas and to not affect habitat areas, similar habitat impacts could occur to drainages and other waterbodies (e.g., wetlands and riparian habitat). The cumulative impact from habitat loss is potentially significant due to the loss of habitat for special-status species. Cumulative projects would need to comply with local, State and federal laws and regulations protecting special-status species and sensitive habitats. The majority of the Projects impacts would be temporary and any permanent impacts to habitat would be minimal as maintenance activities largely consist of repairs aimed at maintaining the status quo and would be limited in scale and duration. EBMUD would mitigate biological resource impacts to a less-than-significant level through implementation of MM BIO-1 through MM BIO-23. The Project contribution to a potentially significant biological resource impact would be less than considerable with mitigation and thus less than significant.

***Cultural Resources (Less than Significant Impact with Mitigation)***

Potential cumulative projects would not occur in the EBMUD ROW and therefore would not impact the same cultural resources. No known historical resources or archaeological deposits associated with previously recorded resources are located along the EBMUD ROW. Although there is a potential for maintenance work to uncover previously undiscovered cultural resources or for activities to impact resources that are not currently known at the time of this IS/MND analysis, implementation of MM CR-1 through MM CR-4 would reduce these impacts to less than significant. Thus, the Project contribution to a potentially significant cultural resources impact would be less than considerable with mitigation and less than significant.

***Energy (Less than Significant Impact)***

Although the Project would require the consumption of fossil fuels, maintenance activities would generally be a continuation of existing similar activities, with a similar level of energy use. In addition, the Project would be conducted in accordance with energy efficient practices. Thus, the Project's contribution to a cumulative impact would be less than considerable, and less than significant.

***Geology and Soils (Less than Significant Impact with Mitigation)***

Cumulative projects near the Aqueduct alignment may require grading and earth disturbance and would subject to local and State laws, regulations, and ordinances regarding the proper construction of facilities to ensure public safety. The Project involves conducting routine maintenance activities at existing facilities and does not involve new construction of structures that would increase peoples' exposure to adverse effects associated with fault rupture, ground shaking, liquefaction, landslides,

lateral spreading, subsidence, collapse, or expansive or unstable soils. The Project largely consists of above ground maintenance that would not require substantial excavation; however, unknown paleontological resources could be discovered during these ground disturbing activities. In the unlikely event of a discovery, implementation of MM GEO-1 would require work to be halted and appropriate mitigation to be implemented if an unknown paleontological resource is found. The Project contribution to a potentially significant geology and soils impact would be less than considerable with mitigation and thus less than significant.

**Greenhouse Gas Emissions (*Less than Significant Impact*)**

Greenhouse gases are cumulative in nature and the cumulative impact from greenhouse gas production at a global scale is significant. The Project would generate GHG emissions during maintenance activities; however, these activities would be limited in nature and duration and similar to activities conducted in the existing condition. In addition, estimated GHG emissions would be below the applicable thresholds established by local air districts. Thus, the Project's contribution to a cumulative impact would be less than considerable, and less than significant.

**Hazards and Hazardous Materials (*Less than Significant Impact with Mitigation*)**

Proposed maintenance activities would be of short duration in any one location, and generally would be confined to small areas. Implementation of MMs HAZ-1, BIO-8, BIO-9, BIO-10, and EBMUD Procedure 711 would ensure that hazardous materials are handled, used, transported, and disposed of properly. No known hazardous materials sites are located on the Project site. Potential cumulative projects would not occur in the EBMUD ROW. The Project contribution to a potentially significant hazards and hazardous materials impact would be less than considerable with mitigation and thus less than significant.

**Hydrology and Water Quality (*Less than Significant Impact with Mitigation*)**

Cumulative projects near the Aqueduct alignment may require grading and earth disturbance. Cumulative projects that result in land disturbance of more than 1 acre would be required to prepare an SWPPP and comply with the statewide Construction General Permit. All maintenance-related activities would be of short duration and confined to small areas. Although these activities would occur along and within channels and creeks and could adversely affect water quality, implementation of MMs HYD-1, HYD-2, BIO-8, BIO-9, BIO-10, HAZ-1, and EBMUD Procedure 711 would reduce temporary impacts associated with ground-disturbing, dewatering, and vegetation management activities, and hazardous materials. In addition, maintenance activities would protect water quality by ensuring that runoff is properly directed to culverts and drainages, thus preventing erosion, sedimentation, and flooding from occurring. The Project contribution to a potentially significant hydrology and water quality impact would be less than considerable with mitigation and thus less than significant.

**Noise (*Less than Significant Impact with Mitigation*)**

Cumulative projects may generate construction noise similar to or greater than the Project near the EBMUD ROW. The Project would generate temporary construction noise associated with maintenance work; however, noise would be of short duration (one to two days typically) and would immediately cease once maintenance is complete. The scale of noise generation from maintenance activities would be less than that of a typical construction project and for the most part would not be close enough to sensitive receptors to exceed local noise standards. Further, implementation of MM NOI-1 would require maintenance work to comply with established hours allowed under the relevant jurisdictions' noise standards. The Project would not permanently increase noise levels along the

alignment above the existing condition. The Project contribution to a potentially significant noise impact would be less than considerable with mitigation and thus less than significant.

**Recreation (*Less than Significant Impact*)**

Potential cumulative projects would not occur in the EBMUD ROW and would not impact the same recreational resources. The Project could result in temporary disruptions to recreational trails located in the EBMUD ROW adjacent to maintenance sites along the aqueduct alignment. However, these activities would be of short duration and localized to a specific maintenance site. Project maintenance activities would not significantly affect the availability of public trails or other recreational facilities. Thus, the Project's contribution to a cumulative recreation impact would be less than considerable, and less than significant.

**Transportation (*Less than Significant Impact*)**

Potential cumulative projects could result in significant construction and operational transportation impacts in various regions near the Project alignment. During maintenance activities, the Project would contribute additional vehicle traffic to local roadways; however, the number of additional vehicles on local roadways generated by maintenance crews at any given location would be small (typically less than four vehicles), intermittent, limited in duration, and similar to ongoing maintenance work conducted in the past. In addition, maintenance work would not occur on public roads and roadway or lane closures would not be required. Thus, the Project's contribution to a cumulative transportation impact would be less than considerable, and less than significant.

**Tribal Cultural Resources (*Less than Significant Impact with Mitigation*)**

Potential cumulative projects would not occur in the EBMUD ROW and therefore would not impact the same TCRs. No TCRs were identified to occur within the Project area; however, it is possible that TCRs could be discovered during ground disturbing activities. MMs CR-1 through CR-4 would reduce potential impacts to unknown TCRs or TCRs that have not yet been identified. Thus, the Project contribution to a potentially significant tribal cultural resources impact would be less than considerable with mitigation and less than significant.

**Wildfire (*Less than Significant Impact with Mitigation*)**

The Project alignment traverses through very high severity zones for wildfire risk. It is unknown if potential cumulative projects could exacerbate wildfire risk, although it is unlikely given focus on wildfire prevention throughout California. Although maintenance activities would introduce maintenance equipment in these areas that could cause a fire, EBMUD would comply with the California Fire Code and implement MM WILD-1 to ensure the potential for and spread of a wildfire is reduced. In addition, maintenance work at any given location would be minor and short in duration. Thus, the Project contribution to a potentially significant wildfire impact would be less than considerable with mitigation and less than significant.

- c. **Less than Significant with Mitigation.** Based on the analysis provided in the above resource sections, the Project would result in less than significant impacts for the following resources topics: aesthetics, energy, greenhouse gas emissions, recreation, and transportation. Mitigation measures pertaining to air quality, biological resources, cultural resources, geology and soils, hazards and hazardous materials, hydrology and water quality, noise, tribal cultural resources, and wildfire would reduce Project-related impacts to a less than significant level. As such, implementation of mitigation measures would ensure that the effects on human beings would be less than significant with mitigation.

*This page intentionally left blank.*

## **CHAPTER 4**

---

### **REFERENCES**

#### **Aesthetics**

California Department of Transportation (Caltrans), California Scenic Highway Mapping System. 2019. Contra Costa County. Available online at: [www.dot.ca.gov/hq/LandArch/16\\_livability/scenic\\_highways/](http://www.dot.ca.gov/hq/LandArch/16_livability/scenic_highways/). Accessed January 15, 2019.

#### **Agriculture and Forestry Resources**

California Department of Conservation. 2019. California Important Farmland Finder. Available online at: [maps.conservation.ca.gov/DLRP/CIFF/](http://maps.conservation.ca.gov/DLRP/CIFF/). Accessed February 2, 2019.

CDOC. California Department of Conservation.

#### **Air Quality**

BAAQMD. Bay Area Air Quality Management District.

Bay Area Air Quality Management District. 2017a. California Environmental Quality Act, Air Quality Guidelines. Available online at: [www.baaqmd.gov/~media/files/planning-and-research/ceqa/ceqa\\_guidelines\\_may2017-pdf.pdf?la=en](http://www.baaqmd.gov/~media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en). Accessed January 17, 2019.

\_\_\_\_\_. 2017b. Air Quality Standards and Attainment Status. Available online at: [www.baaqmd.gov/about-air-quality/research-and-data/air-quality-standards-and-attainment-status](http://www.baaqmd.gov/about-air-quality/research-and-data/air-quality-standards-and-attainment-status). Accessed January 18, 2019.

\_\_\_\_\_. 2017c. Spare the Air – Cool the Planet, Final 2017 Clean Air Plan. Available online at: [www.baaqmd.gov/~media/files/planning-and-research/plans/2017-clean-air-plan/attachment-a\\_-\\_proposed-final-cap-vol-1-pdf.pdf?la=en](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 January 17, 2019.

Calaveras County 2018. General Plan DEIR. Available online at: [planning.calaverasgov.us/Portals/Planning/Documents/Draft General Plan Update/CEQA/4\\_3 Air Quality and GHG Emissions.pdf](http://planning.calaverasgov.us/Portals/Planning/Documents/Draft%20General%20Plan%20Update/CEQA/4_3_Air%20Quality%20and%20GHG%20Emissions.pdf). Accessed January 17, 2019.

California Air Resources Board. 2017. Summaries of Historical Area Designations. Available online at: [www.arb.ca.gov/desig/changes.htm#summaries](http://www.arb.ca.gov/desig/changes.htm#summaries). Accessed January 18, 2019.

CARB. California Air Resources Board.

SJVAPCD. San Joaquin Valley Air Pollution Control District.

San Joaquin Valley Air Pollution Control District. 2015. Air Quality Thresholds of Significance – Criteria Pollutants. Available online at: [www.valleyair.org/transportation/0714-GAMAQI-Criteria-Pollutant-Thresholds-of-Significance.pdf](http://www.valleyair.org/transportation/0714-GAMAQI-Criteria-Pollutant-Thresholds-of-Significance.pdf). Accessed January 17, 2019.

\_\_\_\_\_. 2019a. Ambient Air Quality Standards & Valley Attainment Status. Available online at: [www.valleyair.org/aqinfo/attainment.htm](http://www.valleyair.org/aqinfo/attainment.htm). Accessed January 18, 2019.

\_\_\_\_\_. 2019b. Air Quality Attainment Plans. Available online at: [valleyair.org/Air\\_Quality\\_Plans/air-quality-plans.htm](http://valleyair.org/Air_Quality_Plans/air-quality-plans.htm). Accessed January 17, 2019.

United States Environmental Protection Agency. 2018a. Green Book. Available online at: [www3.epa.gov/airquality/greenbook/anayo\\_ca.html](http://www3.epa.gov/airquality/greenbook/anayo_ca.html). Accessed January 18, 2019.

\_\_\_\_\_. 2018b. CALIFORNIA Intended Area Designations for the 2015 Ozone National Ambient Air Quality Standards Technical Support Document (TSD). Available online at: [www.epa.gov/sites/production/files/2017-12/documents/ca\\_120d\\_tsd\\_combined\\_final.pdf](http://www.epa.gov/sites/production/files/2017-12/documents/ca_120d_tsd_combined_final.pdf). Accessed January 18, 2019.

USEPA. United States Environmental Protection Agency.

### **Biological Resources**

Horizon Water and Environment, LLC (Horizon). 2019a. Biological Resources Assessment for the Mokelumne Aqueduct Routine Maintenance Agreement Renewals. July.

U.S. Fish and Wildlife Service. 2017. Framework for Assessing Impacts to the Valley Elderberry Longhorn Beetle (*Desmocerus californicus dimorphus*). U.S. Fish and Wildlife Service; Sacramento, California. 28 pp.

### **Cultural Resources**

Horizon. 2019b. Cultural Resources Assessment for the Mokelumne Aqueduct Routine Maintenance Agreement Renewals. July.

### **Energy**

California Energy Commission. 2018a. Power Content Label Pacific Gas and Electric Company. Available at: [www.energy.ca.gov/pcl/labels/2017\\_labels/PG\\_and\\_E\\_2017\\_PCL.pdf](http://www.energy.ca.gov/pcl/labels/2017_labels/PG_and_E_2017_PCL.pdf). Accessed January 30, 2019.

\_\_\_\_\_. 2018b. 2017 Power Content Label Marin Clean Energy. Available at: [www.energy.ca.gov/pcl/labels/2017\\_labels/MCE\\_2017\\_PCL.pdf](http://www.energy.ca.gov/pcl/labels/2017_labels/MCE_2017_PCL.pdf). Accessed January 30, 2019.

CEC. California Energy Commission.

East Bay Community Energy. 2019. Power Mix. Available at: [ebce.org/power-mix/](http://ebce.org/power-mix/). Accessed on: January 31, 2019.



East Bay Mud Municipal Utility District (EBMUD). 2012. EBMUD Energy. Available at: [www.ebmud.com/index.php/download\\_file/force/2270/1365/?energy-fact-sheet-03-12.pdf](http://www.ebmud.com/index.php/download_file/force/2270/1365/?energy-fact-sheet-03-12.pdf). Accessed January 31, 2019.

\_\_\_\_\_. 2018. Sustainability at EBMUD Fiscal Year 2018. Available at: [www.ebmud.com/about-us/sustainability/](http://www.ebmud.com/about-us/sustainability/). Accessed January 24, 2019.

EBCE. East Bay Community Energy.

EBMUD. East Bay Municipal Utility District.

## **Geology and Soils**

California Department of Conservation. 2018. Interactive Data Viewer. Available online at: [maps.conservation.ca.gov/cgs/DataViewer/](http://maps.conservation.ca.gov/cgs/DataViewer/). Accessed January 21, 2019.

Society of Vertebrate Paleontology. 2010. Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Paleontological Resources. Available online at: [vertpaleo.org/Membership/Member-Ethics/SVP\\_Impact\\_Mitigation\\_Guidelines.aspx](http://vertpaleo.org/Membership/Member-Ethics/SVP_Impact_Mitigation_Guidelines.aspx). Accessed July 11, 2019.

## **GHG Emissions**

BAAQMD. Bay Area Air Quality Management District.

BAAQMD. 2017. California Environmental Quality Act, Air Quality Guidelines. Available online at: [www.baaqmd.gov/~media/files/planning-and-research/ceqa/ceqa\\_guidelines\\_may2017-pdf.pdf?la=en](http://www.baaqmd.gov/~media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en). Accessed January 17, 2019.

Calaveras County 2018. General Plan DEIR. Available online at: [planning.calaverasgov.us/Portals/Planning/Documents/Draft General Plan Update/CEQA/4\\_3 Air Quality and GHG Emissions.pdf](http://planning.calaverasgov.us/Portals/Planning/Documents/Draft%20General%20Plan%20Update/CEQA/4_3_Air%20Quality%20and%20GHG%20Emissions.pdf). Accessed January 17, 2019.

California Air Resources Board. 2017. Summaries of Historical Area Designations. Available online at: [www.arb.ca.gov/desig/changes.htm#summaries](http://www.arb.ca.gov/desig/changes.htm#summaries). Accessed January 18, 2019.

CARB. California Air Resources Board.

East Bay Mud Municipal Utility District (EBMUD). 2014. 2014 Climate Change Monitoring and Response Plan.

\_\_\_\_\_. 2018. Sustainability at EBMUD Fiscal Year 2018. Available online at: [www.ebmud.com/about-us/sustainability/](http://www.ebmud.com/about-us/sustainability/). Accessed January 24, 2019.

\_\_\_\_\_. 2019. Climate Change. Available online at: [www.ebmud.com/about-us/sustainability/climate-change/](http://www.ebmud.com/about-us/sustainability/climate-change/). Accessed March 12, 2019.

EBMUD. East Bay Municipal Utility District.

San Joaquin Valley Air Pollution Control District. 2019. Climate Action Plan. Available online at: [www.valleyair.org/Programs/CCAP/CCAP\\_menu.htm](http://www.valleyair.org/Programs/CCAP/CCAP_menu.htm). Accessed January 24, 2019.

SJVAPCD. San Joaquin Valley Air Pollution Control District.

### **Hazards and Hazardous Materials**

California Department of Forestry and Fire Protection. 2012. California Fire Hazard Severity Zone Map Update Project. Available online at: [www.fire.ca.gov/fire\\_prevention/fire\\_prevention\\_wildland\\_statewide](http://www.fire.ca.gov/fire_prevention/fire_prevention_wildland_statewide). Accessed January 28, 2019.

Cal Fire. California Department of Forestry and Fire Protection.

DTOC. Department of Toxic Substances Control

DTOC. 2019. EnviroStor. Available online at: [www.envirostor.dtsc.ca.gov/public/](http://www.envirostor.dtsc.ca.gov/public/). Accessed January 25, 2019.

DTSC. Department of Toxic Substances Control.

SWRCB. State Water Resources Control Board.

State Water Resources Control Board. 2015a. GeoTracker. Available online at: [geotracker.waterboards.ca.gov/](http://geotracker.waterboards.ca.gov/). Accessed January 25, 2019.

\_\_\_\_\_. 2015b. GeoTracker. TY Lin Property (T0601300577). Available online at: [geotracker.waterboards.ca.gov/profile\\_report?global\\_id=T0601300577](http://geotracker.waterboards.ca.gov/profile_report?global_id=T0601300577). Accessed January 25, 2019.

### **Hydrology and Water Quality**

California Department of Conservation. 2018. Contra Costa County Tsunami Inundation Maps. Available online at: [www.conservation.ca.gov/cgs/Pages/Tsunami/Maps/ContraCosta.aspx](http://www.conservation.ca.gov/cgs/Pages/Tsunami/Maps/ContraCosta.aspx). Accessed January 16, 2019.

California Department of Water Resources. 2019a. 2018 SGMA Basin Prioritization Dashboard Data Viewer. Available online at: [gis.water.ca.gov/app/bp2018-dashboard/p1/](http://gis.water.ca.gov/app/bp2018-dashboard/p1/). Accessed January 24, 2019.

California Department of Water Resources. 2019b. Basin Prioritization. Available online at: [water.ca.gov/Programs/Groundwater-Management/Basin-Prioritization](http://water.ca.gov/Programs/Groundwater-Management/Basin-Prioritization). Accessed January 24, 2019.

### **Land Use and Planning**

Alameda County. 2012. Castro Valley General Plan. Available online at: [www.acgov.org/cda/planning/generalplans/documents/CastroValleyGeneralPlan\\_2012\\_FINAL.pdf](http://www.acgov.org/cda/planning/generalplans/documents/CastroValleyGeneralPlan_2012_FINAL.pdf). Accessed January 29, 2019.

Calaveras County. 2015. Calaveras County General Plan, Land Use Element. Available online at: [calaverascap.com/planning-documents/general-plan-documents/](http://calaverascap.com/planning-documents/general-plan-documents/). Accessed January 29, 2019.

Contra Costa County. 2005. Contra Costa County General Plan, Land Use Element. Available online at: [www.co.contra-costa.ca.us/DocumentCenter/View/30913/Ch3-Land-Use-Element?bidId=](http://www.co.contra-costa.ca.us/DocumentCenter/View/30913/Ch3-Land-Use-Element?bidId=). Accessed January 29, 2019.

San Joaquin County. 2017. San Joaquin County General Plan, Land Use Element. Available online at: [www.sjgov.org/commdev/cgi-bin/cdyn.exe/file/Planning/General Plan 2035/Part 3.1a\\_Land Use\\_2017-03-13.pdf](http://www.sjgov.org/commdev/cgi-bin/cdyn.exe/file/Planning/General%20Plan%202035/Part%203.1a_Land%20Use_2017-03-13.pdf). Accessed January 29, 2019.

### **Mineral Resources**

California Department of Conservation, Division of Mine Reclamation. 2016. Mines Online. Available online at: [maps.conservation.ca.gov/mol/index.html](http://maps.conservation.ca.gov/mol/index.html). Accessed January 15, 2019.

### **Noise**

Antioch. 2019. Noise Ordinance. Available at: [www.antiochca.gov/fc/public-works/engineering/Noise-Ordinance.pdf](http://www.antiochca.gov/fc/public-works/engineering/Noise-Ordinance.pdf). Accessed February 7, 2019.

Brentwood. 2019. Noise Ordinance. Available at: [www.brentwoodca.gov/civicax/filebank/blobdload.aspx?BlobID=27737](http://www.brentwoodca.gov/civicax/filebank/blobdload.aspx?BlobID=27737). Accessed February 7, 2019.

Calaveras County. 2019. Noise Ordinance. Available at: [calaverascounty-ca.elaws.us/code/coor\\_apxid42427\\_title9\\_ch9.02\\_sec9.02.030](http://calaverascounty-ca.elaws.us/code/coor_apxid42427_title9_ch9.02_sec9.02.030). Accessed February 7, 2019.

Concord. 2019. Concord Municipal Code. Available at: [www.codepublishing.com/CA/Concord/?Concord18/Concord18150.html#18.150.130](http://www.codepublishing.com/CA/Concord/?Concord18/Concord18150.html#18.150.130). Accessed February 7, 2019.

Contra Costa County. 2008. Buchanan Field Master Plan. Available at: [www.co.contra-costa.ca.us/4016/Buchanan-Field-Master-Plan-RevOct-2008](http://www.co.contra-costa.ca.us/4016/Buchanan-Field-Master-Plan-RevOct-2008). Accessed January 29, 2019.

\_\_\_\_\_. 2010. Contra Costa County General Plan Noise Element. Available at: [www.co.contra-costa.ca.us/DocumentCenter/View/30921/Ch11-Noise-Element?bidId=](http://www.co.contra-costa.ca.us/DocumentCenter/View/30921/Ch11-Noise-Element?bidId=). Accessed February 7, 2019.

\_\_\_\_\_. 2016. Buchanan Field Noise Program Overview. Available at: [www.co.contra-costa.ca.us/DocumentCenter/View/46626/Noise-Program?bidId=](http://www.co.contra-costa.ca.us/DocumentCenter/View/46626/Noise-Program?bidId=). Accessed January 29, 2019.

- Federal Highway Administration. 2019. Construction Noise Handbook. Available online at: [www.fhwa.dot.gov/environment/noise/construction\\_noise/handbook/handbook09.cfm](http://www.fhwa.dot.gov/environment/noise/construction_noise/handbook/handbook09.cfm). Accessed January 31, 2019.
- Federal Transit Administration. 2018. Transit Noise and Vibration Impact Assessment Manual. Available online at: [www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/118131/transit-noise-and-vibration-impact-assessment-manual-fta-report-no-0123\\_0.pdf](http://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/118131/transit-noise-and-vibration-impact-assessment-manual-fta-report-no-0123_0.pdf). Accessed January 31, 2019.
- FHWA. Federal Highway Administration.
- FTA. Federal Transit Administration.
- Lafayette. 2019. Noise Ordinance. Available at: [library.municode.com/ca/lafayette/codes/code\\_of\\_ordinances?nodeId=TIT5HESA\\_CH5-2NO](http://library.municode.com/ca/lafayette/codes/code_of_ordinances?nodeId=TIT5HESA_CH5-2NO). Accessed February 7, 2019.
- Moraga. 2019. Noise Control Ordinance. Available at: [library.municode.com/ca/moraga/codes/code\\_of\\_ordinances?nodeId=MOCA\\_TIT7HESA\\_CH7.12NOCO](http://library.municode.com/ca/moraga/codes/code_of_ordinances?nodeId=MOCA_TIT7HESA_CH7.12NOCO). Accessed February 7, 2019.
- Oakland. 2017. Oakland Planning Code. Available at: [www2.oaklandnet.com/oakca1/groups/ceda/documents/report/oak061640.pdf](http://www2.oaklandnet.com/oakca1/groups/ceda/documents/report/oak061640.pdf). Accessed February 7, 2019.
- Orinda. 2019. Orinda Code of Ordinances. Available at: [library.municode.com/ca/orinda/codes/code\\_of\\_ordinances?nodeId=TIT17ZO\\_CH17.39NOCO](http://library.municode.com/ca/orinda/codes/code_of_ordinances?nodeId=TIT17ZO_CH17.39NOCO). Accessed February 7, 2019.
- Pittsburg. 2019. Pittsburg Municipal Code. Available at: [www.codepublishing.com/CA/Pittsburg/#!/Pittsburg18/Pittsburg1882.html#18.82.040](http://www.codepublishing.com/CA/Pittsburg/#!/Pittsburg18/Pittsburg1882.html#18.82.040). Accessed February 7, 2019.
- Pleasant Hill. 2019. Pleasant Hill Municipal Code. Available at: [www.codepublishing.com/CA/PleasantHill/html/PleasantHill09/PleasantHill0915.html#9.15.040](http://www.codepublishing.com/CA/PleasantHill/html/PleasantHill09/PleasantHill0915.html#9.15.040). Accessed February 7, 2019.
- San Joaquin County. 2016. San Joaquin County General Plan. Available at: [www.sjgov.org/commdev/cgi-bin/cdyn.exe/file/Planning/General%20Plan%202035/GENERAL%20PLAN%202035.pdf](http://www.sjgov.org/commdev/cgi-bin/cdyn.exe/file/Planning/General%20Plan%202035/GENERAL%20PLAN%202035.pdf). Accessed February 7, 2019.
- Stockton. 2019. Stockton Municipal Code. Available at: [qcode.us/codes/stockton/view.php?topic=16-3-16\\_60&showAll=1&frames=on](http://qcode.us/codes/stockton/view.php?topic=16-3-16_60&showAll=1&frames=on). Accessed February 7, 2019.
- Walnut Creek. 2019. Walnut Creek Municipal Code. Available at: [www.codepublishing.com/CA/WalnutCreek/html/WalnutCreek04/WalnutCreek0406.html#4-6.201](http://www.codepublishing.com/CA/WalnutCreek/html/WalnutCreek04/WalnutCreek0406.html#4-6.201). Accessed February 7, 2019.

## **Population and Housing**

None.

**Public Services**

None.

**Recreation**

None.

**Transportation**

None.

**Tribal Cultural Resources**

Horizon. 2019. Cultural Resources Assessment for the Mokelumne Aqueduct Routine Maintenance Agreement Renewals. March.

**Utilities and Service Systems**

None.

**Wildfire**

California Building Standards Commission. 2016. California Fire Code. Available online at: [www.bsc.ca.gov/codes.aspx](http://www.bsc.ca.gov/codes.aspx). Accessed January 30, 2019.

California Department of Forestry and Fire Protection (Cal Fire). 2012. California Fire Hazard Severity Zone Map Update Project. Available online at: [www.fire.ca.gov/fire\\_prevention/fire\\_prevention\\_wildland\\_statewide](http://www.fire.ca.gov/fire_prevention/fire_prevention_wildland_statewide). Accessed January 30, 2019.

**Mandatory Findings**

None.

*This page intentionally left blank.*

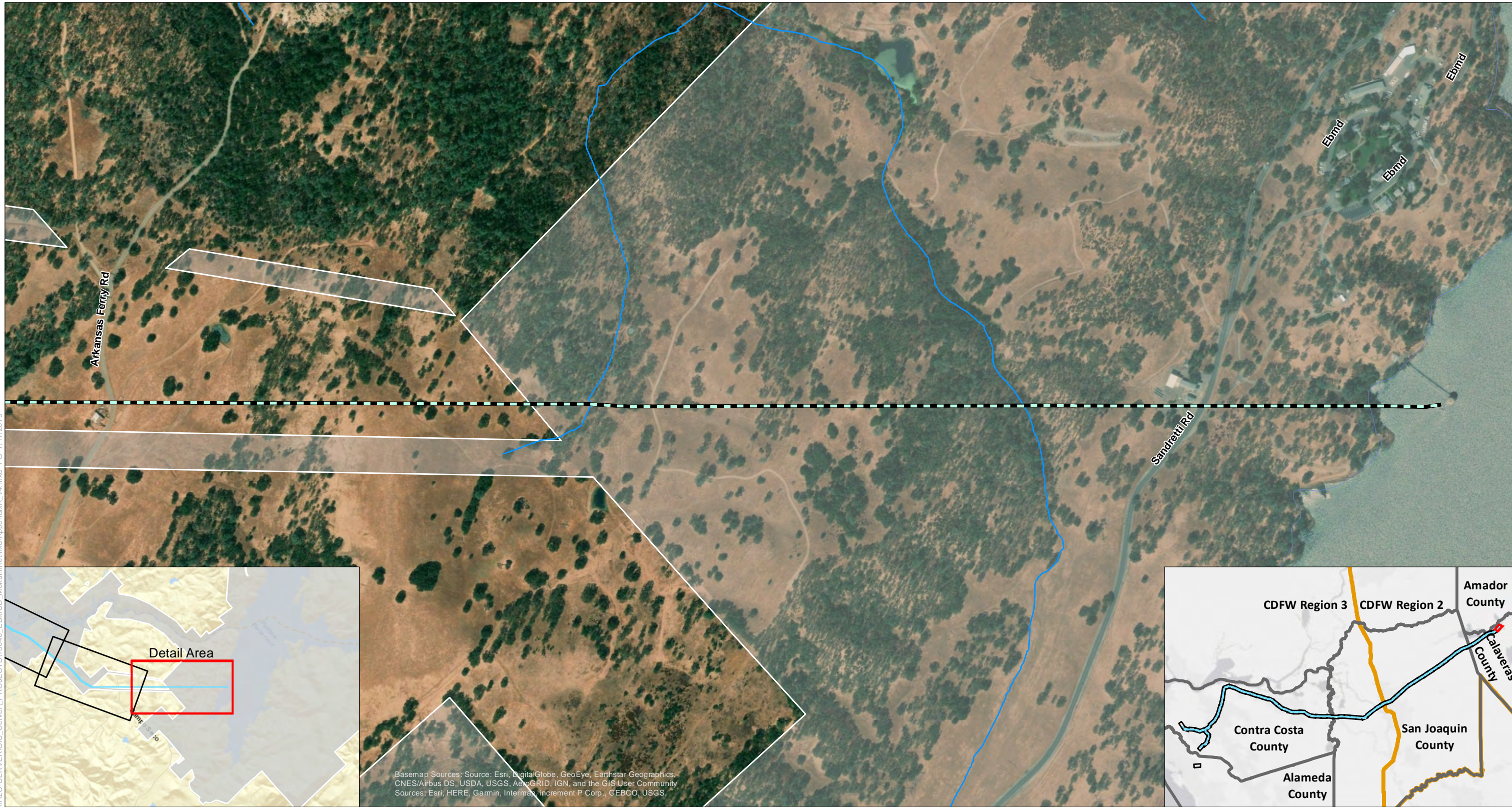
**APPENDIX A**  
**DETAILED PROJECT ALIGNMENT SHEETS**

---

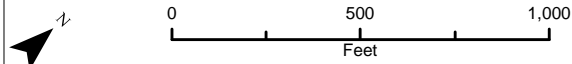




\\H2O-SERVER\GIS\_Server\PROJECTS\18040\_EBMUD\_Mokelumne\AppendixA\_v4.mxd PG 7/17/2019



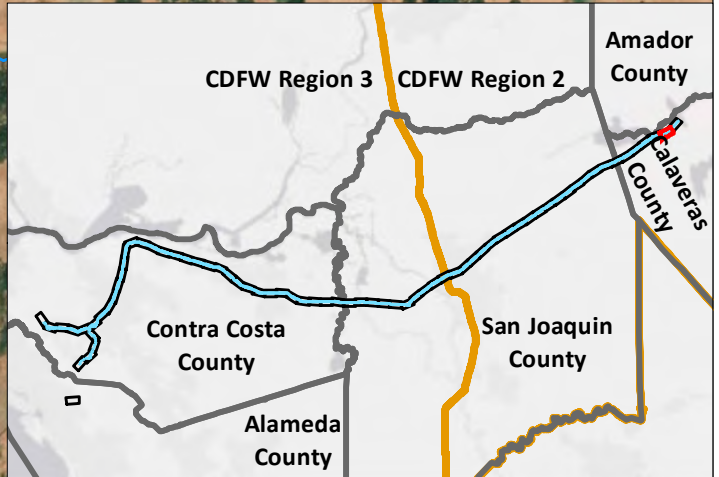
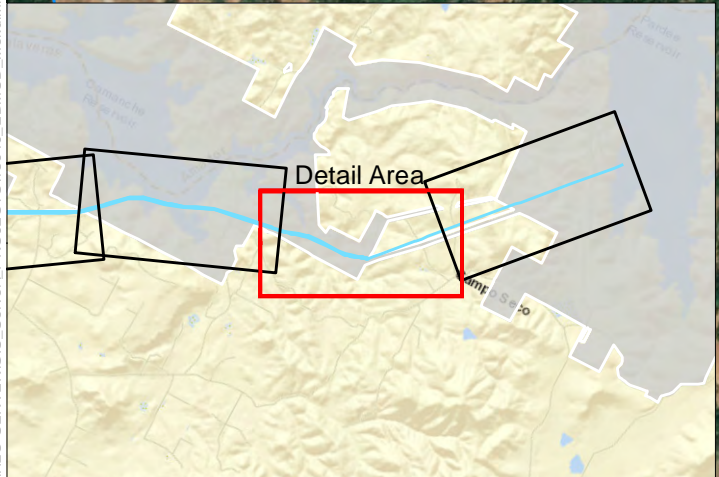
Basemap Sources: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community  
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS,



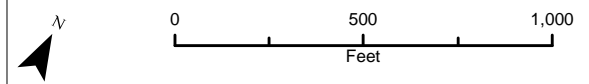
- Maintenance Sites
- ⊕ Stationing
- Creeks
- Water Bodies
- EBMUD Properties
- CDFW Region Boundary
- County Boundary

Prepared by:  
**Horizon**  
WATER AND ENVIRONMENT  
Prepared for:  
EBMUD

VH20-SERVERIGIS\_Server1\_PROJECTS\18040\_EBMUD\_Mokelumne\AppendixA\_v4.mxd PG 7/17/2019



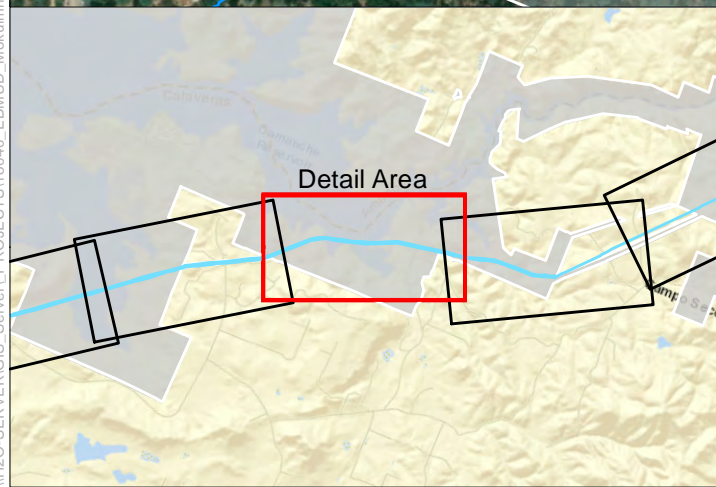
Basemap Sources: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community  
 Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS,



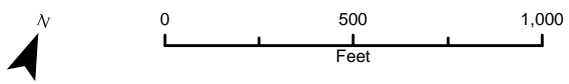
- Maintenance Sites
- ⊕ Stationing
- Creeks
- Water Bodies
- EBMUD Properties
- CDFW Region Boundary
- County Boundary

Prepared by:  
  
 Prepared for:  
 EBMUD

\\NH20-SERVER\GIS\_Server\PROJECTS\18040\_EBMUD\_Mokelumne\AppendixA\_v4.mxd PG 7/17/2019



Basemap Sources: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community  
 Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS.



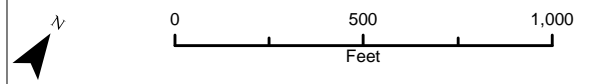
Prepared by:  
**Horizon**  
 WATER AND ENVIRONMENT  
 Prepared for:  
 EBMUD

- Maintenance Sites
- Stationing
- Creeks
- Water Bodies
- EBMUD Properties
- CDFW Region Boundary
- County Boundary

\\H2O-SERVER\GIS\_Server\PROJECTS\18040\_EBMUD\_Mokelumne\AppendixA\_v4.mxd PG 7/17/2019



Basemap Sources: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community  
 Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS,



- Maintenance Sites
- ⊕ Stationing
- Creeks
- Water Bodies
- EBMUD Properties
- CDFW Region Boundary
- County Boundary

Prepared by:  
  
 Prepared for:  
 EBMUD



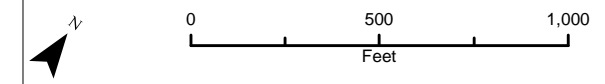
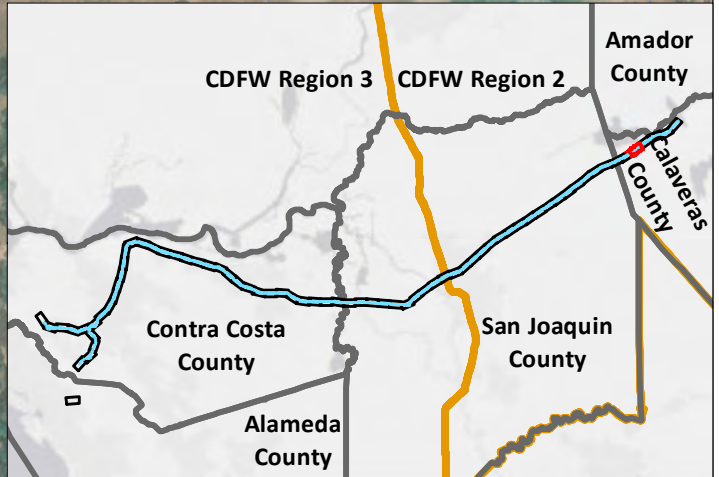
13: Wallace, Calaveras;  
SW of Pattison Rd.  
Seasonal water flow,  
culvert near lake bed

15: Culvert

14: Culvert

16: Culvert

Basemap Sources: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community  
Sources: Esri, HERE, Garmin, Intermap, Increment P Corp., GEBCO, USGS,



- Maintenance Sites
- Stationing
- Creeks
- Water Bodies
- EBMUD Properties
- CDFW Region Boundary
- County Boundary

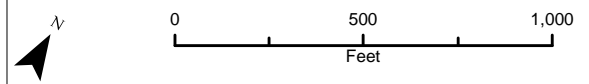
Prepared by:  
**Horizon**  
WATER AND ENVIRONMENT  
Prepared for:  
EBMUD

V:\H2O-SERVER\GIS\_Server\PROJECTS\18040\_EBMUD\_Mokelumne\AppendixA\_v4.mxd PG 7/17/2019

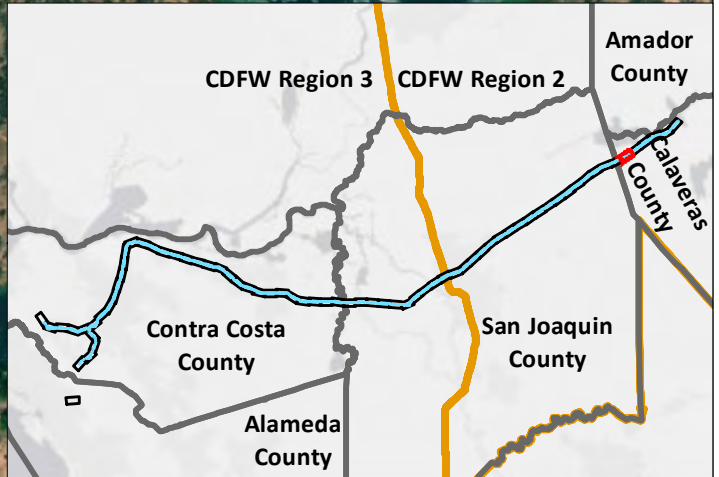


Basemap Sources: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community  
 Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS,

VH20-SERVERIGIS\_Server1\_PROJECTS\18040\_EBMUD\_Mokelumne\AppendixA\_v4.mxd PG 7/17/2019

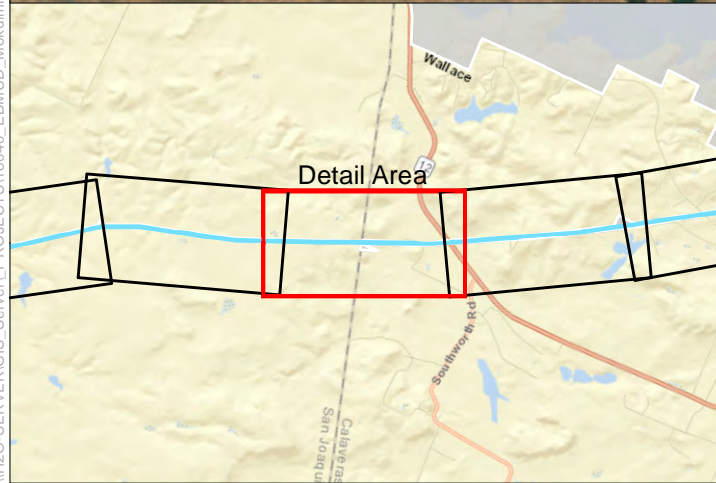


- Maintenance Sites
- ⊕ Stationing
- Creeks
- Water Bodies
- EBMUD Properties
- CDFW Region Boundary
- County Boundary

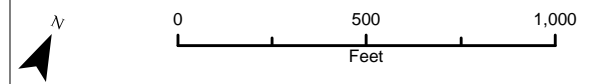
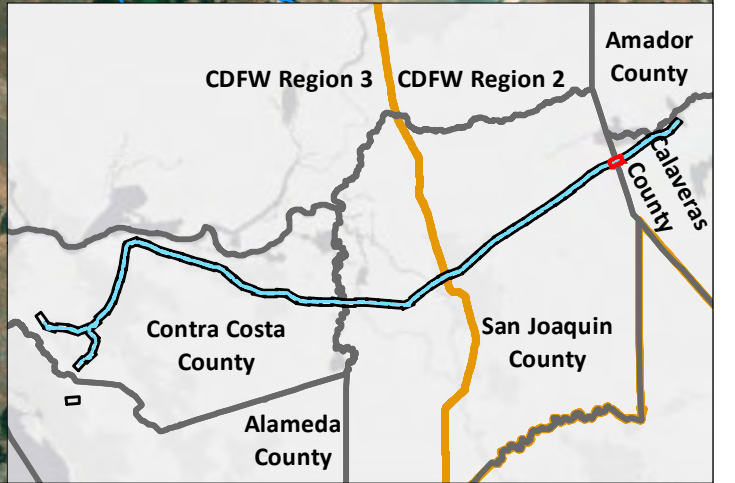


Prepared by:  
  
 Prepared for:  
 EBMUD

\\H2O-SERVER\GIS\_Server\PROJECTS\18040\_EBMUD\_Mokelumne\AppendixA\_v4.mxd PG 7/17/2019



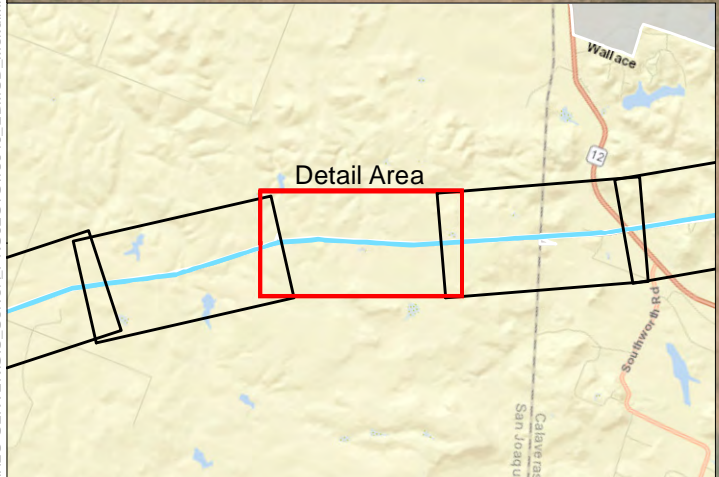
Basemap Sources: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community  
 Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS.



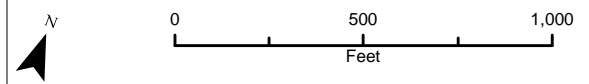
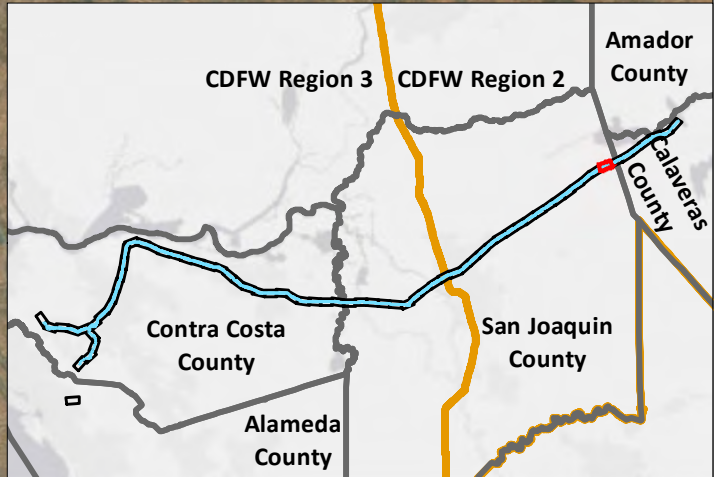
- Maintenance Sites
- ⊕ Stationing
- Creeks
- Water Bodies
- EBMUD Properties
- CDFW Region Boundary
- County Boundary

Prepared by:  
  
 Prepared for:  
 EBMUD

\\H2O-SERVER\GIS\_Server\PROJECTS\18040\_EBMUD\_Mokelumne\AppendixA\_v4.mxd PG 7/17/2019



Basemap Sources: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community  
 Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS,



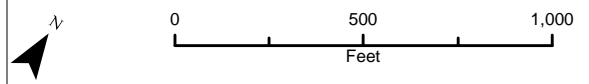
- Maintenance Sites
- ⊕ Stationing
- Creeks
- Water Bodies
- EBMUD Properties
- CDFW Region Boundary
- County Boundary



\\H2O-SERVER\GIS\_Server\PROJECTS\18040\_EBMUD\_Mokelumne\AppendixA\_v4.mxd PG 7/17/2019



Basemap Sources: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community  
 Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS,

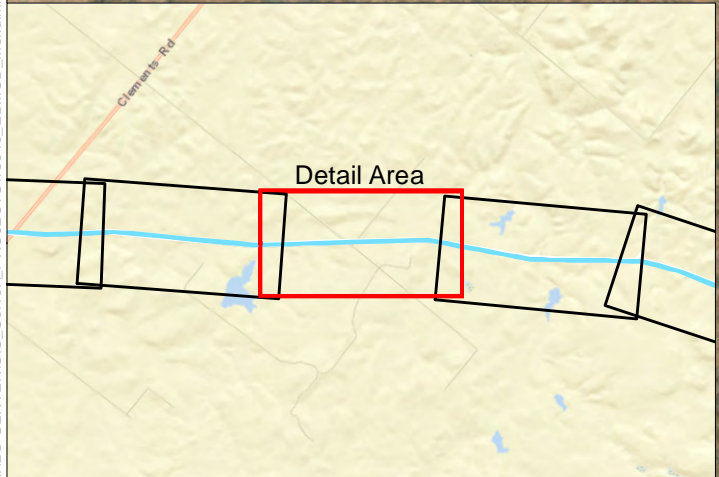


- Maintenance Sites
- ⊕ Stationing
- Creeks
- Water Bodies
- EBMUD Properties
- CDFW Region Boundary
- County Boundary

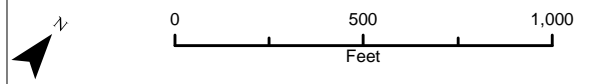
Prepared by:  
  
 Prepared for:  
 EBMUD



\\H2O-SERVER\GIS\_Server\PROJECTS\18040\_EBMUD\_Mokelumne\AppendixA\_v4.mxd PG 7/17/2019



Basemap Sources: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community  
 Sources: Esri, HERE, Garmin, Intermap, Increment P Corp., GEBCO, USGS,



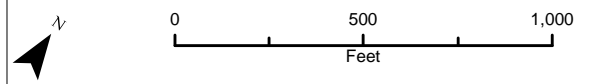
- Maintenance Sites
- ⊕ Stationing
- Creeks
- Water Bodies
- EBMUD Properties
- CDFW Region Boundary
- County Boundary

Prepared by:  
  
 Prepared for:  
 EBMUD

\\H2O-SERVER\GIS\_Server\PROJECTS\18040\_EBMUD\_Mokelumne\AppendixA\_v4.mxd PG 7/17/2019



Basemap Sources: Sources: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community  
 Sources: Esri, HERE, Garmin, Intermap, Increment P Corp., GEBCO, USGS.



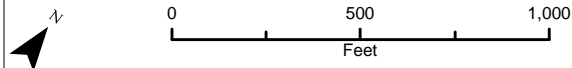
- Maintenance Sites
- ⊕ Stationing
- Creeks
- Water Bodies
- EBMUD Properties
- CDFW Region Boundary
- County Boundary

Prepared by:  
  
 Prepared for:  
 EBMUD



\\H2O-SERVER\GIS\_Server\PROJECTS\18040\_EBMUD\_Mokelumne\AppendixA\_v4.mxd PG 7/17/2019

Basemap Sources: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community  
Sources: Esri, HERE, Garmin, Intermap, Increment P Corp., GEBCO, USGS.



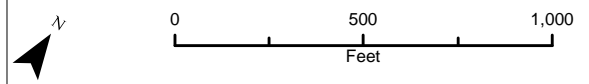
- Maintenance Sites
- ⊕ Stationing
- Creeks
- Water Bodies
- EBMUD Properties
- CDFW Region Boundary
- County Boundary

Prepared by:  
**Horizon**  
WATER and ENVIRONMENT  
Prepared for:  
EBMUD



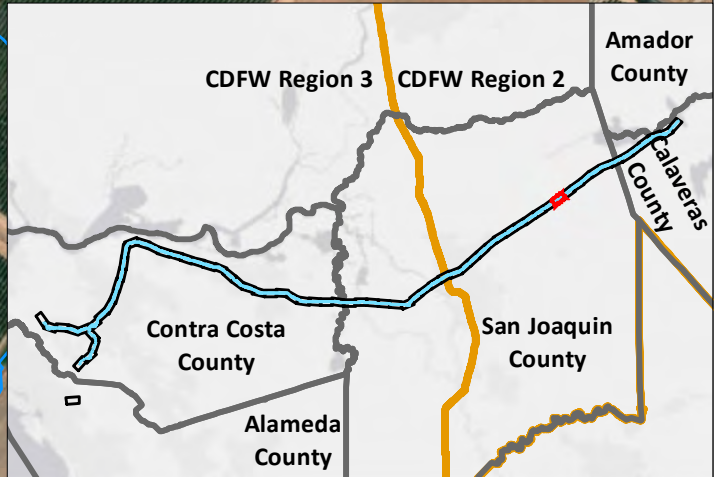
\\H2O-SERVER\GIS\_Server\PROJECTS\18040\_EBMUD\_Mokelumne\AppendixA\_v4.mxd PG 7/17/2019

Basemap Sources: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community  
 Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS,



- Maintenance Sites
- ⊕ Stationing
- Creeks
- Water Bodies
- EBMUD Properties
- CDFW Region Boundary
- County Boundary

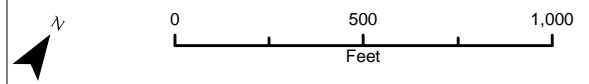
Prepared by:  
  
 Prepared for:  
 EBMUD



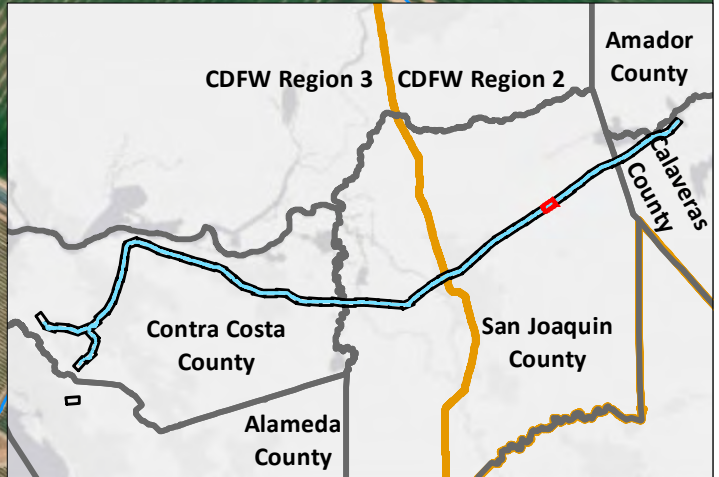
\\H2O-SERVER\GIS\_Server\PROJECTS\18040\_EBMUD\_Mokelumne\AppendixA\_v4.mxd PG 7/17/2019



Basemap Sources: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community  
 Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS,



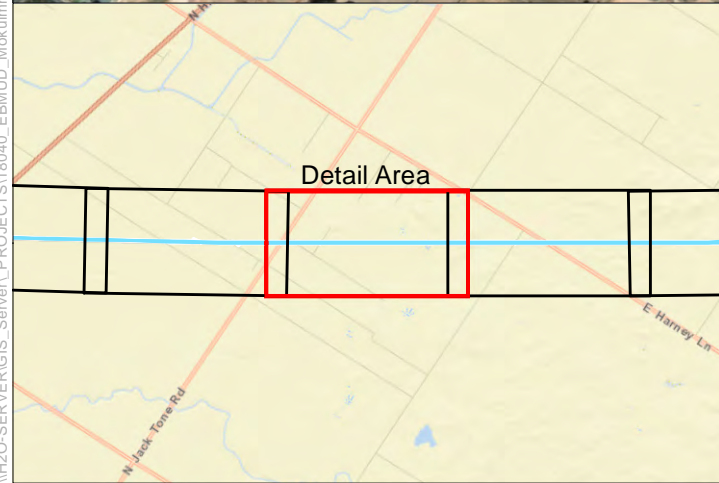
- Maintenance Sites
- ⊕ Stationing
- Creeks
- Water Bodies
- EBMUD Properties
- CDFW Region Boundary
- County Boundary



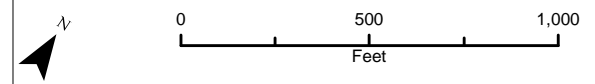
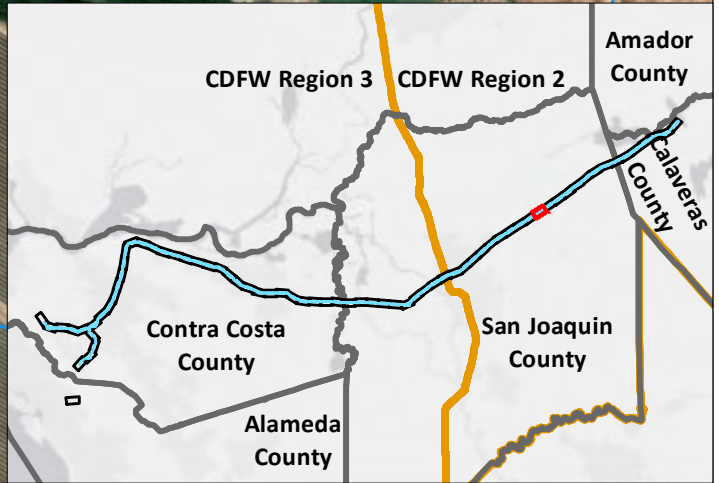
Prepared by:  
  
 Prepared for:  
 EBMUD



VH20-SERVERIGIS\_ServerL\_PROJECTS\18040\_EBMUD\_Mokelumne\AppendixA\_v4.mxd PG 7/17/2019



Background Sources: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community  
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS



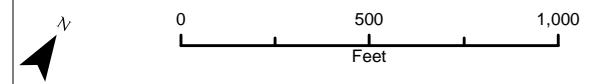
- Maintenance Sites
- ⊕ Stationing
- Creeks
- Water Bodies
- EBMUD Properties
- CDFW Region Boundary
- County Boundary

Prepared by:  
  
 Prepared for:  
 EBMUD

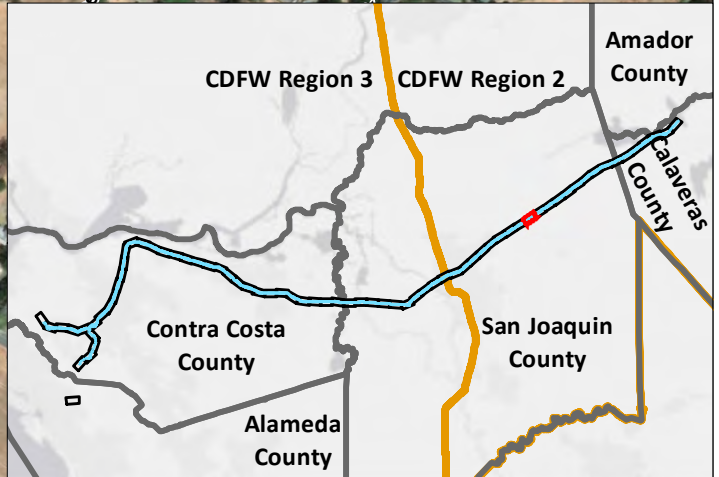


Basemap Sources: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community  
 Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS,

NH20-SERVERIGIS\_Server1\_PROJECTS\18040\_EBMUD\_Mokelumne\AppendixA\_v4.mxd PG 7/17/2019



- Maintenance Sites
- ⊕ Stationing
- Creeks
- Water Bodies
- EBMUD Properties
- CDFW Region Boundary
- County Boundary



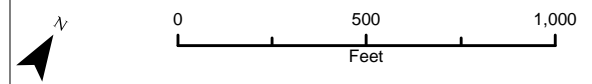
Prepared by:  
 Horizon  
 WATER AND ENVIRONMENT  
 Prepared for:  
 EBMUD

**Mokelumne Aqueduct System  
 Routine Maintenance Project**





Basemap Sources: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community  
 Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS,



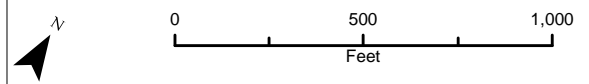
- Maintenance Sites
- ⊕ Stationing
- Creeks
- Water Bodies
- EBMUD Properties
- CDFW Region Boundary
- County Boundary

Prepared by:  
 Horizon  
 WATER AND ENVIRONMENT  
 Prepared for:  
 EBMUD



\\H2O-SERVER\GIS\_Server\PROJECTS\18040\_EBMUD\_Mokelumne\AppendixA\_v4.mxd PG 7/17/2019

Basemap Sources: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community  
 Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS.

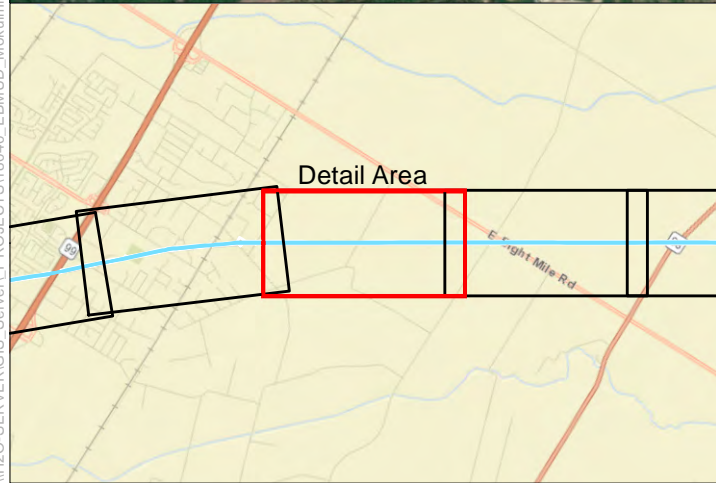


Prepared by:  
 Horizon  
 WATER AND ENVIRONMENT  
 Prepared for:  
 EBMUD

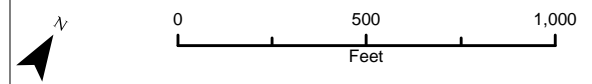
- Maintenance Sites
- ⊕ Stationing
- Creeks
- Water Bodies
- EBMUD Properties
- CDFW Region Boundary
- County Boundary



VH20-SERVERIGIS\_Server1\_PROJECTS\18040\_EBMUD\_Mokelumne\AppendixA\_v4.mxd PG 7/17/2019



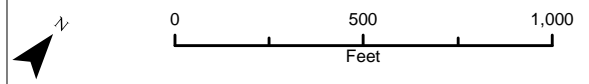
Basemap Sources: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community  
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS.



- Maintenance Sites
- ⊕ Stationing
- Creeks
- Water Bodies
- EBMUD Properties
- CDFW Region Boundary
- County Boundary

Prepared by:  
 Horizon  
 WATER AND ENVIRONMENT  
 Prepared for:  
 EBMUD

V:\H2O-SERVER\GIS\_Server\PROJECTS\18040\_EBMUD\_Mokelumne\AppendixA\_v4.mxd PG 7/17/2019

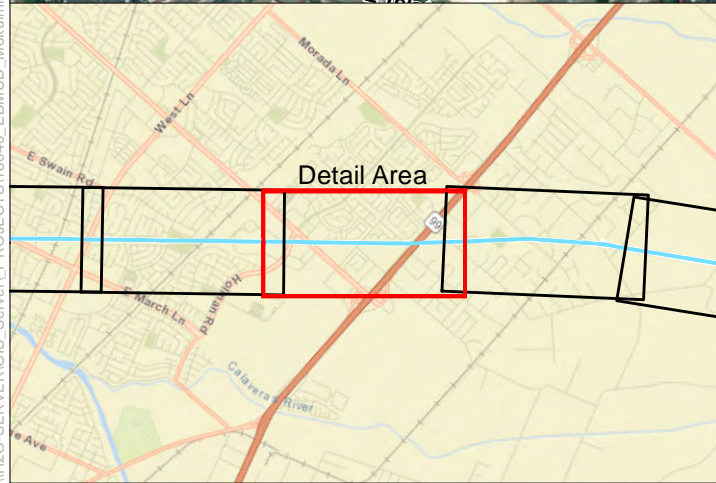


- Maintenance Sites
- ⊕ Stationing
- Creeks
- Water Bodies
- EBMUD Properties
- CDFW Region Boundary
- County Boundary

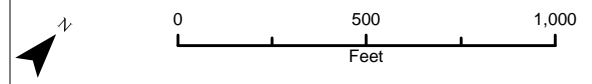
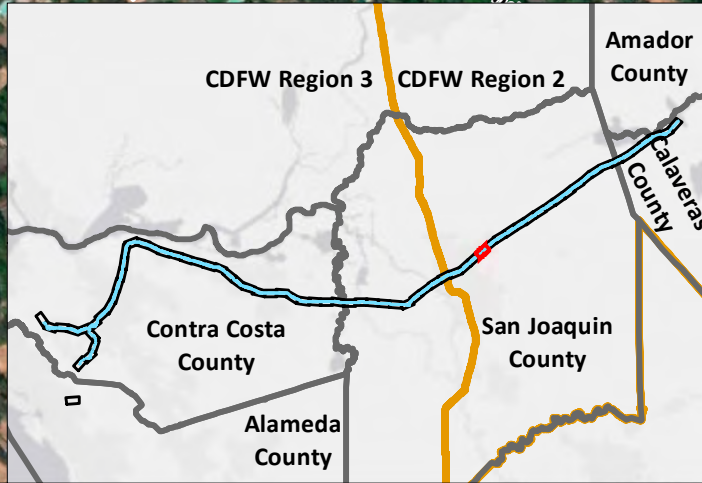
Prepared by:  
  
 Prepared for:  
 EBMUD



\NH20-SERVER\GIS\_Server\PROJECTS\18040\_EBMUD\_Mokelumne\AppendixA\_v4.mxd PG 7/17/2019



Basemap Sources: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community  
 Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS,



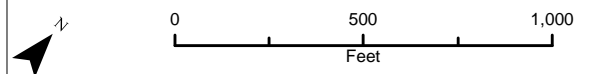
- Maintenance Sites
- ⊕ Stationing
- Creeks
- Water Bodies
- EBMUD Properties
- CDFW Region Boundary
- County Boundary

Prepared by:  
  
 Prepared for:  
 EBMUD

**Mokelumne Aqueduct System  
 Routine Maintenance Project**

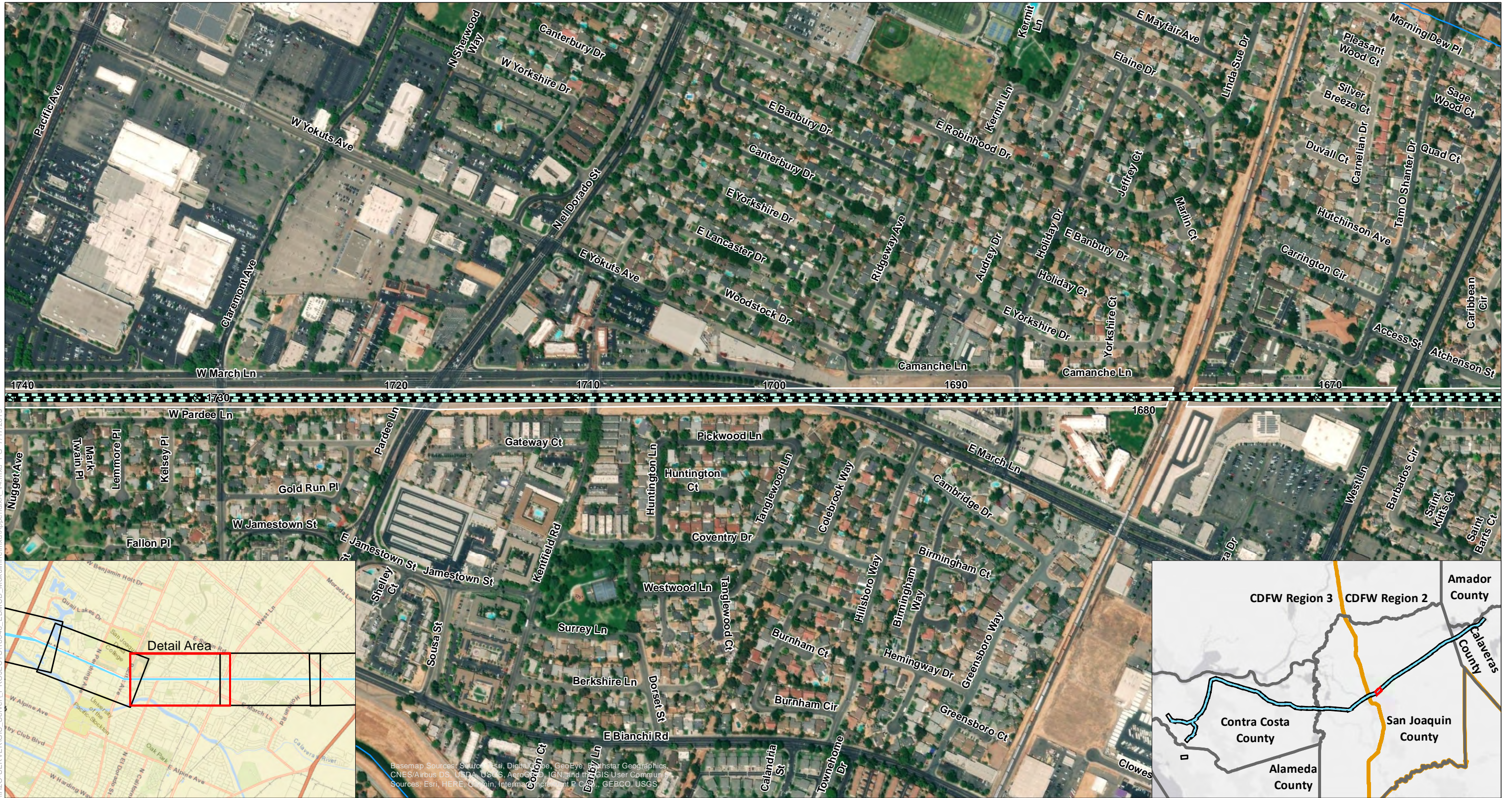


V:\H2O-SERVER\GIS\Server\PROJECTS\18040\_EBMUD\_Mokelumne\AppendixA\_v4.mxd PG 7/17/2019



Prepared by:  
 Horizon  
 WATER AND ENVIRONMENT  
 Prepared for:  
 EBMUD

- Maintenance Sites
- ⊕ Stationing
- Creeks
- Water Bodies
- EBMUD Properties
- CDFW Region Boundary
- County Boundary



\NH20-SERVER\GIS\_Server\PROJECTS\18040\_EBMUD\_Mokelumne\AppendixA\_v4.mxd PG 7/17/2019

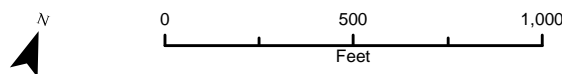
Basemap Sources: Suro, Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community  
 Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS





V:\H2O-SERVER\GIS\_Server\PROJECTS\18040\_EBMUD\_Mokelumne\AppendixA\_v4.mxd PG 7/17/2019

Basemap Sources: Source: Esri, DigitalGlobe, GeoEye, Earthstar (United States), CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community  
 Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, Swisstopo

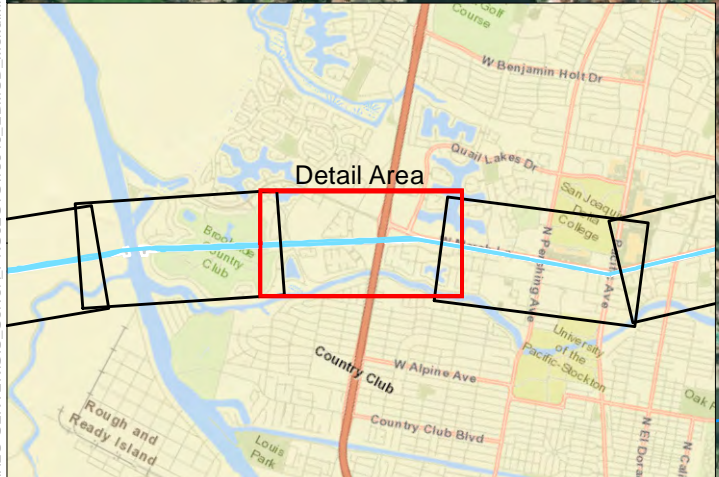
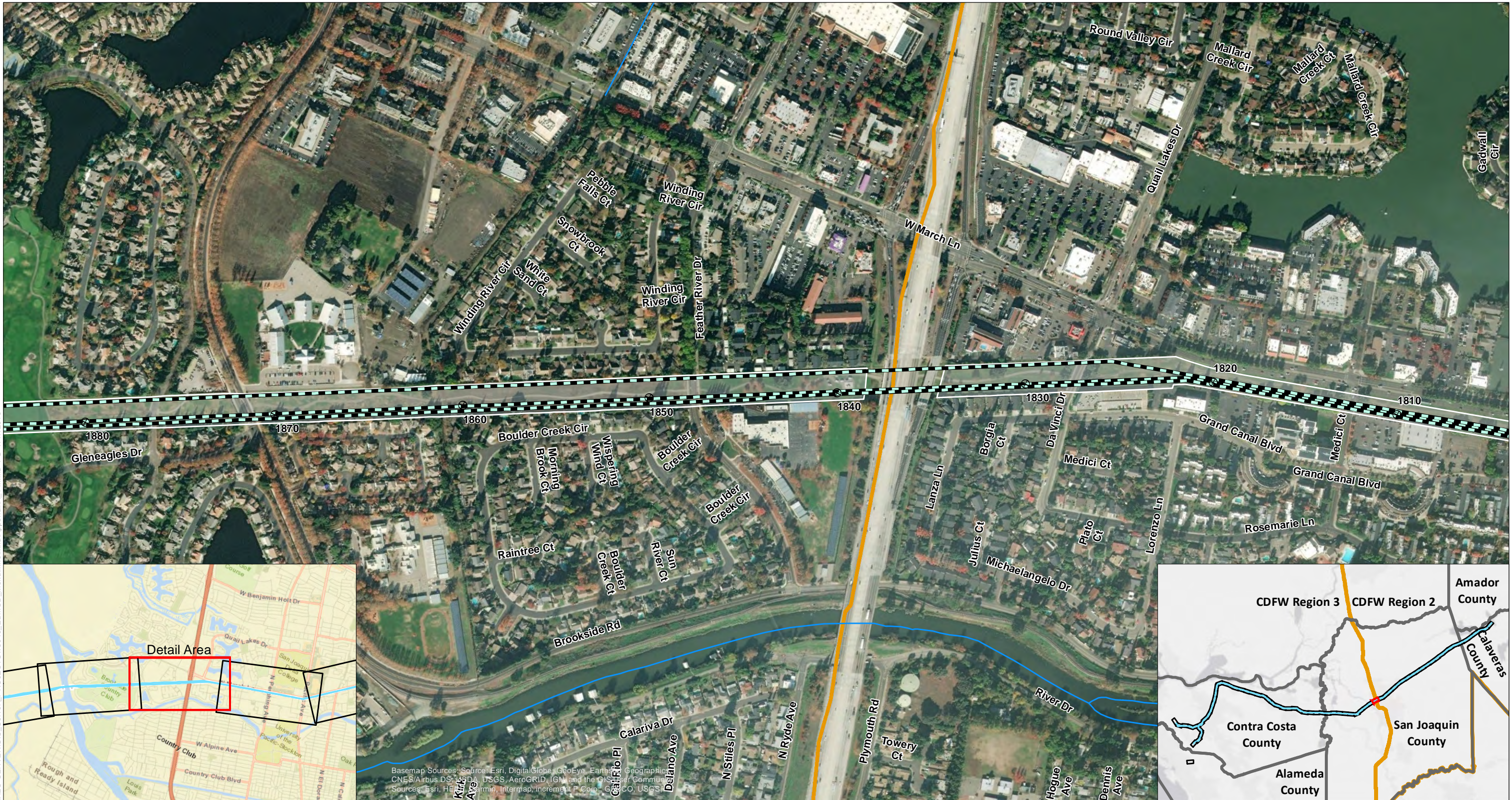


Prepared by:  
**Horizon**  
 WATER AND ENVIRONMENT  
 Prepared for:  
 EBMUD

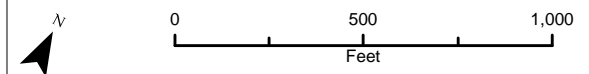
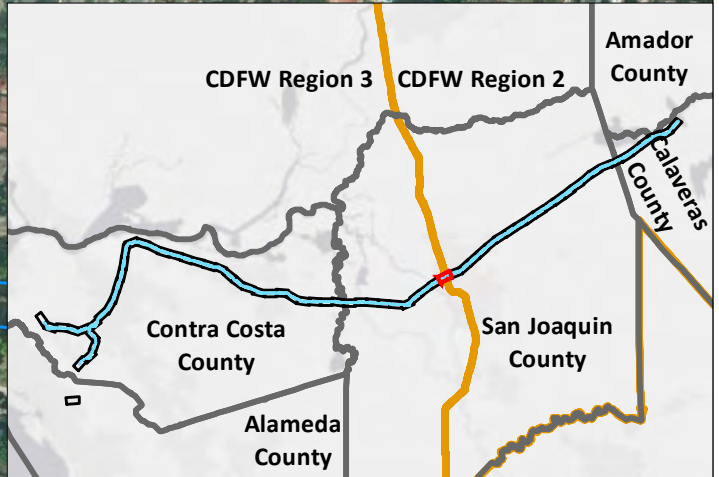
- Maintenance Sites
- ⊕ Stationing
- Creeks
- Water Bodies
- EBMUD Properties
- CDFW Region Boundary
- County Boundary



\\H2O-SERVER\GIS\_Server\PROJECTS\18040\_EBMUD\_Mokelumne\AppendixA\_v4.mxd PG 7/17/2019



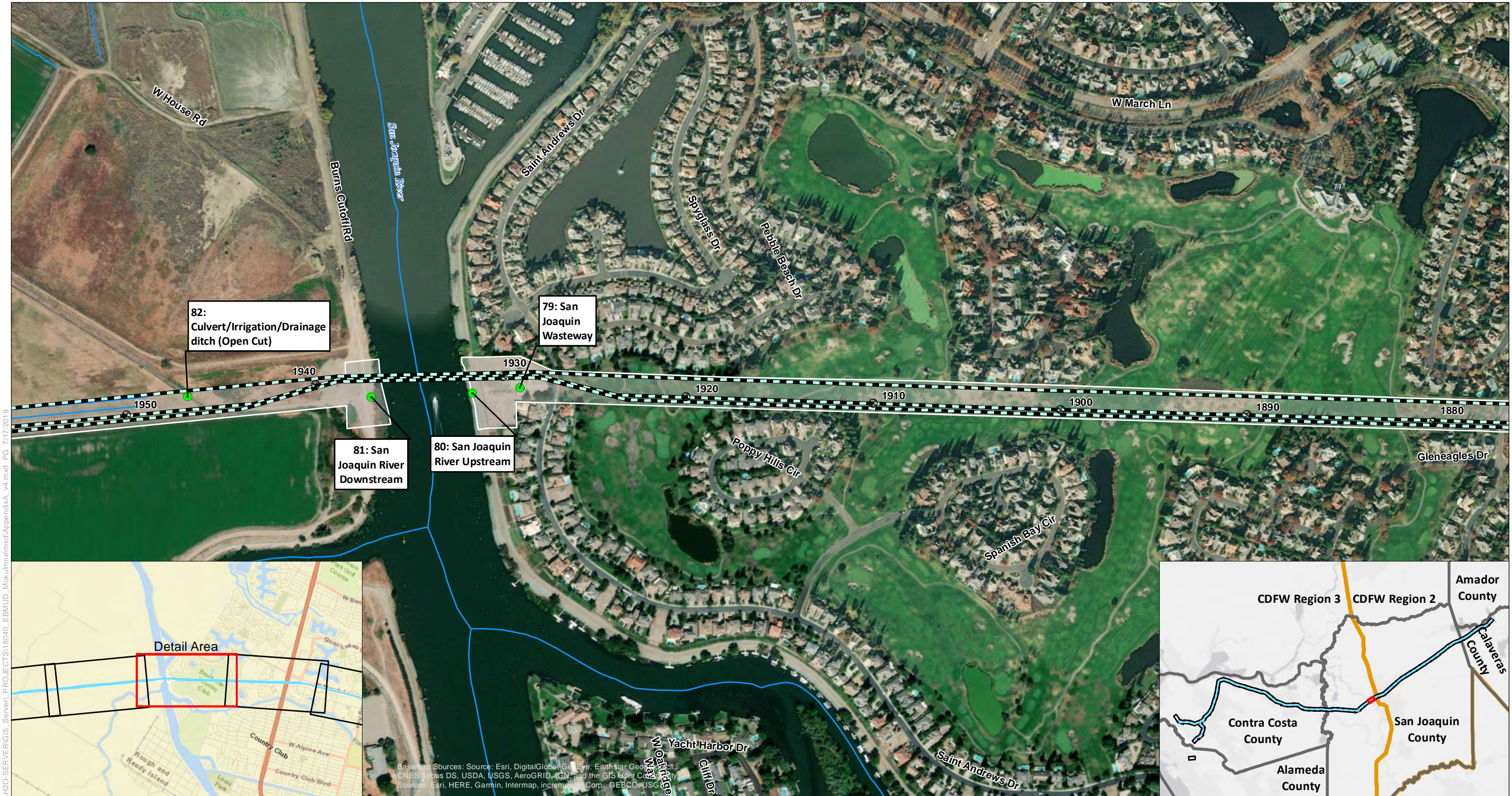
Basemap Sources: Source: Esri, DigitalGlobe, GeoEye, Earthstar, Geographic CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community  
 Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS



- Maintenance Sites
- ⊕ Stationing
- Creeks
- Water Bodies
- EBMUD Properties
- CDFW Region Boundary
- County Boundary

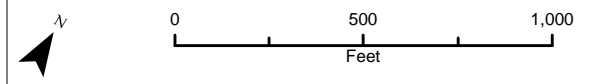
Prepared by:  
 Horizon  
 WATER AND ENVIRONMENT  
 Prepared for:  
 EBMUD

**Mokelumne Aqueduct System  
 Routine Maintenance Project**



V:\H2O-SERVER\GIS\_Server\PROJECTS\18040\_EBMUD\_Mokelumne\AppendixA\_v4.mxd PG 7/17/2019

Basemap Sources: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community  
 Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS

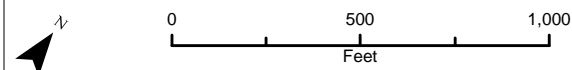


- Maintenance Sites
- EBMUD Properties
- ⊕ Stationing
- CDFW Region Boundary
- Creeks
- County Boundary
- Water Bodies

Prepared by:  
 Horizon  
 WATER AND ENVIRONMENT  
 Prepared for:  
 EBMUD



\\H2O-SERVER\GIS\_Server\PROJECTS\18040\_EBMUD\_Mokelumne\AppendixA\_v4.mxd PG 7/17/2019



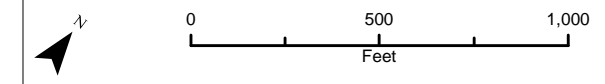
- Maintenance Sites
- ⊕ Stationing
- Creeks
- Water Bodies
- EBMUD Properties
- CDFW Region Boundary
- County Boundary

Prepared by:  
 Horizon  
 WATER AND ENVIRONMENT  
 Prepared for:  
 EBMUD



Basemap Sources: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community  
 Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS,

VH20-SERVERIGIS\_ServerL\_PROJECTS\18040\_EBMUD\_Mokelumne\AppendixA\_v4.mxd PG 7/17/2019

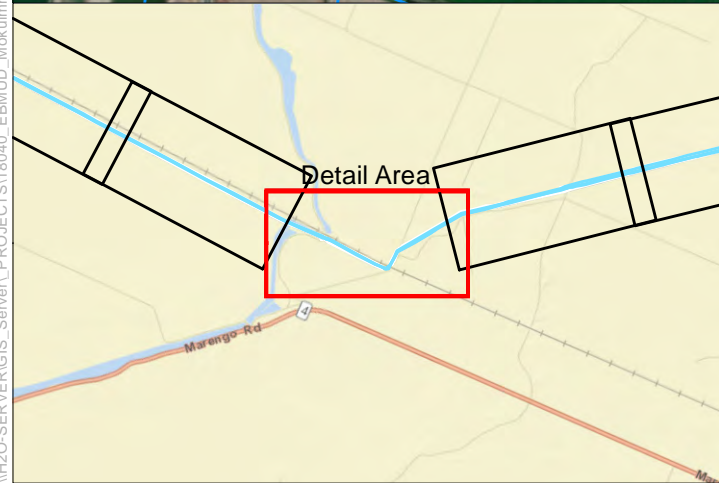


- Maintenance Sites
- ⊕ Stationing
- Creeks
- Water Bodies
- EBMUD Properties
- CDFW Region Boundary
- County Boundary

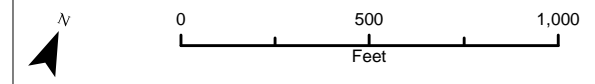
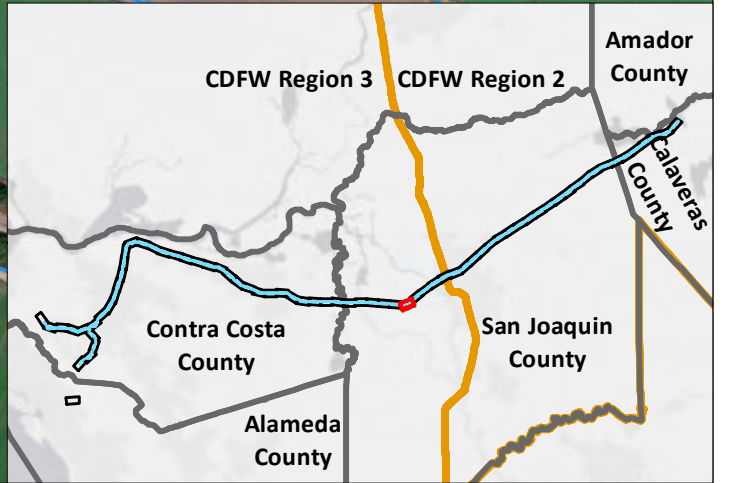
Prepared by:  
  
 Prepared for:  
 EBMUD



\NH20-SERVER\GIS\_Server\PROJECTS\18040\_EBMUD\_Mokelumne\AppendixA\_v4.mxd PG 7/17/2019



Basemap Sources: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community  
 Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS,



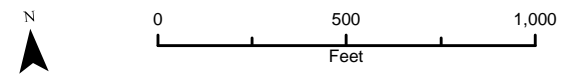
- Maintenance Sites
- ⊕ Stationing
- Creeks
- Water Bodies
- EBMUD Properties
- CDFW Region Boundary
- County Boundary

Prepared by:  
  
 Prepared for:  
 EBMUD



V:\H2O-SERVER\GIS\_Server\PROJECTS\18040\_EBMUD\_Mokelumne\AppendixA\_v4.mxd PG 7/17/2019

Basemap Sources: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community  
 Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS,



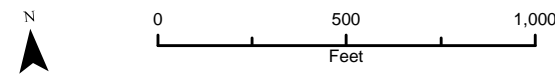
- Maintenance Sites
- ⊕ Stationing
- Creeks
- Water Bodies
- EBMUD Properties
- CDFW Region Boundary
- County Boundary

Prepared by:  
  
 Prepared for:  
 EBMUD



VH20-SERVERIGIS\_Server1\_PROJECTS\18040\_EBMUD\_Mokelumne\AppendixA\_v4.mxd PG 7/17/2019

Basemap Sources: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community  
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS,

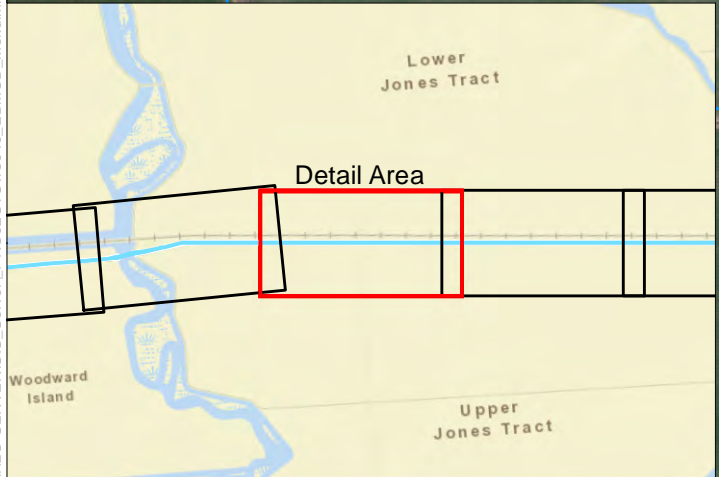


- Maintenance Sites
- ⊕ Stationing
- Creeks
- Water Bodies
- EBMUD Properties
- CDFW Region Boundary
- County Boundary

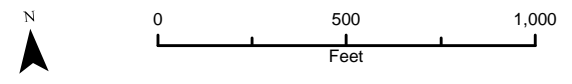
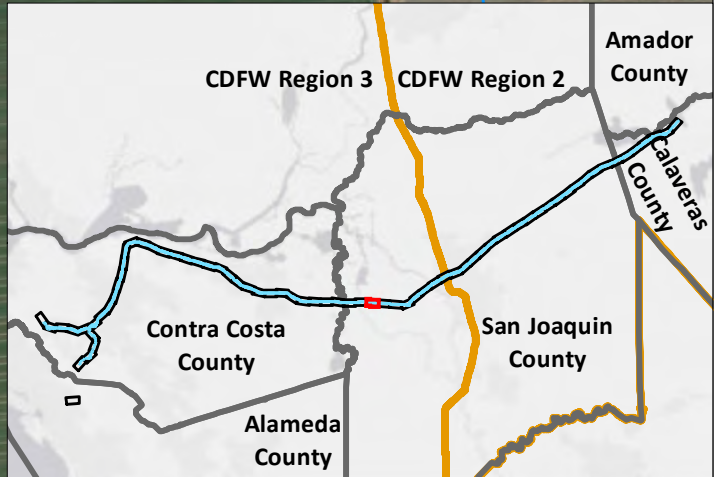
Prepared by:  
  
 Prepared for:  
 EBMUD



VH20-SERVERIGIS\_ServerL\_PROJECTS\18040\_EBMUD\_Mokelumne\AppendixA\_v4.mxd PG 7/17/2019



Basemap Sources: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community  
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS,



- Maintenance Sites
- ⊕ Stationing
- Creeks
- Water Bodies
- EBMUD Properties
- CDFW Region Boundary
- County Boundary

Prepared by:  
  
 Prepared for:  
 EBMUD



\\H2O-SERVER\GIS\_Server\PROJECTS\18040\_EBMUD\_Mokelumne\AppendixA\_v4.mxd PG 7/17/2019



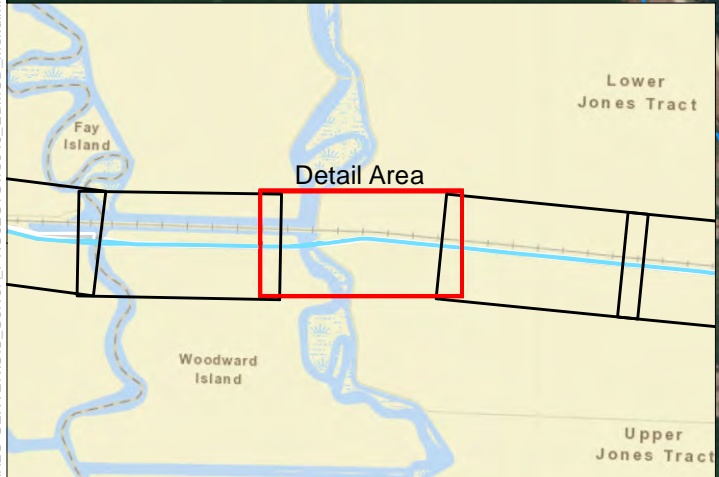
104: Middle River Downstream

103: Middle River Upstream

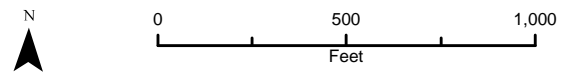
102:

101:

100:



Basemap Sources: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community  
 Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS,

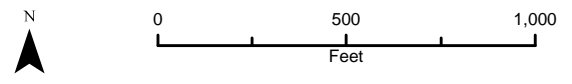


- Maintenance Sites
- Stationing
- Creeks
- Water Bodies
- EBMUD Properties
- CDFW Region Boundary
- County Boundary

Prepared by:  
  
 Prepared for:  
 EBMUD



V:\H2O-SERVER\GIS\_Server\PROJECTS\18040\_EBMUD\_Mokelumne\AppendixA\_v4.mxd PG 7/17/2019



- Maintenance Sites
- ⊕ Stationing
- Creeks
- Water Bodies
- EBMUD Properties
- CDFW Region Boundary
- County Boundary

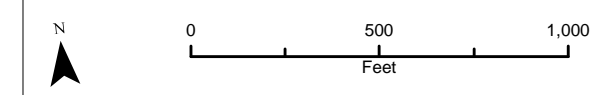
Prepared by:  
 Horizon  
 WATER AND ENVIRONMENT  
 Prepared for:  
 EBMUD



Basemap Sources: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community  
 Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS,

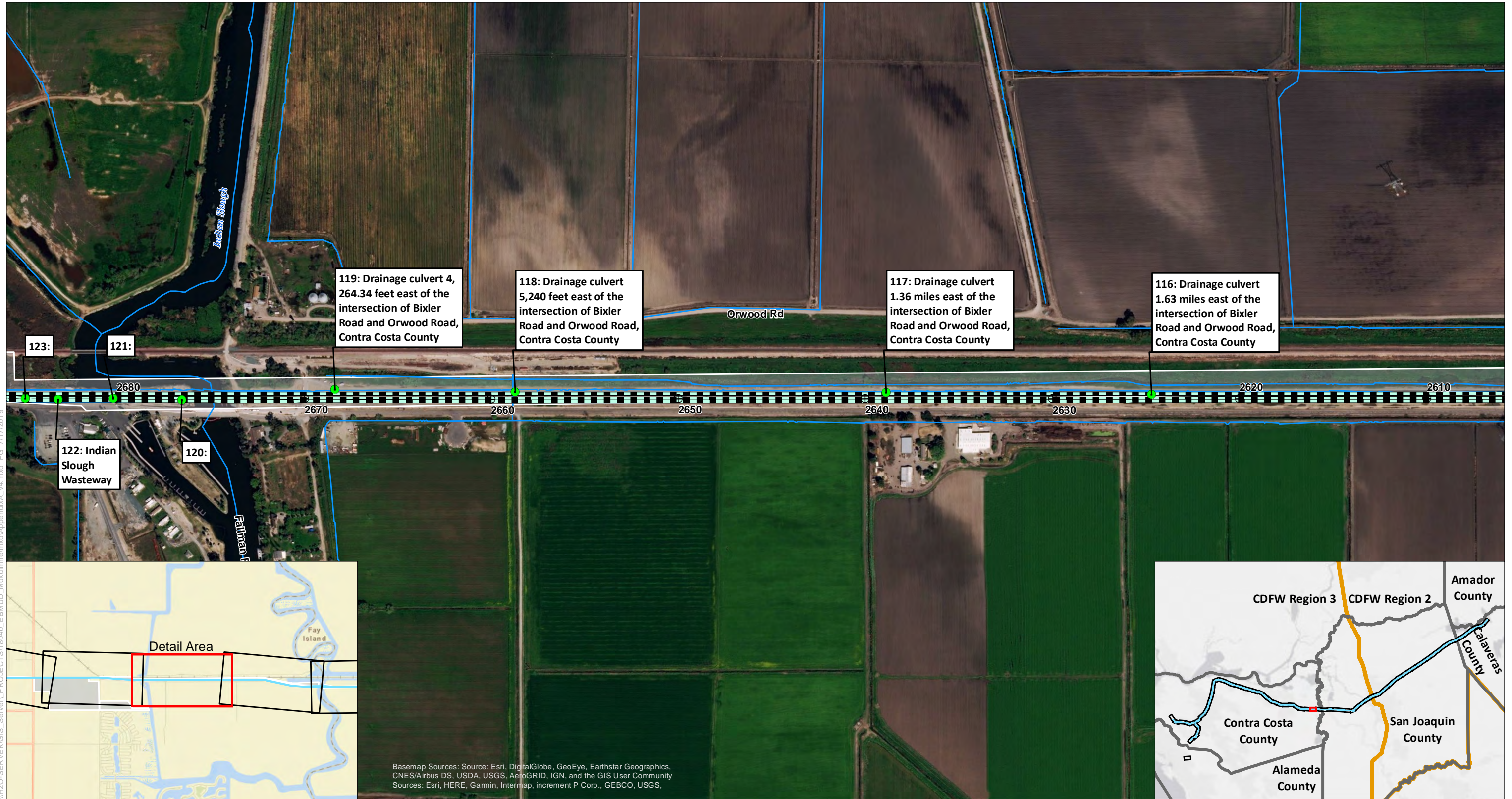
- 110: Drainage channel/culvert 3.23 miles east of the intersection of Bixler Road and Orwood Road, unincorporated Contra Costa County
- 111: Drainage channel/culvert 3.215 miles east of the intersection of Bixler Road and Orwood Road, unincorporated Contra Costa County
- 112:
- 113: Drainage channel on the east side of Orwood Tract, unincorporated Contra Costa County;
- 114:
- 115: Drainage channel immediately west of Site 13;
- 109: Old River Downstream

VH20-SERVERIGIS\_ServerL\_PROJECTS\18040\_EBMUD\_Mokelumne\AppendixA\_v4.mxd PG 7/17/2019



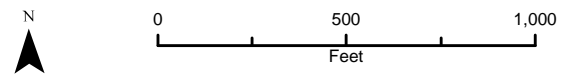
- Maintenance Sites
- ⊕ Stationing
- Creeks
- Water Bodies
- EBMUD Properties
- ▭ CDFW Region Boundary
- ▭ County Boundary

Prepared by:  
**Horizon**  
 WATER AND ENVIRONMENT  
 Prepared for:  
 EBMUD



Basemap Sources: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community  
 Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS,

VH20-SERVERIGIS\_Server1\_PROJECTS\18040\_EBMUD\_Mokelumne\AppendixA\_v4.mxd PG 7/17/2019



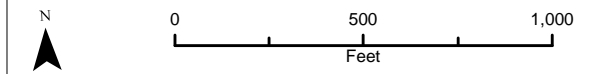
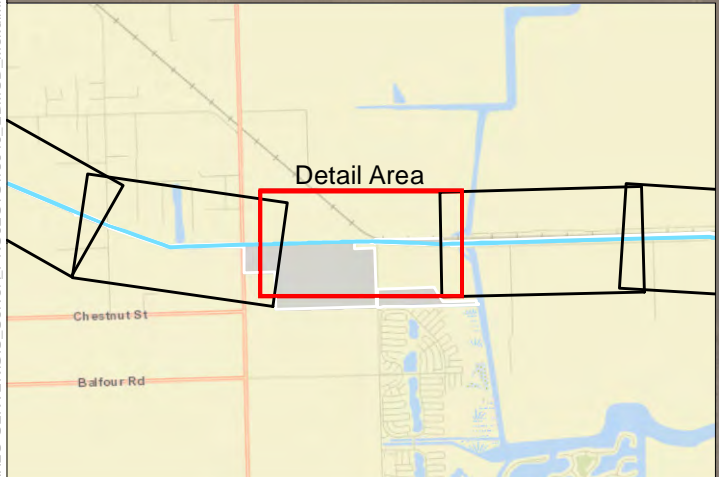
- Maintenance Sites
- ⊕ Stationing
- Creeks
- Water Bodies
- EBMUD Properties
- CDFW Region Boundary
- County Boundary

Prepared by:  
  
 Prepared for:  
 EBMUD

\\H2O-SERVER\GIS\_Server\PROJECTS\18040\_EBMUD\_Mokelumne\AppendixA\_v4.mxd PG 7/17/2019



Basemap Sources: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community  
 Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS,

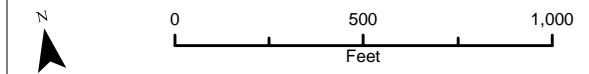
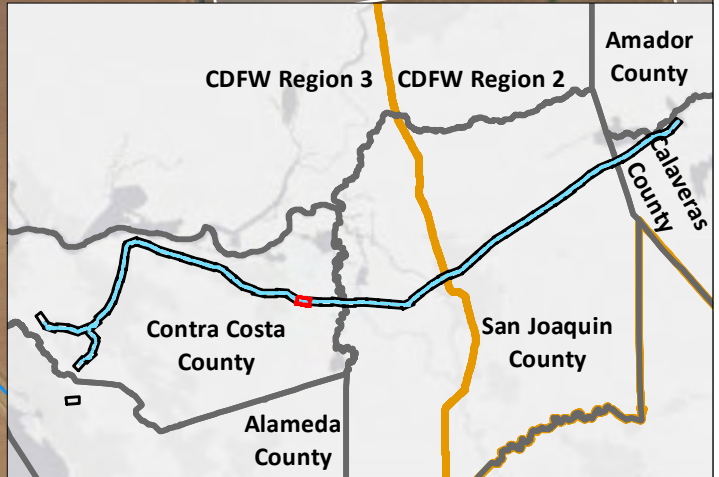


Prepared by:  
**Horizon**  
 WATER AND ENVIRONMENT  
 Prepared for:  
 EBMUD

- Maintenance Sites
- ⊕ Stationing
- Creeks
- Water Bodies
- EBMUD Properties
- CDFW Region Boundary
- County Boundary



Basemap Sources: Source: Esri, DigitalGlobe, GeoEye, Earthstar-Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community  
 Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS,



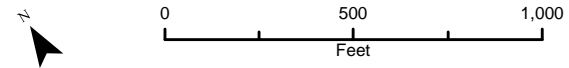
- Maintenance Sites
- ⊕ Stationing
- Creeks
- Water Bodies
- EBMUD Properties
- CDFW Region Boundary
- County Boundary

Prepared by:  
  
 Prepared for:  
 EBMUD



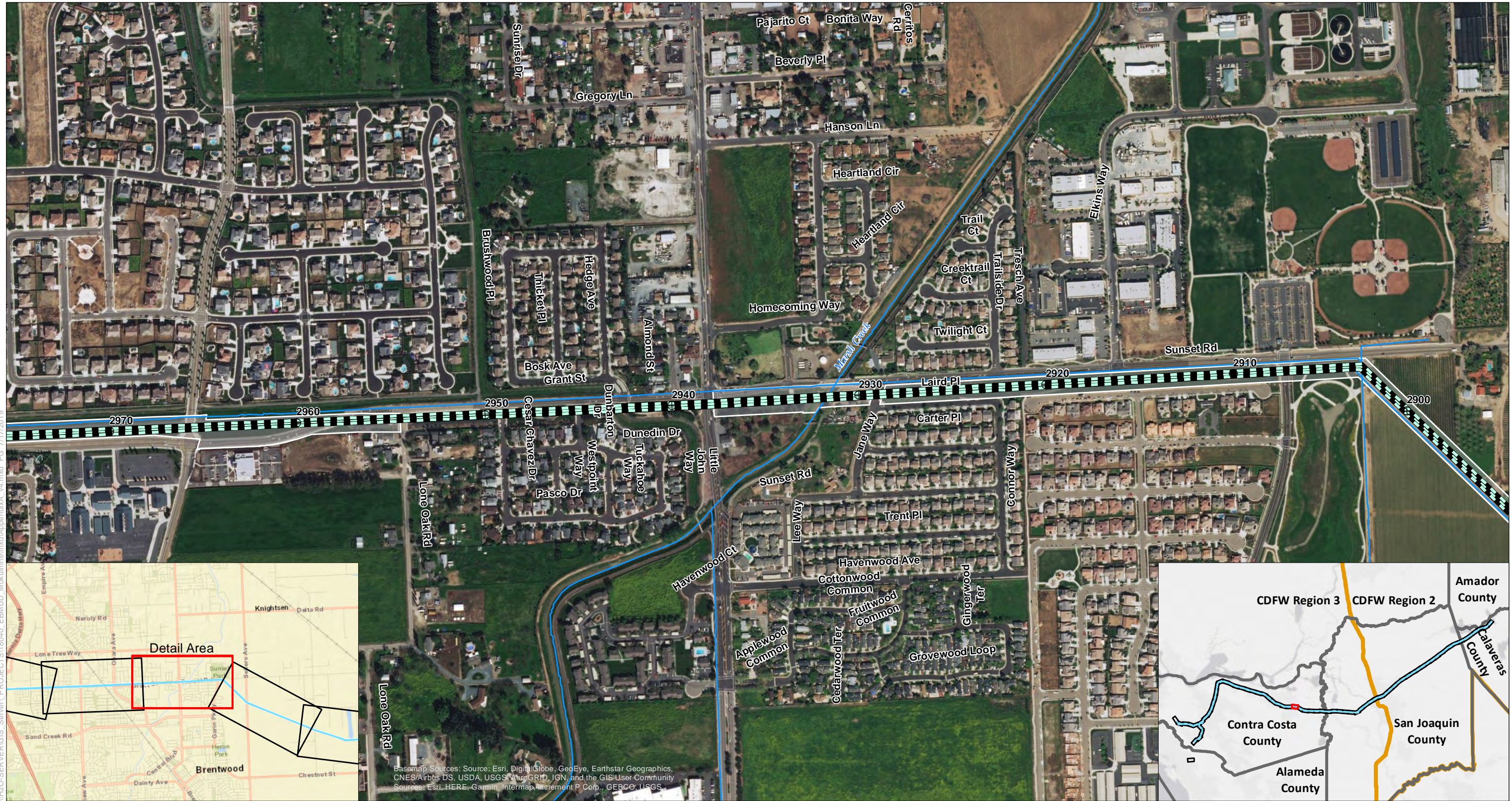
Basemap Sources: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community  
 Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS,

V:\H2O-SERVER\GIS\_Server\PROJECTS\18040\_EBMUD\_Mokelumne\AppendixA\_v4.mxd PG 7/17/2019

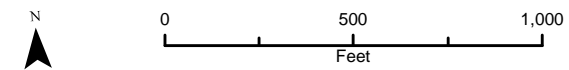


Prepared by:  
**Horizon**  
 WATER AND ENVIRONMENT  
 Prepared for:  
 EBMUD

- Maintenance Sites
- EBMUD Properties
- ⊕ Stationing
- CDFW Region Boundary
- Creeks
- County Boundary
- Water Bodies



VH20-SERVER\GIS\_Server\PROJECTS\18040\_EBMUD\_Mokelumne\AppendixA\_v4.mxd PG 7/17/2019



Prepared by:  
 Horizon  
 WATER AND ENVIRONMENT  
 Prepared for:  
 EBMUD

- Maintenance Sites
- ⊕ Stationing
- Creeks
- Water Bodies
- EBMUD Properties
- CDFW Region Boundary
- County Boundary

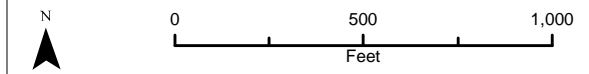




126: Drainage channel north of the intersection of Grant Street and Minnesota Avenue, City of Brentwood, Contra Costa County;

Base map Sources: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community  
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS,

VH20-SERVER\GIS\_Server\PROJECTS\18040\_EBMUD\_Mokelumne\AppendixA\_v4.mxd PG 7/17/2019



Prepared by:  
 Horizon  
 WATER AND ENVIRONMENT  
 Prepared for:  
 EBMUD

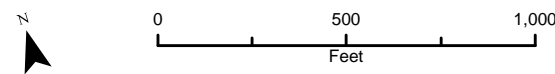
- Maintenance Sites
- ⊕ Stationing
- Creeks
- Water Bodies
- EBMUD Properties
- CDFW Region Boundary
- County Boundary





\NH20-SERVER\GIS\_Server\PROJECTS\18040\_EBMUD\_Mokelumne\AppendixA\_v4.mxd PG 7/17/2019

Basemap Sources: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community  
 Sources: Esri, HERE, Garmin, Intermap, Increment P Corp., GEBCO, USGS,



- Maintenance Sites
- ⊕ Stationing
- Creeks
- Water Bodies
- EBMUD Properties
- CDFW Region Boundary
- County Boundary

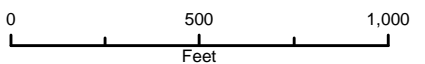
Prepared by:  
  
 Prepared for:  
 EBMUD



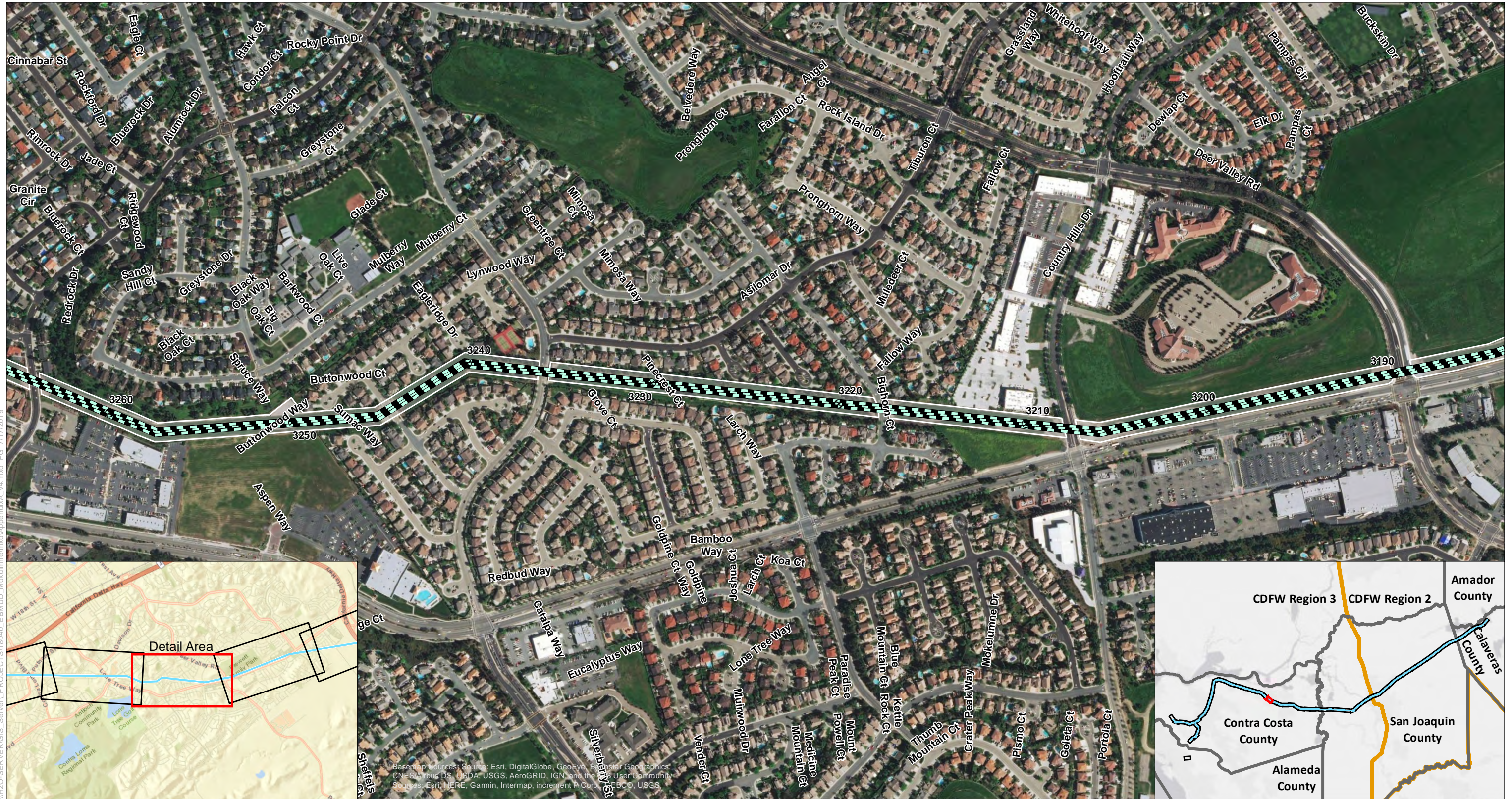
127: Drainage culvert 880 feet west of the intersection of Lone Tree way and Hillcrest Ave, City of Antioch, Contra Costa County

Detail Area

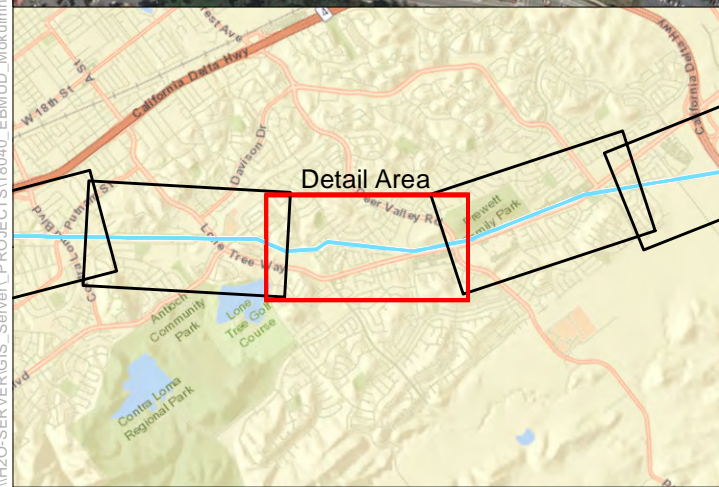
- Maintenance Sites
- ⊕ Stationing
- Creeks
- Water Bodies
- EBMUD Properties
- CDFW Region Boundary
- County Boundary



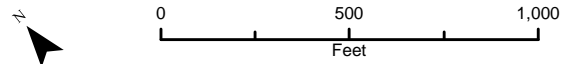
Prepared by:  
 Horizon  
 WATER AND ENVIRONMENT  
 Prepared for:  
 EBMUD



\NH20-SERVER\GIS\_Server\PROJECTS\18040\_EBMUD\_Mokelumne\AppendixA\_v4.mxd PG 7/17/2019

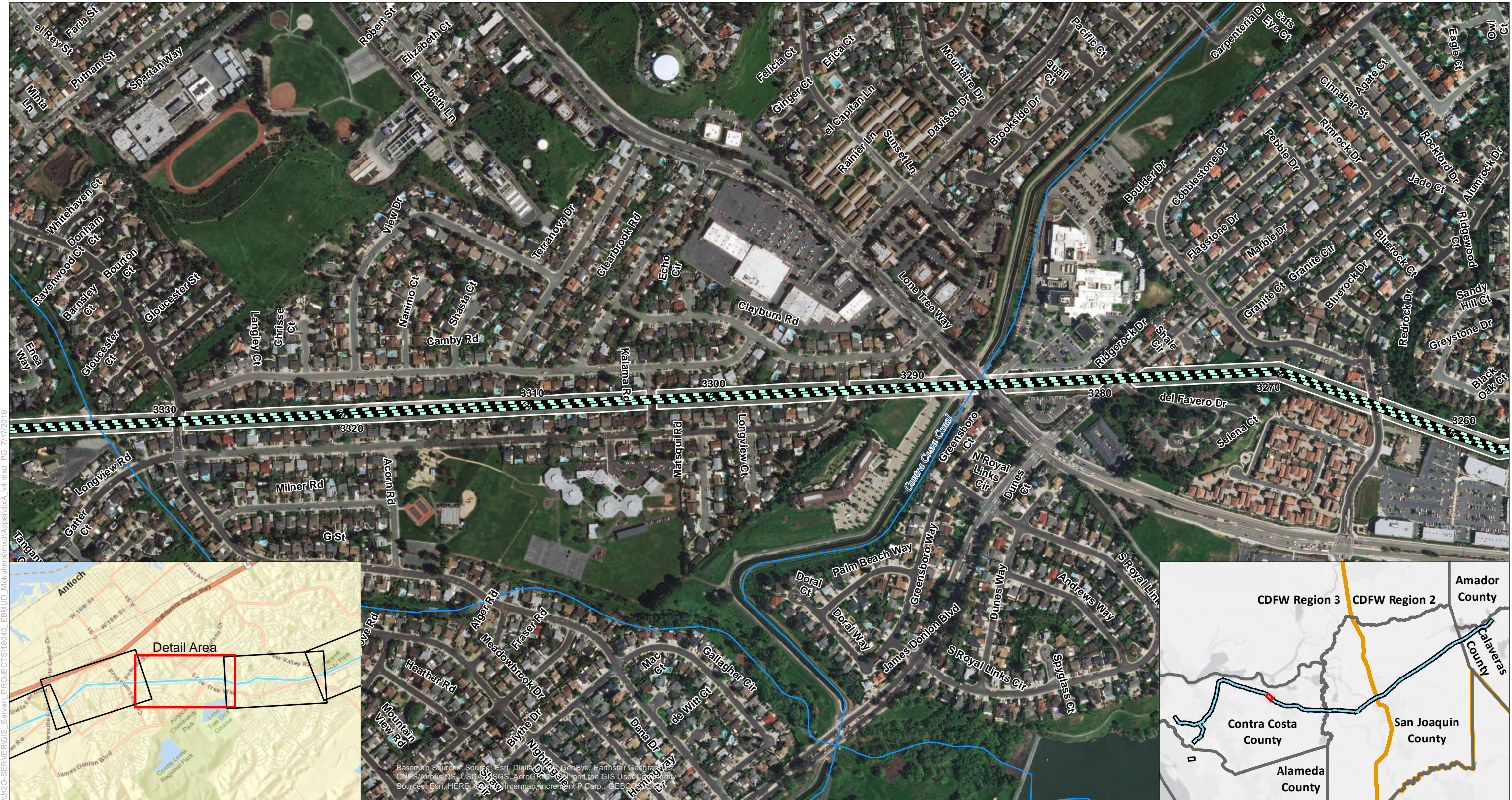


Basemap Sources: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community  
 Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS

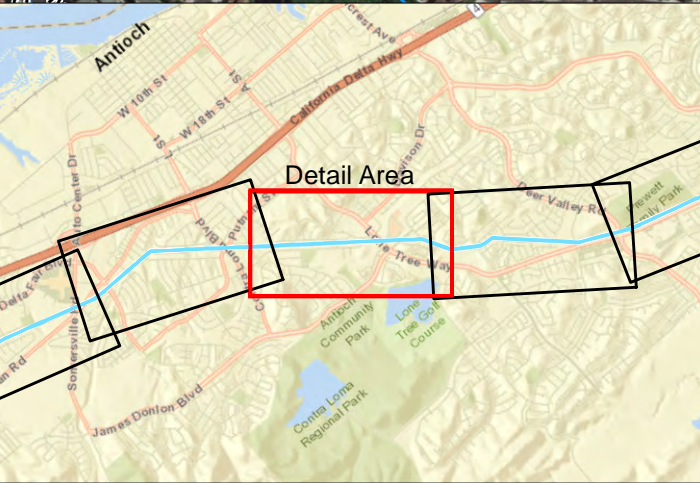


Prepared by:  
**Horizon**  
 WATER AND ENVIRONMENT  
 Prepared for:  
 EBMUD

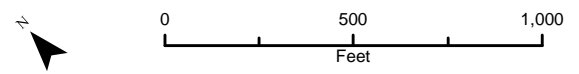
- Maintenance Sites
- ⊕ Stationing
- Creeks
- Water Bodies
- EBMUD Properties
- CDFW Region Boundary
- County Boundary



\NH20-SERVER\GIS\_Server\PROJECTS\18040\_EBMUD\_Mokelumne\AppendixA\_v4.mxd PG 7/17/2019

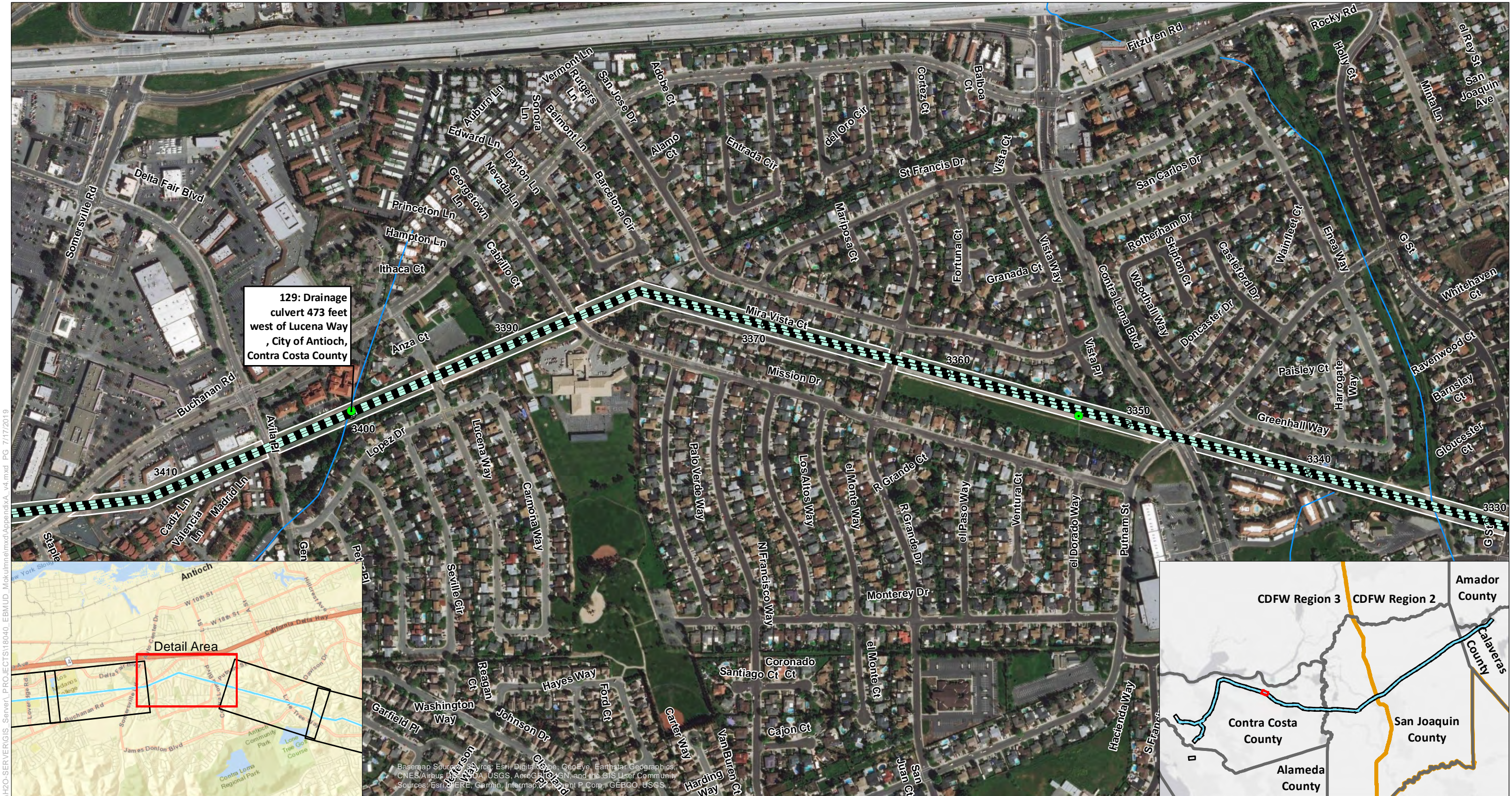


Basemap Sources: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community  
 Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO



Prepared by:  
 HORIZON WATER AND ENVIRONMENT  
 Prepared for:  
 EBMUD

- Maintenance Sites
- ⊕ Stationing
- Creeks
- Water Bodies
- EBMUD Properties
- CDFW Region Boundary
- County Boundary



129: Drainage culvert 473 feet west of Lucena Way, City of Antioch, Contra Costa County

3410

3400

3390

3370

3360

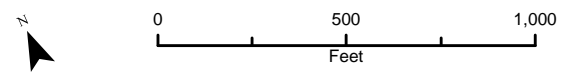
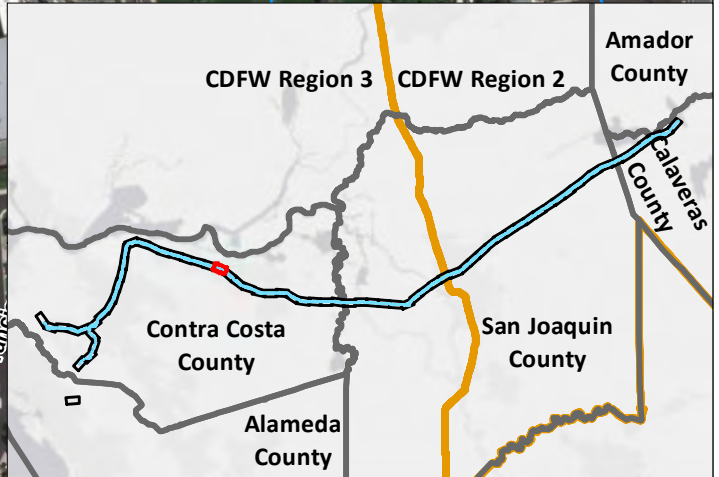
3350

3340

3330

V:\H2O-SERVER\GIS\Server\PROJECTS\18040\_EBMUD\_Mokelumne\AppendixA\_v4.mxd PG 7/17/2019

Basemap Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus, USDA, USGS, AeroGRID, IGN, and the GIS User Community  
Sources: Esri, HERE, Garmin, Intermap, DeLorme, P Corp., GEBCO, USGS



- Maintenance Sites
- ⊕ Stationing
- Creeks
- Water Bodies
- EBMUD Properties
- CDFW Region Boundary
- County Boundary



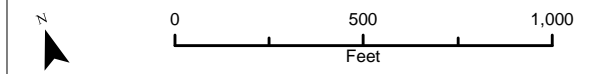
**132: Drainage channel**  
0.2 miles east of Gladstone Drive and north of Norine Drive, City of Pittsburg, Contra Costa County;

**131: Drainage channel**  
0.35 miles east of Gladstone Drive and north of Norine Drive, City of Pittsburg, Contra Costa County;

**130: Drainage culvert on Standard Oil Rd. (837 feet west of Desrys Blvd), City of Pittsburg, Contra Costa County**



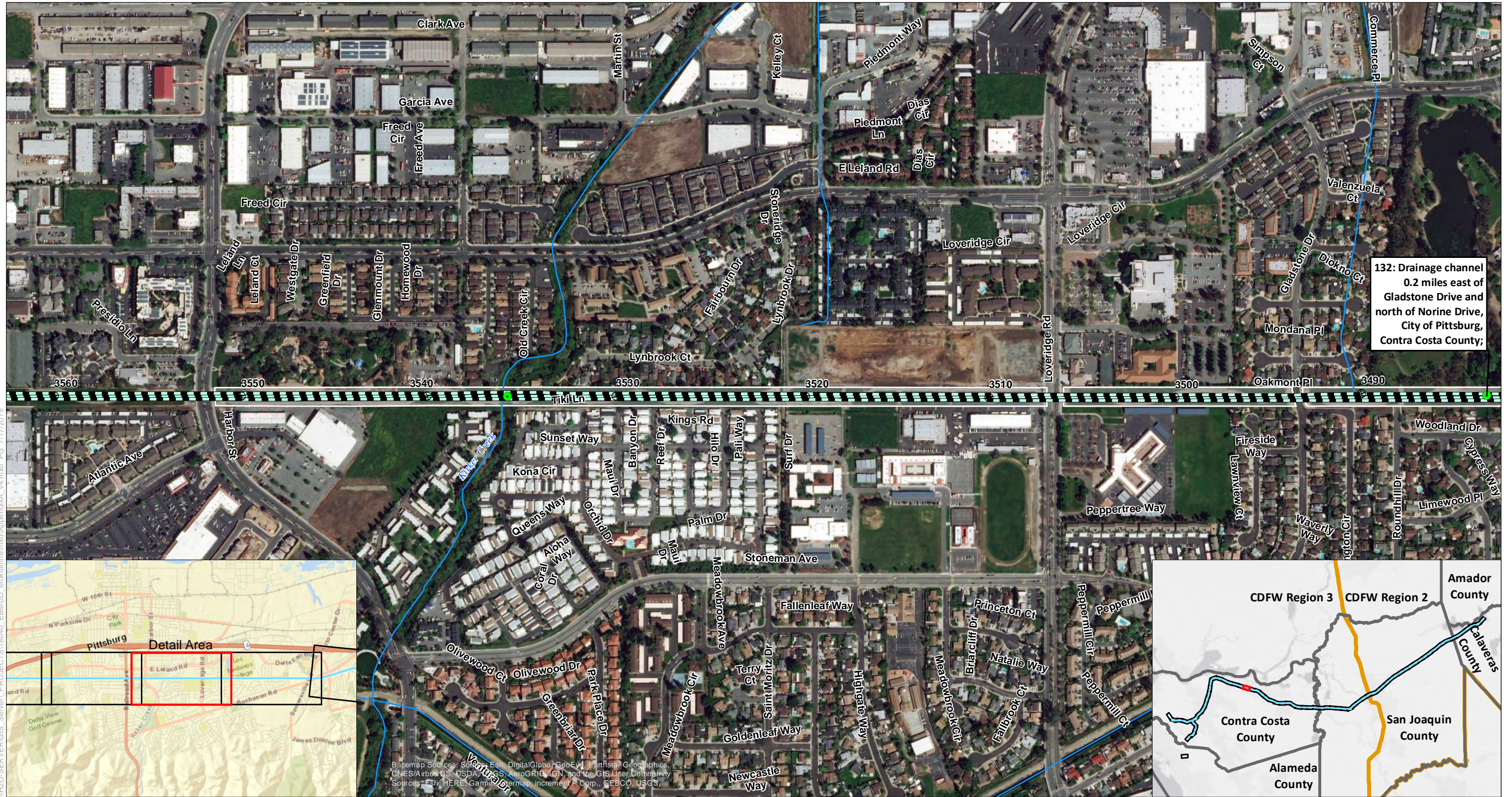
Basemap Sources: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community  
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS.



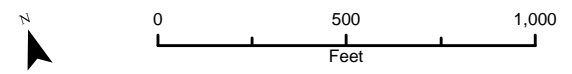
- Maintenance Sites
- ⊕ Stationing
- Creeks
- Water Bodies
- EBMUD Properties
- CDFW Region Boundary
- County Boundary

Prepared by:  
**Horizon**  
WATER AND ENVIRONMENT  
Prepared for:  
EBMUD

**Mokelumne Aqueduct System  
Routine Maintenance Project**



VH20-SERVER\GIS\_Server\PROJECTS\18040\_EBMUD\_Mokelumne\AppendixA\_v4.mxd PG 7/17/2019

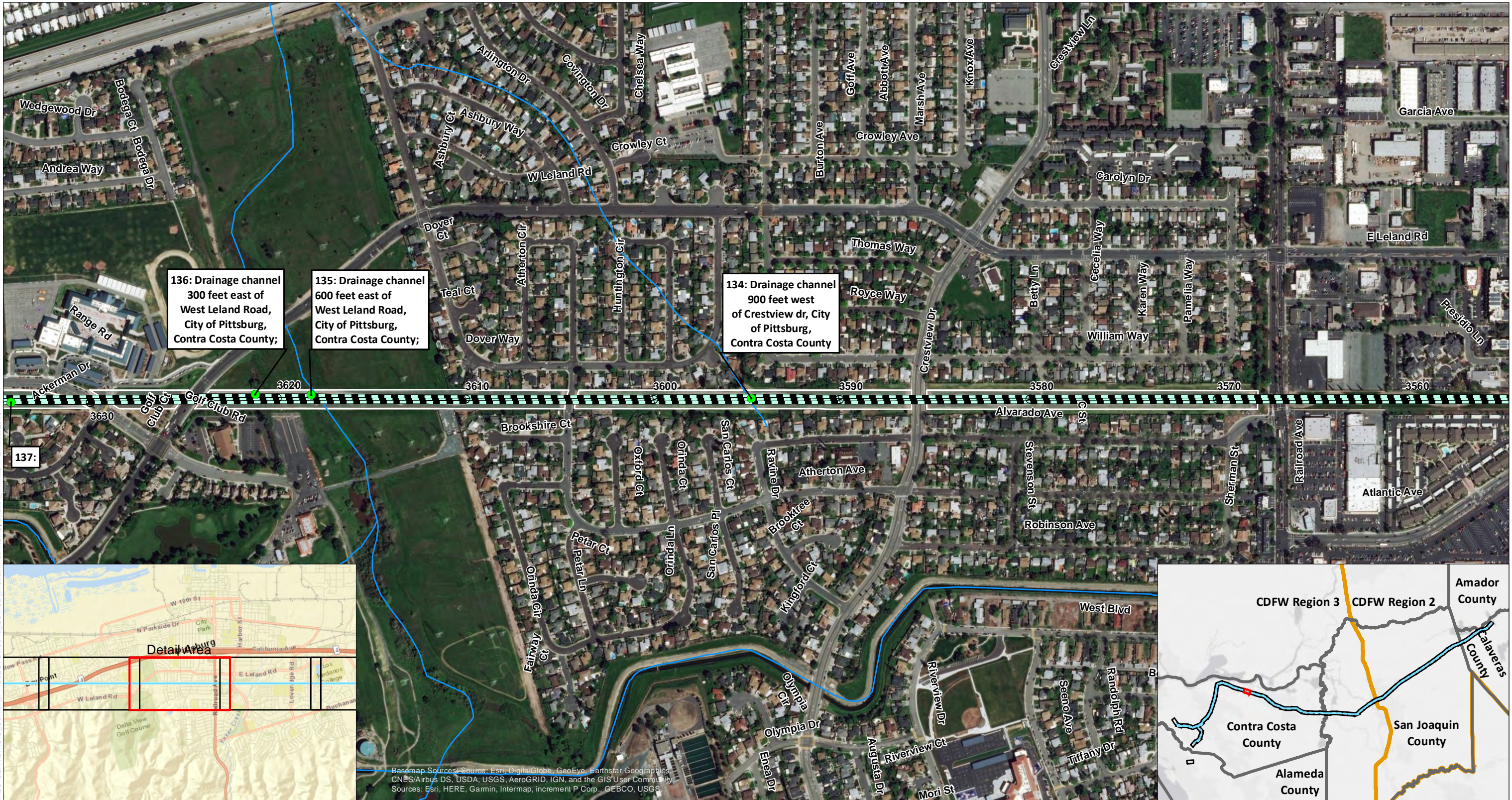


- Maintenance Sites
- ⊕ Stationing
- Creeks
- Water Bodies
- EBMUD Properties
- CDFW Region Boundary
- County Boundary

Prepared by:  
**Horizon**  
WATER AND ENVIRONMENT  
Prepared for:  
EBMUD

**Mokelumne Aqueduct System**  
Routine Maintenance Project





**136: Drainage channel**  
300 feet east of  
West Leland Road,  
City of Pittsburg,  
Contra Costa County;

**135: Drainage channel**  
600 feet east of  
West Leland Road,  
City of Pittsburg,  
Contra Costa County;

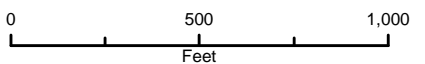
**134: Drainage channel**  
900 feet west  
of Crestview dr, City  
of Pittsburg,  
Contra Costa County

**137:**

**Detail Area**

Basemap Sources: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community  
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS

- Maintenance Sites
- ⊕ Stationing
- Creeks
- Water Bodies
- EBMUD Properties
- CDFW Region Boundary
- County Boundary



Prepared by:  
**Horizon**  
WATER AND ENVIRONMENT  
Prepared for:  
EBMUD



140: Drainage channel near the western terminus of Wedgwood Drive at Hwy 4, City of Pittsburg, Contra Costa County;

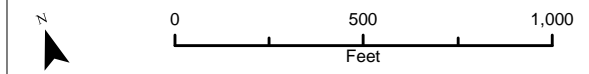
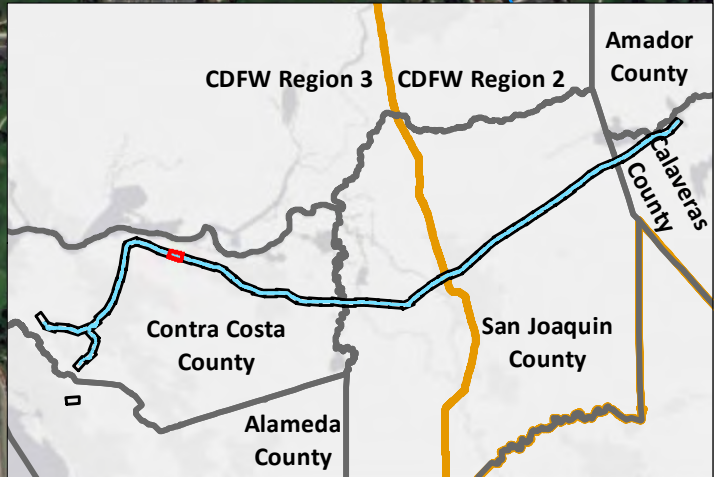
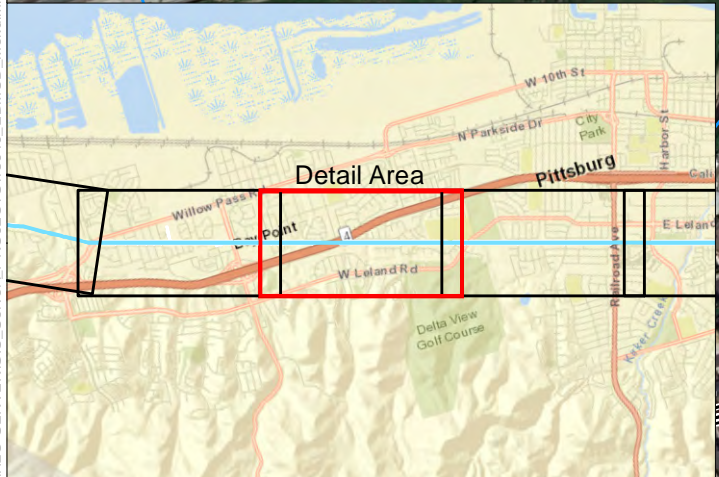
139: Drainage channel near the western terminus of Birchwood Drive, City of Pittsburg, Contra Costa County;

138: Drainage culvert 325 feet west of Ackerman Dr, City of Pittsburg, Contra Costa County

141: Drainage channel east of Franklin Avenue near the southern terminus of Inglewood Street at Hwy 4, City of Bay Point, Contra Costa County;

137:

V:\H2O-SERVER\GIS\Server\PROJECTS\18040\_EBMUD\_Mokelumne\AppendixA\_v4.mxd PG 7/17/2019



- Maintenance Sites
- ⊕ Stationing
- Creeks
- Water Bodies
- EBMUD Properties
- CDFW Region Boundary
- County Boundary

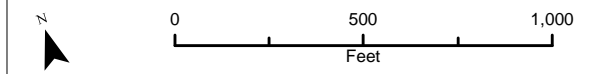
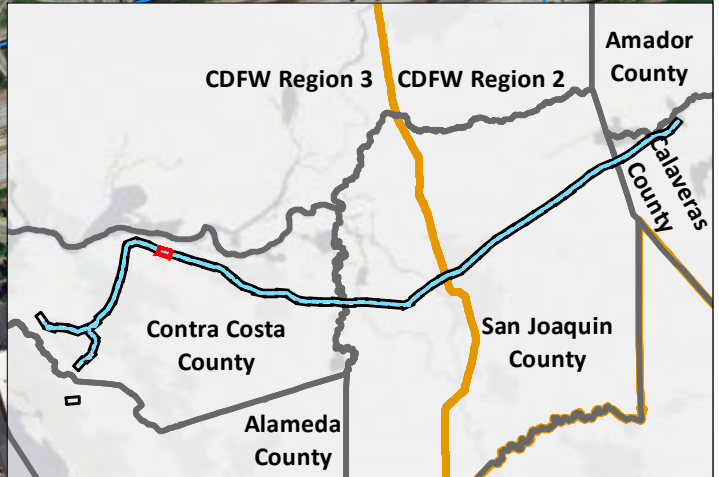
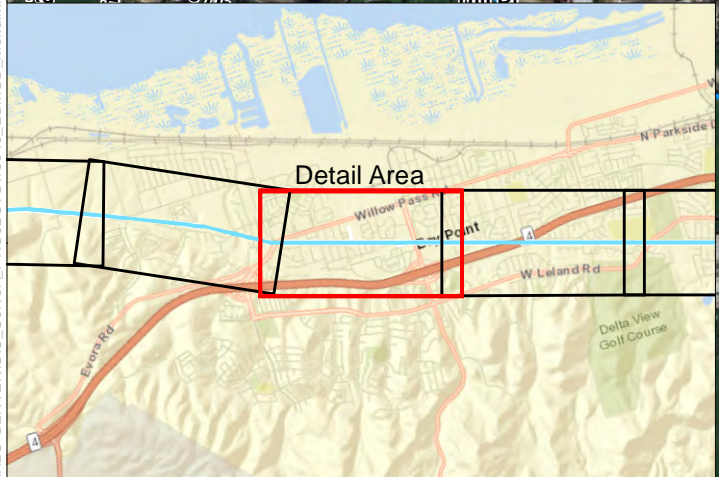
Prepared by:  
 Horizon  
 WATER AND ENVIRONMENT  
 Prepared for:  
 EBMUD



142: Drainage culvert 680 feet west of Bailey Rd, City of Pittsburg, Contra Costa County

Basemap Sources: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community  
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS

VH20-SERVER\GIS\_Server\PROJECTS\18040\_EBMUD\_Mokelumne\AppendixA\_v4.mxd PG 7/17/2019



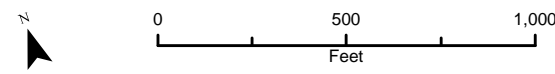
- Maintenance Sites
- ⊕ Stationing
- Creeks
- Water Bodies
- EBMUD Properties
- CDFW Region Boundary
- County Boundary



VH20-SERVERIGIS\_Server1\_PROJECTS\18040\_EBMUD\_Mokelumne\AppendixA\_v4.mxd PG 7/17/2019



Basemap Sources: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community  
 Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS,



- Maintenance Sites
- ⊕ Stationing
- Creeks
- Water Bodies
- EBMUD Properties
- CDFW Region Boundary
- County Boundary

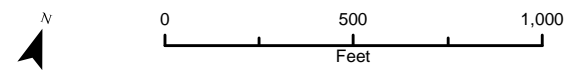
Prepared by:  
  
 Prepared for:  
 EBMUD

\\H2O-SERVER\GIS\_Server\PROJECTS\18040\_EBMUD\_Mokelumne\AppendixA\_v4.mxd PG 7/17/2019



149: Drainage channel  
1.6 miles east of Norman  
Avenue, City of Clyde,  
Contra Costa County.

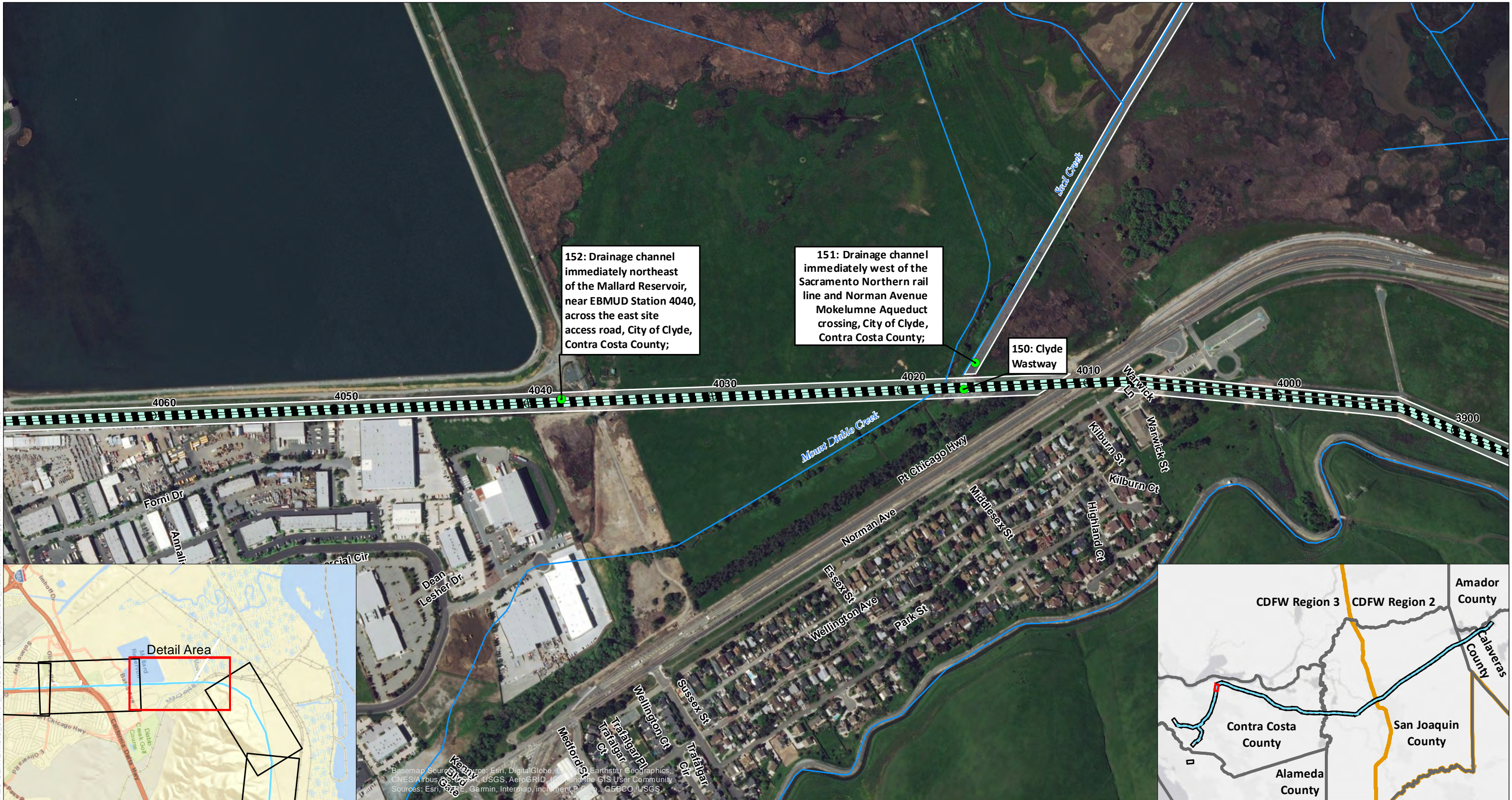
Basemap Sources: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community  
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS,



Prepared by:  
**Horizon**  
WATER AND ENVIRONMENT  
Prepared for:  
EBMUD

- Maintenance Sites
- ⊕ Stationing
- Creeks
- Water Bodies
- EBMUD Properties
- CDFW Region Boundary
- County Boundary

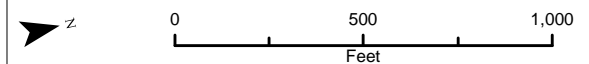
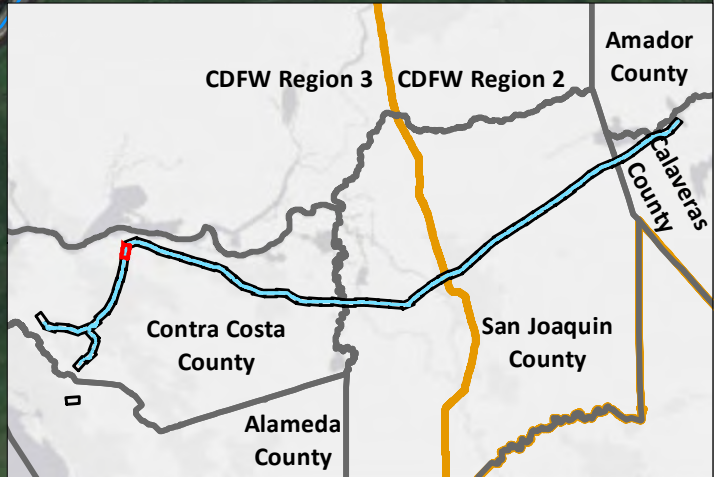
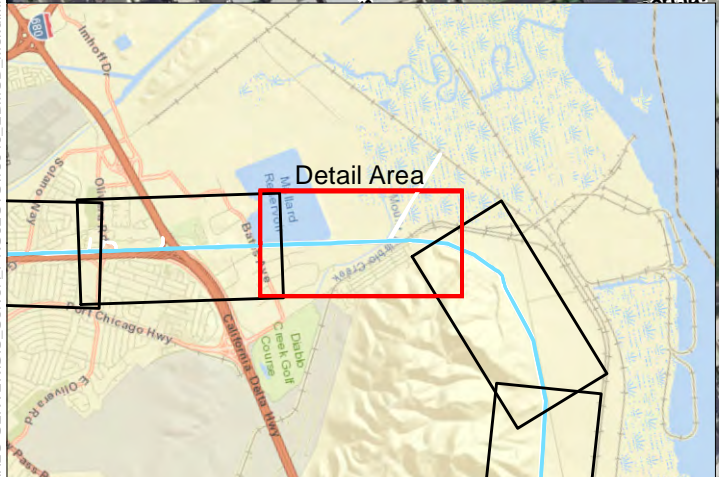
V:\H2O-SERVER\GIS\_Server\PROJECTS\18040\_EBMUD\_Mokelumne\AppendixA\_v4.mxd PG 7/17/2019



152: Drainage channel immediately northeast of the Mallard Reservoir, near EBMUD Station 4040, across the east site access road, City of Clyde, Contra Costa County;

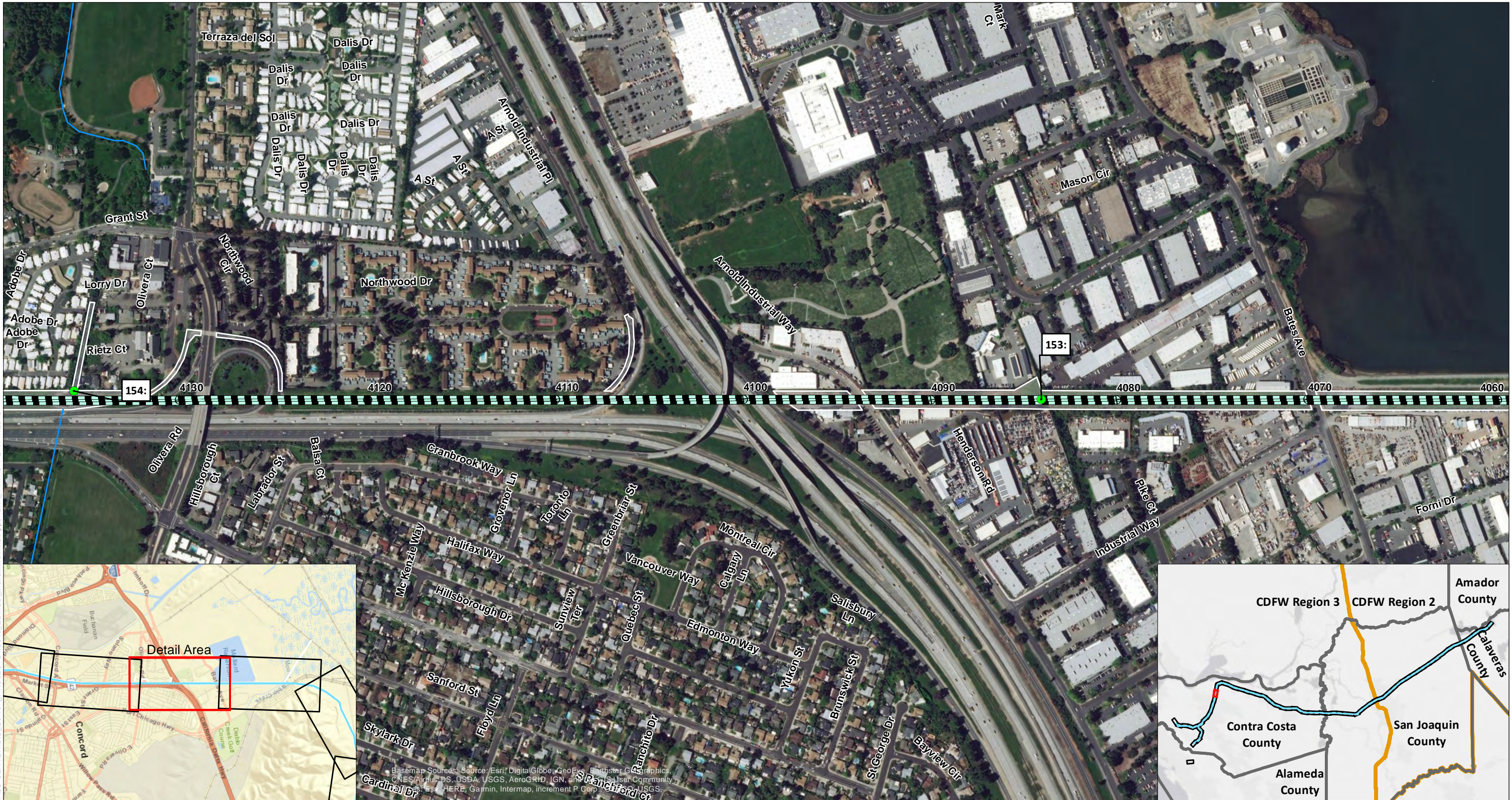
151: Drainage channel immediately west of the Sacramento Northern rail line and Norman Avenue Mokelumne Aqueduct crossing, City of Clyde, Contra Costa County;

150: Clyde Wastway

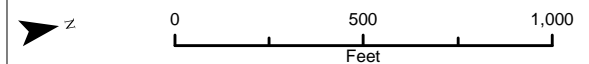


- Maintenance Sites
- ⊕ Stationing
- Creeks
- Water Bodies
- EBMUD Properties
- CDFW Region Boundary
- County Boundary

Prepared by:  
 Horizon  
 WATER AND ENVIRONMENT  
 Prepared for:  
 EBMUD



\NH20-SERVER\GIS\_Server\PROJECTS\18040\_EBMUD\_Mokelumne\AppendixA\_v4.mxd PG 7/17/2019

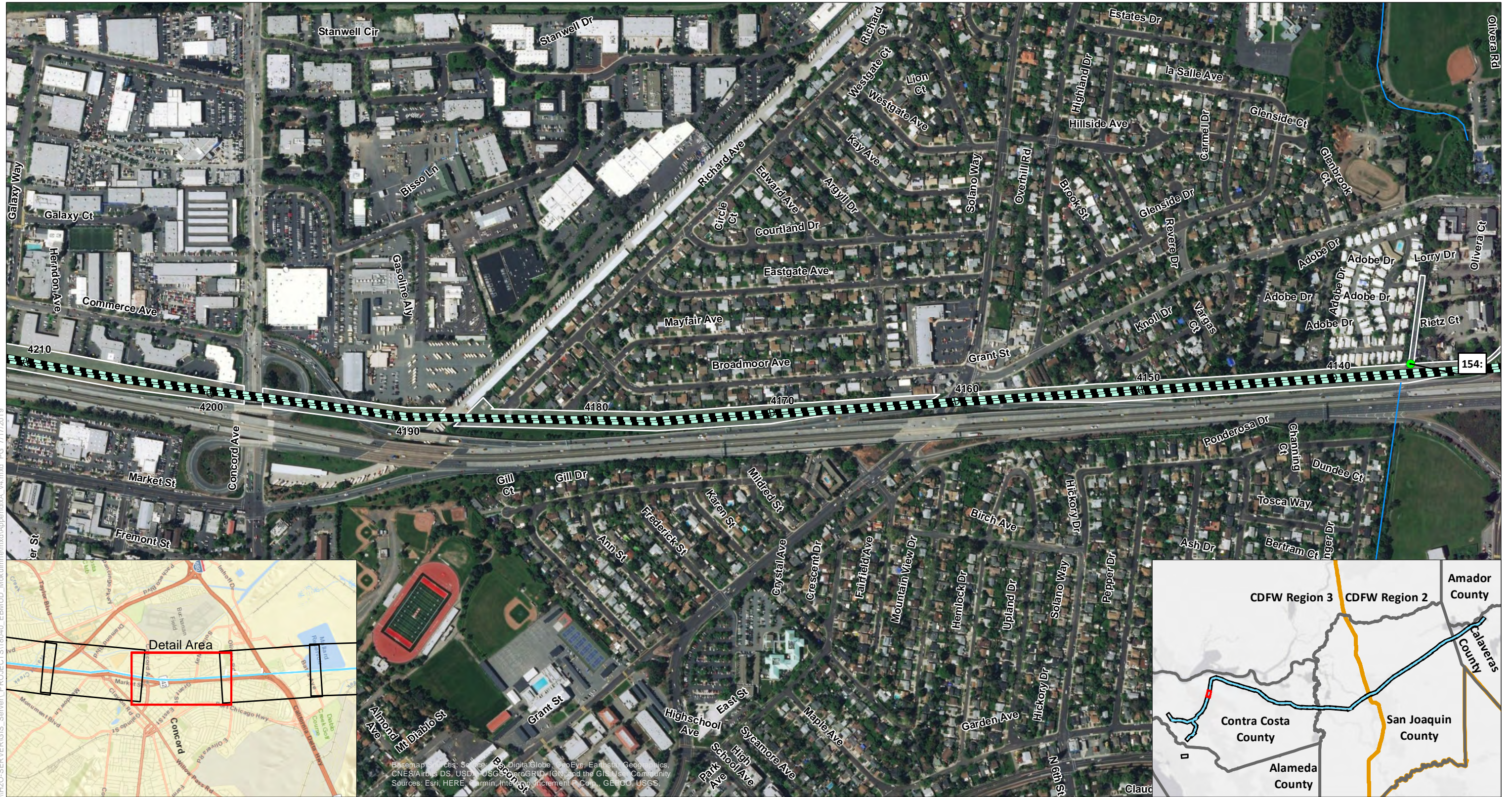


- Maintenance Sites
- ⊕ Stationing
- Creeks
- Water Bodies
- EBMUD Properties
- CDFW Region Boundary
- County Boundary

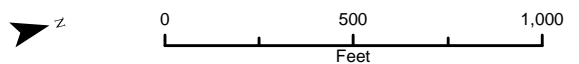
Prepared by:  
  
 Prepared for:  
 EBMUD

**Mokelumne Aqueduct System  
 Routine Maintenance Project**



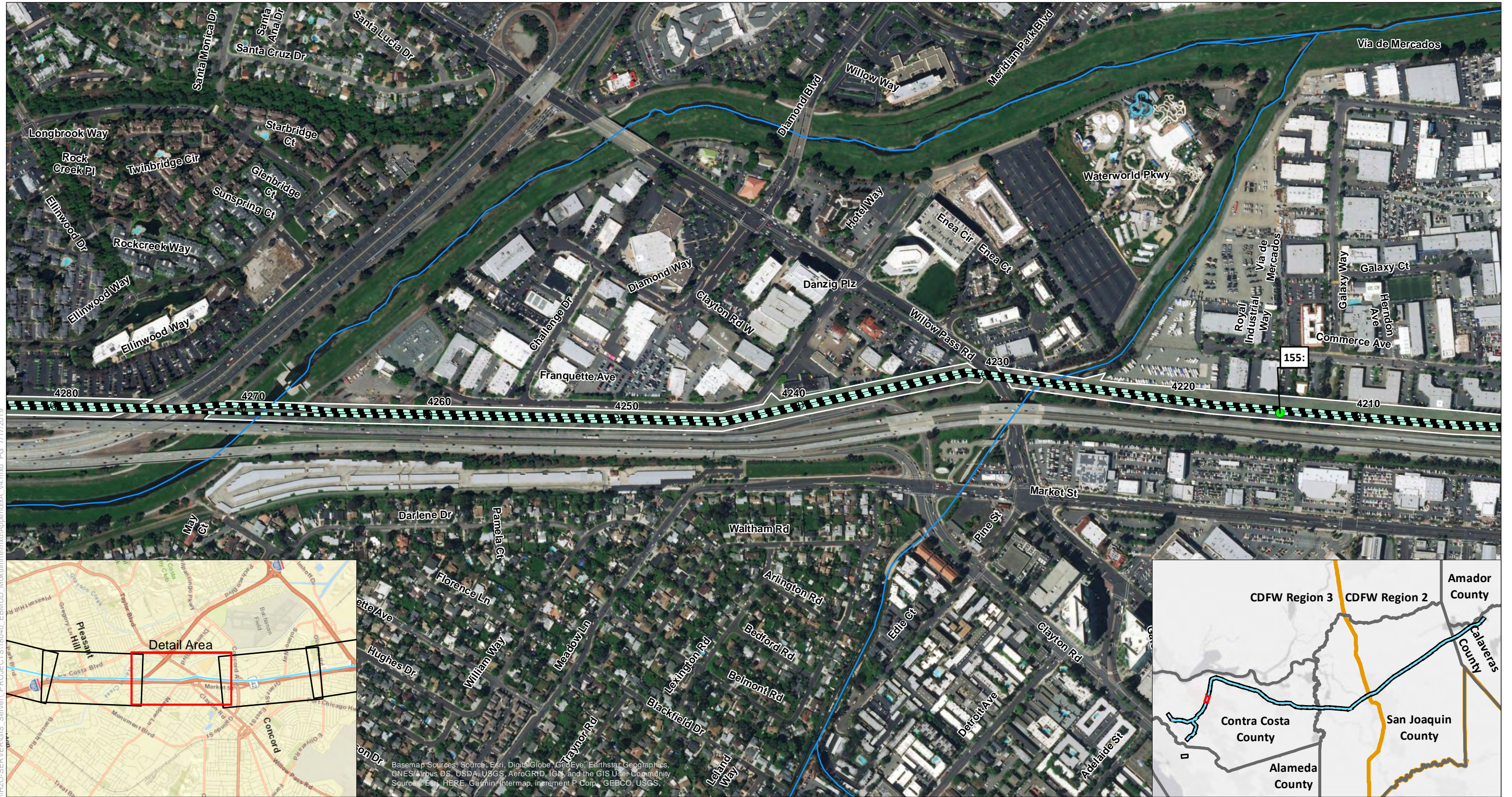


\NH20-SERVER\GIS\_Server\PROJECTS\18040\_EBMUD\_Mokelumne\AppendixA\_v4.mxd PG 7/17/2019



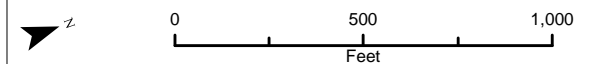
Prepared by:  
**Horizon**  
 WATER AND ENVIRONMENT  
 Prepared for:  
 EBMUD

- Maintenance Sites
- ⊕ Stationing
- Creeks
- Water Bodies
- EBMUD Properties
- CDFW Region Boundary
- County Boundary



V:\H2O-SERVER\GIS\Server\PROJECTS\18040\_EBMUD\_Mokelumne\AppendixA\_v4.mxd PG 7/17/2019

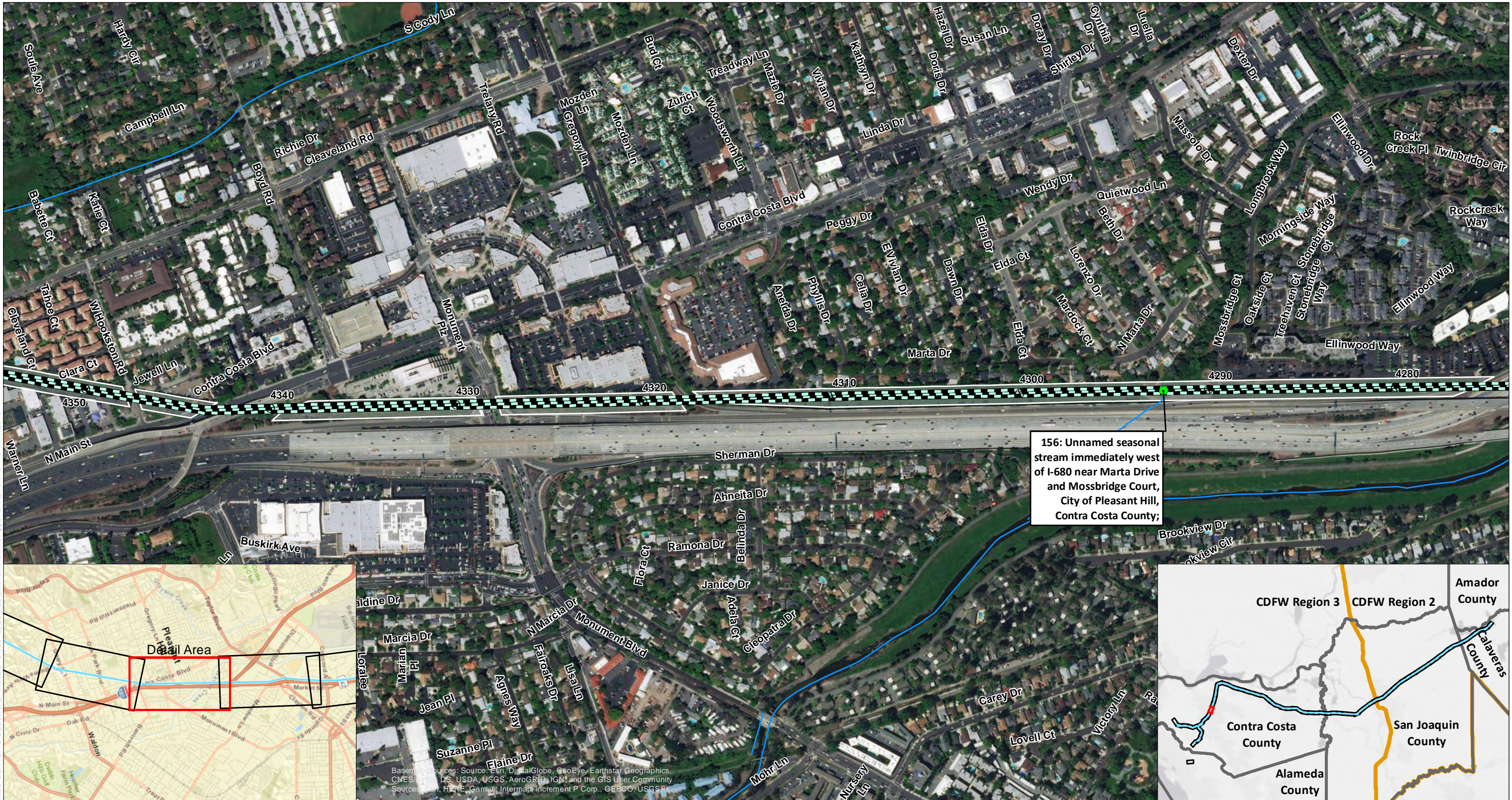
Basemap Sources: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community  
 Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS



- Maintenance Sites
- Stationing
- Creeks
- Water Bodies
- EBMUD Properties
- CDFW Region Boundary
- County Boundary

Prepared by:  
 Horizon  
 WATER AND ENVIRONMENT  
 Prepared for:  
 EBMUD

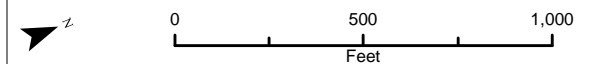
**Mokelumne Aqueduct System  
 Routine Maintenance Project**



156: Unnamed seasonal stream immediately west of I-680 near Marta Drive and Mossbridge Court, City of Pleasant Hill, Contra Costa County;

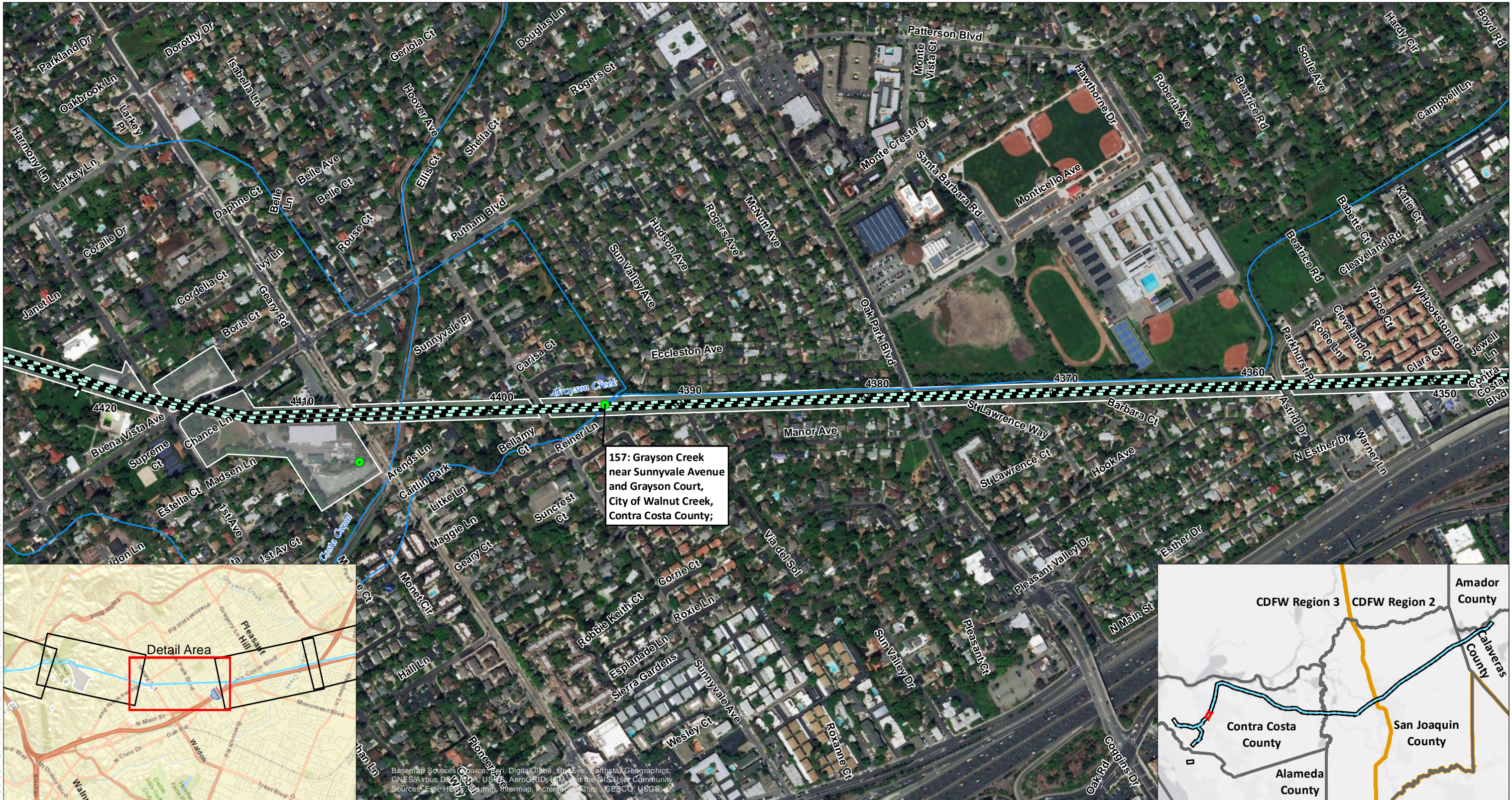
V:\H2O-SERVER\GIS\Server\PROJECTS\18040\_EBMUD\_Mokelumne\AppendixA\_v4.mxd PG 7/17/2019

Basemap sources: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community  
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS



- Maintenance Sites
- Stationing
- Creeks
- Water Bodies
- EBMUD Properties
- CDFW Region Boundary
- County Boundary

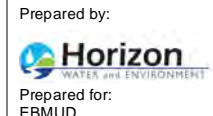
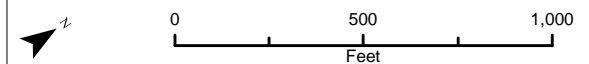




157: Grayson Creek near Sunnyvale Avenue and Grayson Court, City of Walnut Creek, Contra Costa County;

Basemap Sources: Source: Esri, DigitalGlobe, GeoEye, Earthstar\*Geographics, CNES/Airbus DTM, IGN, AeroGRID, IGN, and the GIS User Community  
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS

VH20-SERVER\GIS\_Server\PROJECTS\18040\_EBMUD\_Mokelumne\AppendixA\_v4.mxd PG 7/17/2019



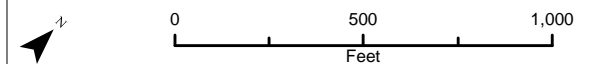
Prepared for:  
EBMUD

- Maintenance Sites
- ⊕ Stationing
- Creeks
- Water Bodies
- EBMUD Properties
- CDFW Region Boundary
- County Boundary



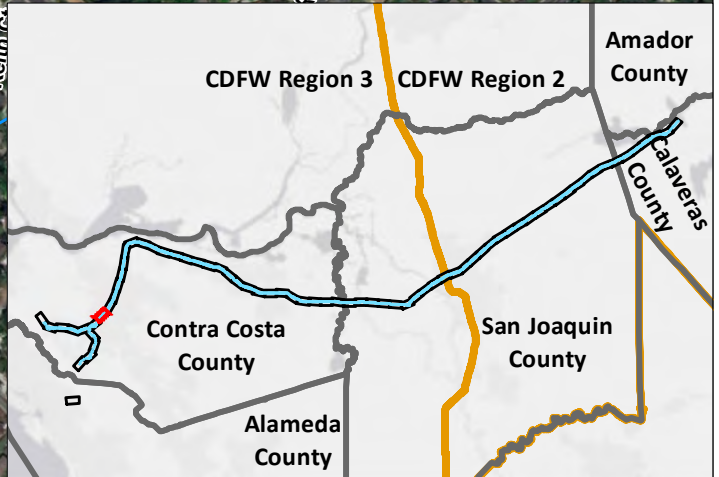
VH20-SERVER\GIS\_Server\PROJECTS\18040\_EBMUD\_Mokelumne\AppendixA\_v4.mxd PG 7/17/2019

Base Map Sources: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNR/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community  
 Symbols: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS



- Maintenance Sites
- ⊕ Stationing
- Creeks
- Water Bodies
- EBMUD Properties
- CDFW Region Boundary
- County Boundary

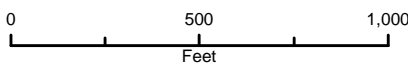
Prepared by:  
 Horizon  
 WATER AND ENVIRONMENT  
 Prepared for:  
 EBMUD





V:\H2O-SERVER\GIS\_Server\PROJECTS\18040\_EBMUD\_Mokelumne\AppendixA\_v4.mxd PG 7/17/2019

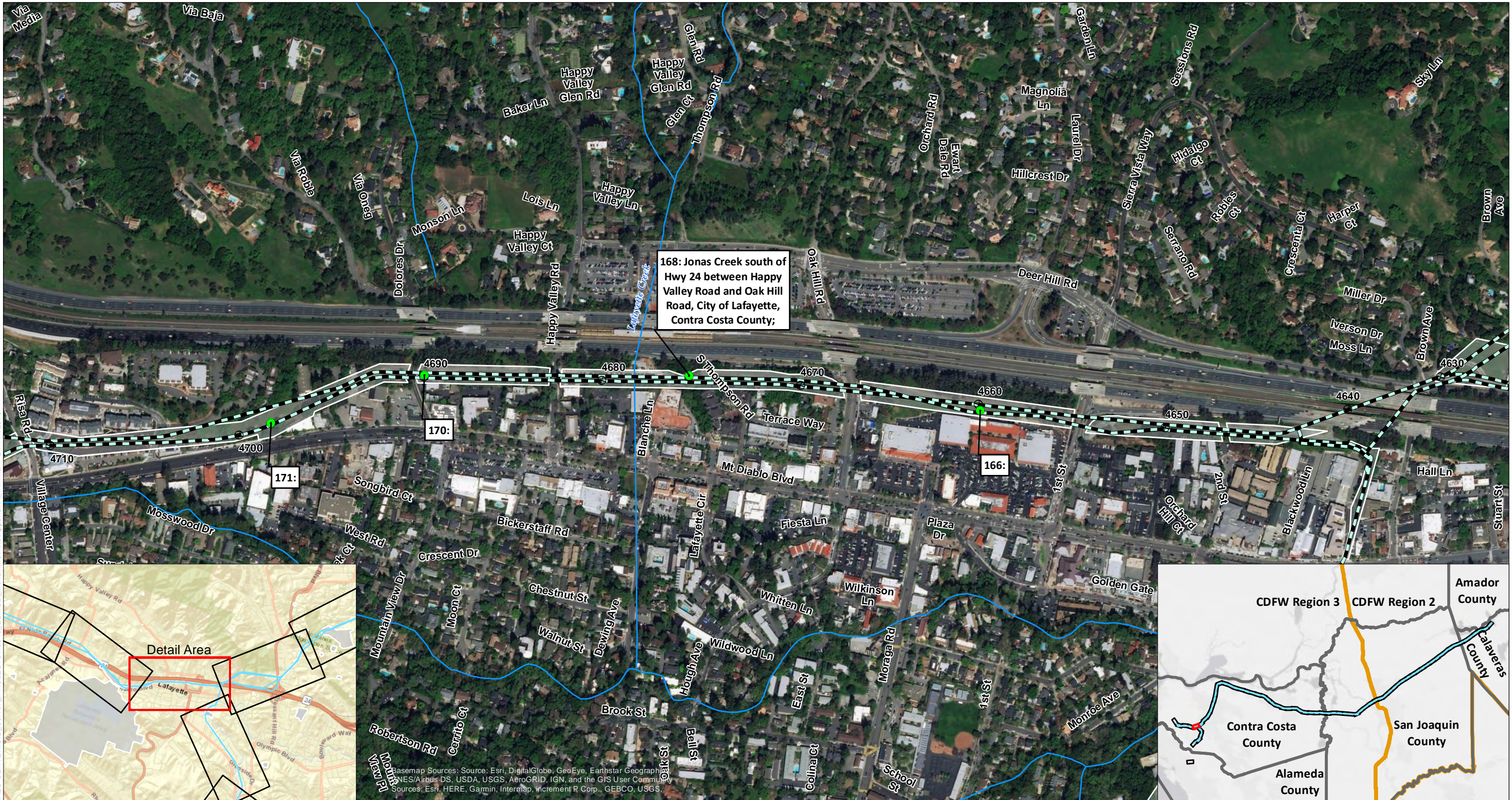
Basemap Sources: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community  
 Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS



- Maintenance Sites
- Stationing
- Creeks
- Water Bodies
- EBMUD Properties
- CDFW Region Boundary
- County Boundary

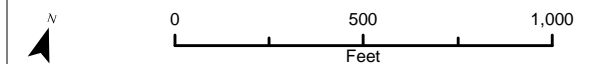
Prepared by:  

 Prepared for:  
 EBMUD

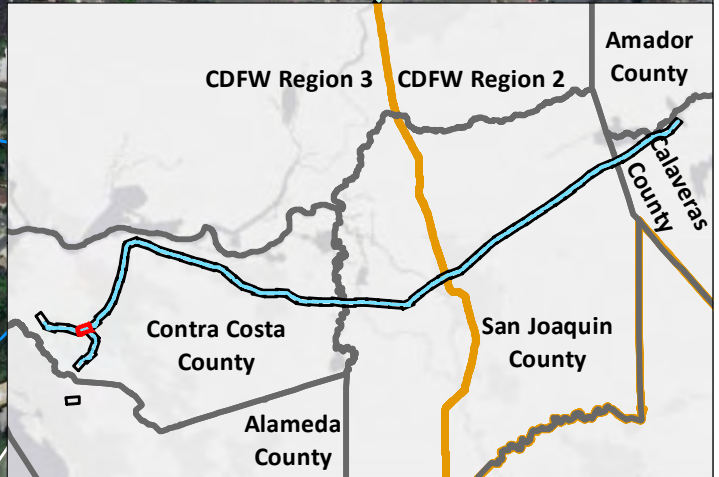


\NH20-SERVER\GIS\_Server\PROJECTS\18040\_EBMUD\_Mokelumne\AppendixA\_v4.mxd PG 7/17/2019

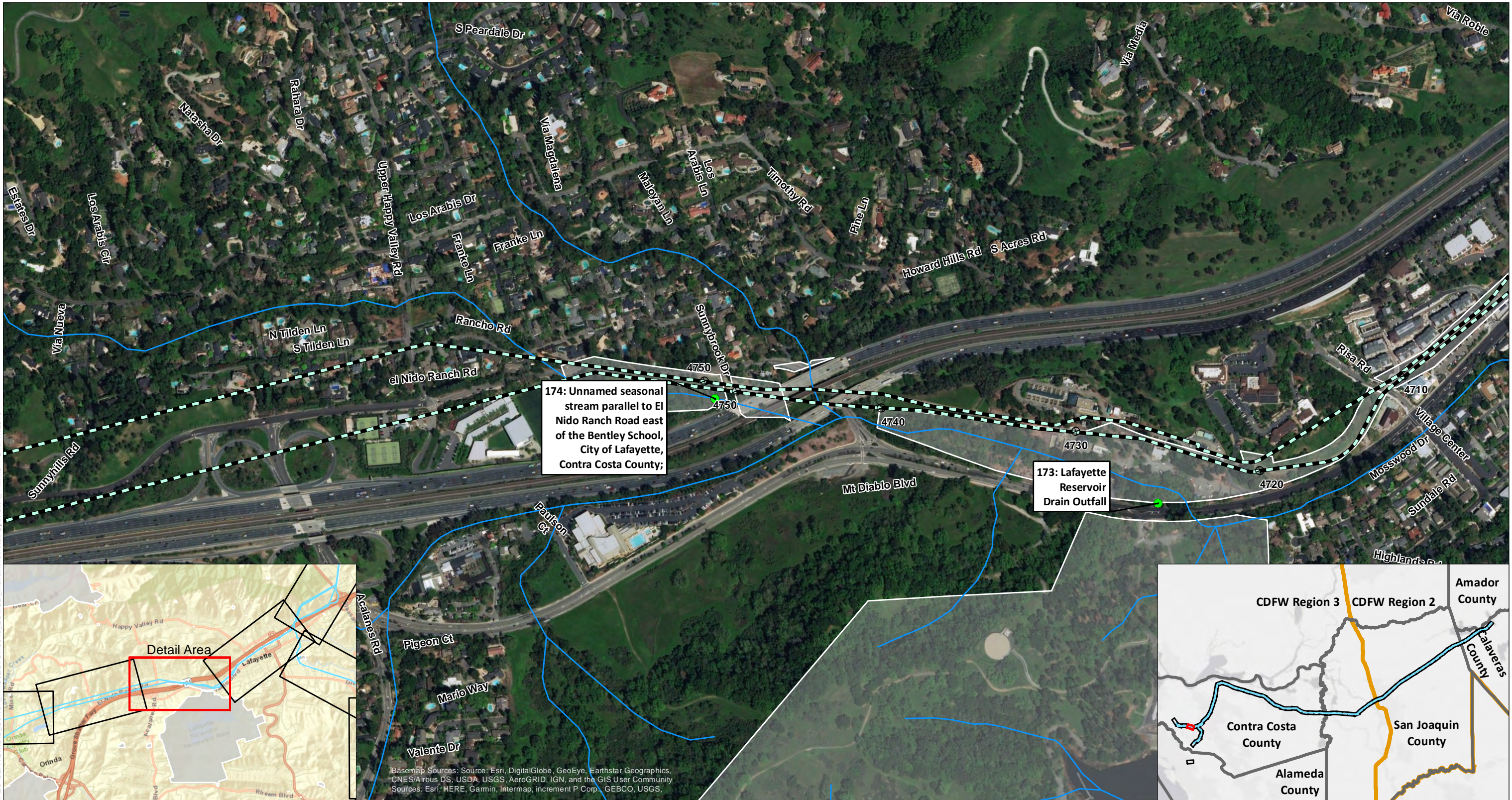
BaseMap Sources: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community  
 Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS



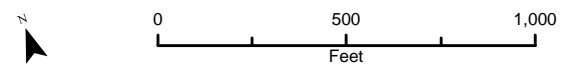
- Maintenance Sites
- ⊕ Stationing
- Creeks
- Water Bodies
- EBMUD Properties
- CDFW Region Boundary
- County Boundary



\\H2O-SERVER\GIS\_Server\PROJECTS\18040\_EBMUD\_Mokelumne\AppendixA\_v4.mxd PG 7/17/2019



Basemap Sources: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community  
 Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS.

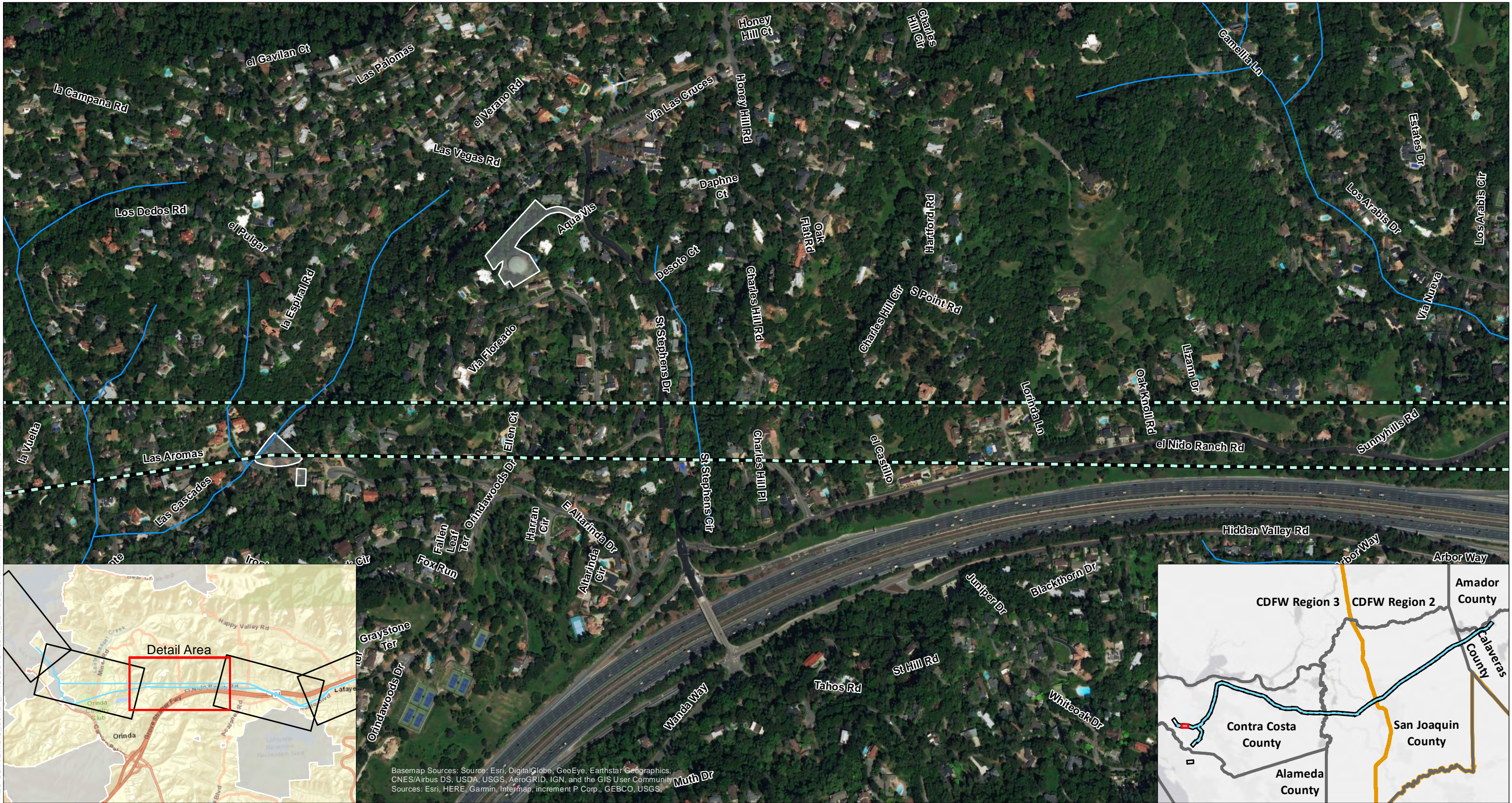


- Maintenance Sites
- ⊕ Stationing
- Creeks
- Water Bodies
- EBMUD Properties
- CDFW Region Boundary
- County Boundary

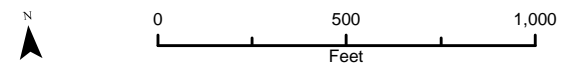
Prepared by:  
  
 Prepared for:  
 EBMUD



\\H2O-SERVER\GIS\_Server\PROJECTS\18040\_EBMUD\_Mokelumne\AppendixA\_v4.mxd PG 7/17/2019



Basemap Sources: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community  
 Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS



- Maintenance Sites
- Stationing
- Creeks
- Water Bodies
- EBMUD Properties
- CDFW Region Boundary
- County Boundary

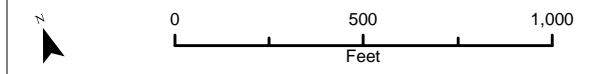
Prepared by:  
  
 Prepared for:  
 EBMUD

**Mokelumne Aqueduct System  
 Routine Maintenance Project**



V:\H2O-SERVER\GIS\_Server\PROJECTS\18040\_EBMUD\_Mokelumne\AppendixA\_v4.mxd PG 7/17/2019

BaseMap Sources: Source: Esri, DigitalGlobe, GeoEye, Earthstar, Geographic, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community  
 Sources: Esri, HERE, Garmin, Intermap, InCREMENT P Corp., GEBCO, USGS



- Maintenance Sites
- Stationing
- Creeks
- Water Bodies
- EBMUD Properties
- CDFW Region Boundary
- County Boundary

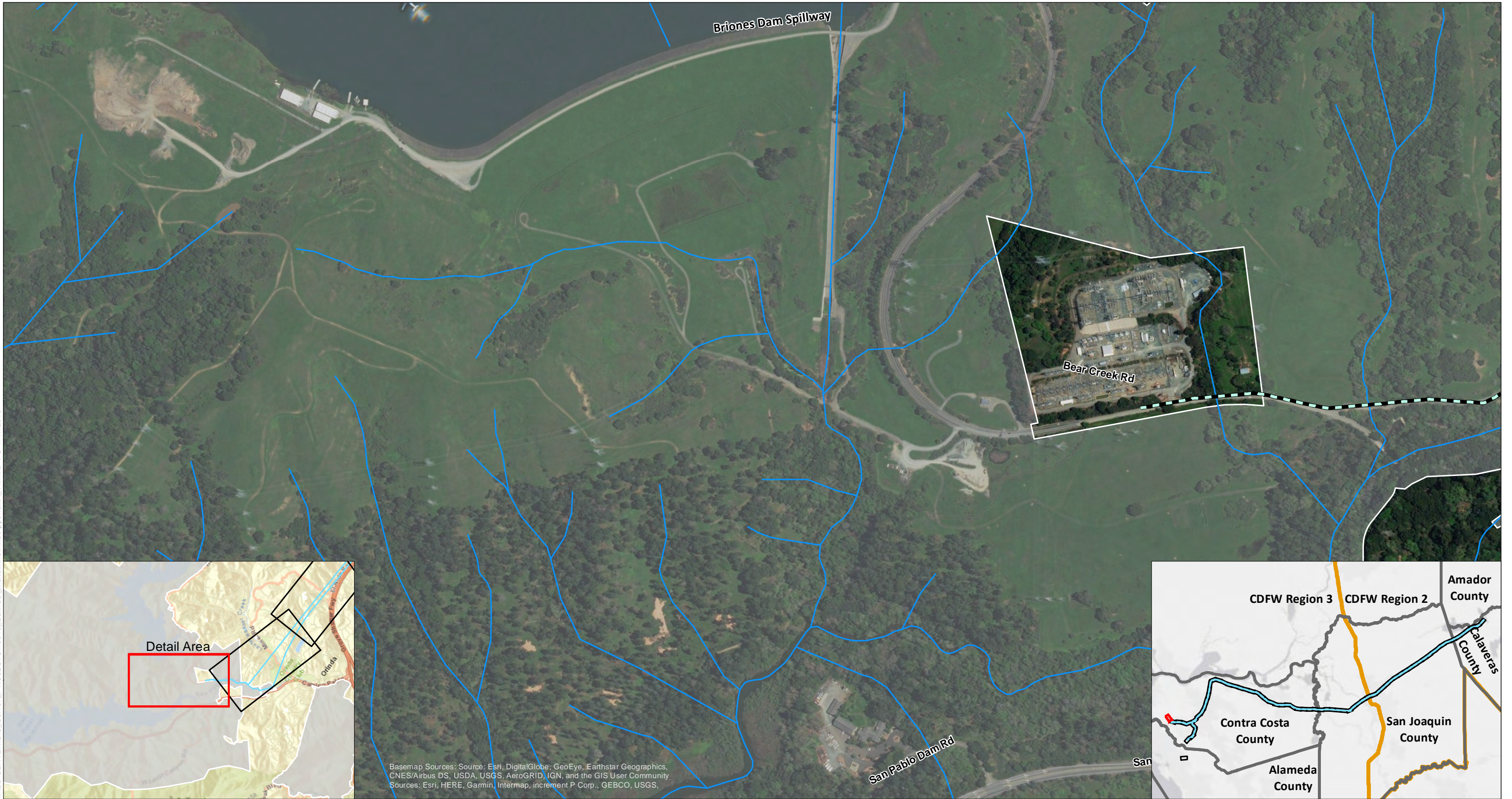


Prepared by:  

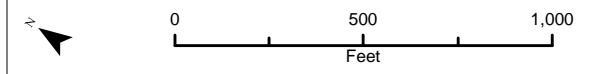
 Prepared for:  
 EBMUD

**Mokelumne Aqueduct System  
 Routine Maintenance Project**

\\H2O-SERVER\GIS\_Server\PROJECTS\18040\_EBMUD\_Mokelumne\AppendixA\_v4.mxd PG 7/17/2019



Basemap Sources: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community  
 Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS,



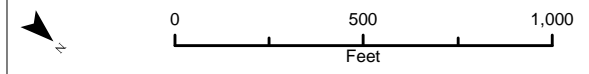
- Maintenance Sites
- ⊕ Stationing
- Creeks
- Water Bodies
- EBMUD Properties
- CDFW Region Boundary
- County Boundary

Prepared by:  
  
 Prepared for:  
 EBMUD

V:\H2O-SERVER\GIS\_Server\PROJECTS\18040\_EBMUD\_Mokelumne\AppendixA\_v4.mxd PG 7/17/2019



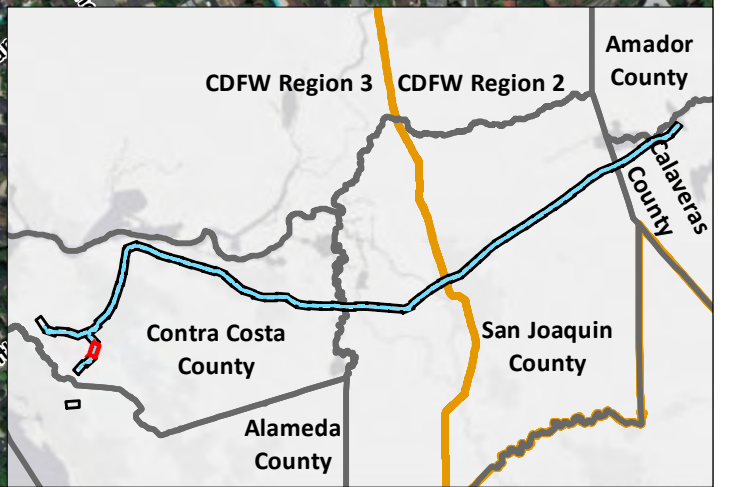
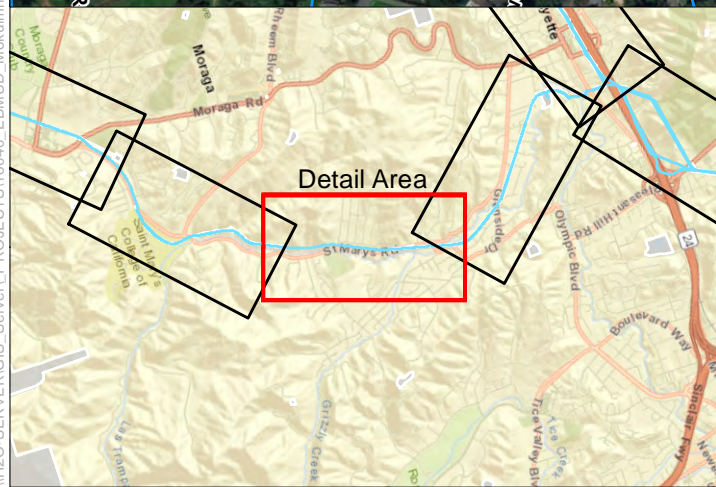
Basemap Sources: Sources: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community  
Sources: Esri, HERE, Garmin, Mapbox, DeLorme, Swatchbld, GEBCO, USGS



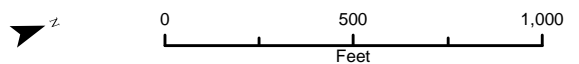
Prepared by:  
**Horizon**  
WATER AND ENVIRONMENT  
Prepared for:  
EBMUD

- Maintenance Sites
- Stationing
- Creeks
- Water Bodies
- EBMUD Properties
- CDFW Region Boundary
- County Boundary

VH20-SERVER\GIS\_Server\PROJECTS\18040\_EBMUD\_Mokelumne\AppendixA\_v4.mxd PG 7/17/2019



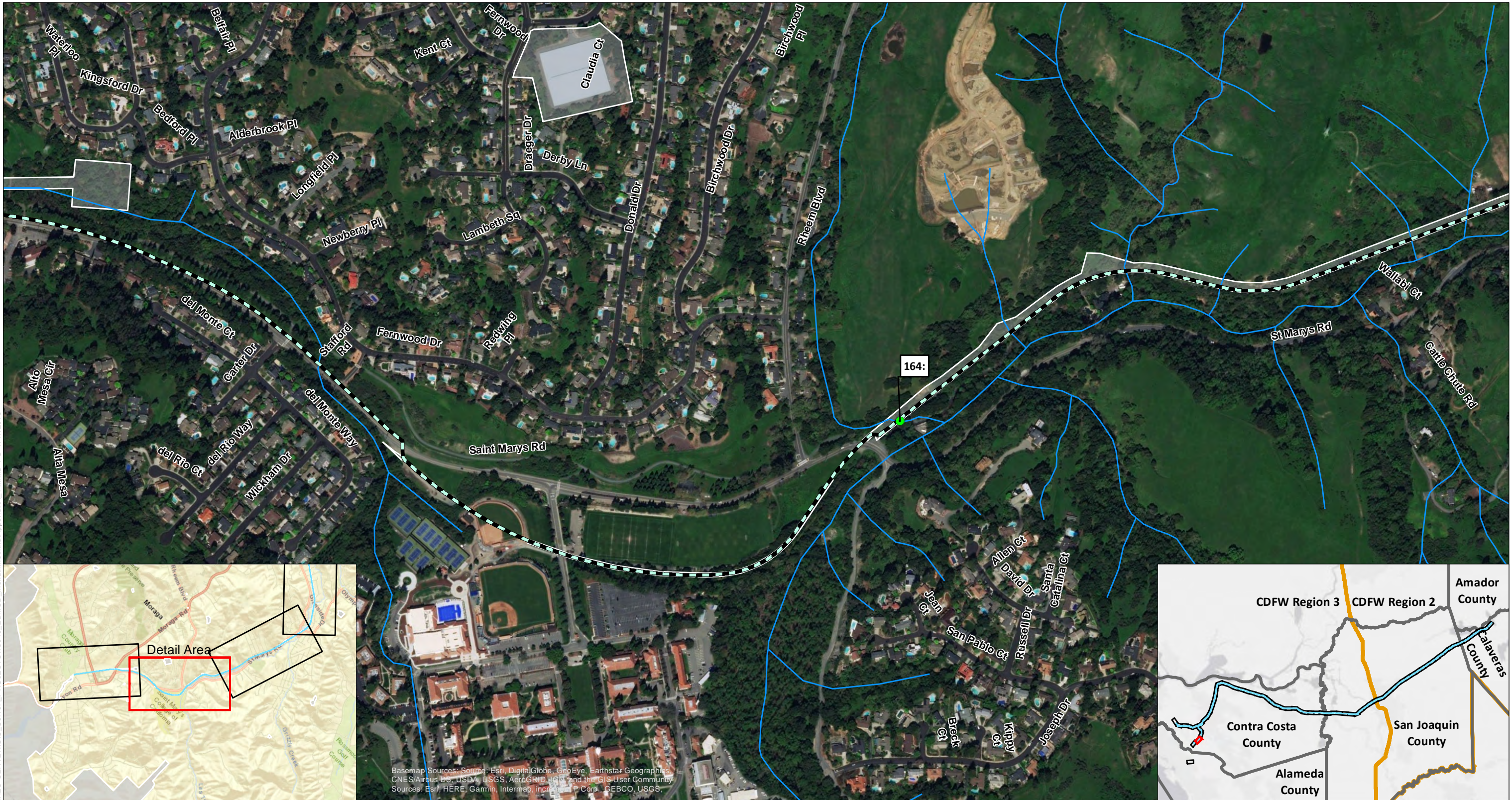
Basemap Sources: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community  
 Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS



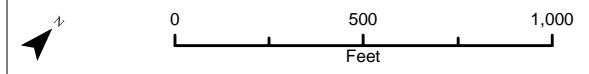
Prepared by:  
**Horizon**  
 WATER AND ENVIRONMENT  
 Prepared for:  
 EBMUD

- Maintenance Sites
- EBMUD Properties
- ⊕ Stationing
- CDFW Region Boundary
- Creeks
- County Boundary
- Water Bodies

\\H2O-SERVER\GIS\_Server\PROJECTS\18040\_EBMUD\_Mokelumne\AppendixA\_v4.mxd PG 7/17/2019



Basemap Sources: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community  
 Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS,

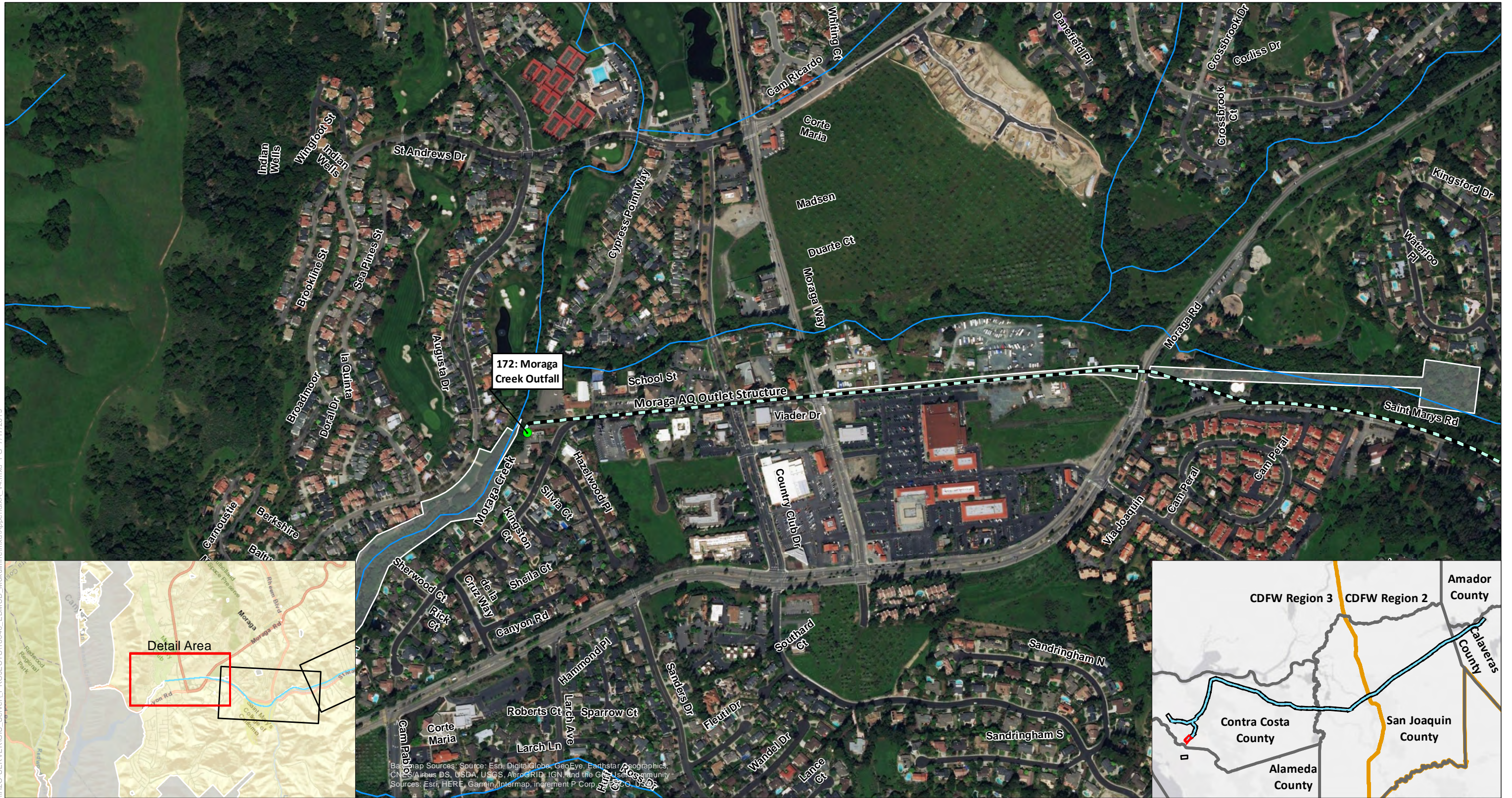


- Maintenance Sites
- Stationing
- Creeks
- Water Bodies
- EBMUD Properties
- CDFW Region Boundary
- County Boundary

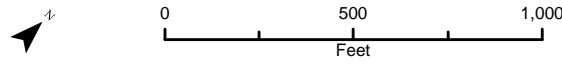


Prepared by:  
 Horizon  
 WATER AND ENVIRONMENT  
 Prepared for:  
 EBMUD

\\H2O-SERVER\GIS\_Server\PROJECTS\18040\_EBMUD\_Mokelumne\AppendixA\_v4.mxd PG 7/17/2019



Basemap Sources: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community  
 Sources: Esri, HERE, Garmin, Intermap, increment P Corp., Swire, GEBCO, USGS

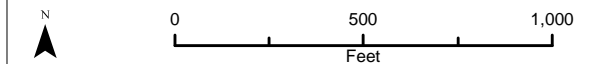


Prepared by:  
  
 Prepared for:  
 EBMUD

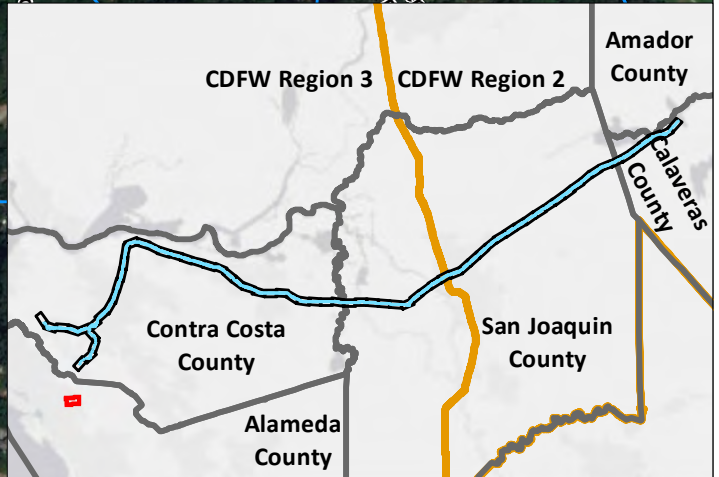


V:\H2O-SERVER\GIS\_Server\PROJECTS\18040\_EBMUD\_Mokelumne\AppendixA\_v4.mxd PG 7/17/2019

Map Sources: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNR/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community  
 Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS,



- Maintenance Sites
- EBMUD Properties
- ⊕ Stationing
- CDFW Region Boundary
- Creeks
- County Boundary
- Water Bodies



Prepared by:  
 Horizon  
 WATER AND ENVIRONMENT  
 Prepared for:  
 EBMUD



**Appendix B EBMUD Practices and Procedures by Environmental Resource Topic**

Environmental Resource Topic	EBMUD Practices and Procedures
<b>Greenhouse Gas Emissions</b>	
EBMUD Climate Change Monitoring and Response Plan.	These plans ensure that EBMUD operations are consistent with the California Climate Change Scoping Plan.
<b>Hazards and Hazardous Materials</b>	
EBMUD Procedure 711, Hazardous Waste Removal	<p>The purpose of this procedure is to define hazardous waste and establish responsibilities for removal of hazardous wastes from District facilities. Responsibilities are delineated as follows:</p> <p>The Unit Supervisor or Project Manager (or his/her designee)</p> <ul style="list-style-type: none"> <li>• Determines if the Waste is a Hazardous Waste, either with assistance from the Environmental Compliance Section (ECS) or based on knowledge.</li> <li>• Contacts ECS staff to coordinate Waste disposal, reuse, or recycling issues.</li> <li>• Provides all known information about the Waste asked for by the ECS.</li> <li>• Assists in the determination of the analyses to be performed by the District Laboratory or other certified laboratory based on his/her knowledge of the Waste.</li> <li>• Labels, stores, inspects, and maintains inventory records for the Waste in an appropriate manner as directed by ECS.</li> <li>• Ensures that Waste is available for transportation when notified by the ECS that Waste collection is scheduled.</li> <li>• Helps the ECS coordinate interim storage of non-routine Hazardous Waste while it is being characterized for disposal.</li> <li>• Reviews Hazardous Waste manifests prepared by haulers, to confirm the accuracy of information.</li> <li>• Signs the Hazardous Waste manifest indicating approval if authorized and trained by ECS.</li> <li>• Sends the signed Generator copy of the manifest to the ECS within seven (7) days of the off-haul date, unless previous agreement has been made with ECS and the hauler to send Generator copy directly to ECS.</li> <li>• Provides the ECS with a budget unit number and a job number.</li> </ul> <p>Environmental Compliance Section</p> <ul style="list-style-type: none"> <li>• Coordinates the appropriate steps to characterize the Waste.</li> <li>• Determines, with the help of the requesting department, what analyses are needed to classify the Waste.</li> <li>• Works with the District Laboratory and/or the Hazardous Waste contract hauler to analyze the Hazardous Waste or to</li> </ul>

*Initial Study/Mitigated Negative Declaration – Appendix B  
Mokelumne Aqueduct System Routine Maintenance Project*

<b>Environmental Resource Topic</b>	<b>EBMUD Practices and Procedures</b>
	<p>assist in identifying other labs certified to perform the analysis.</p> <ul style="list-style-type: none"> <li>• Obtains Hazardous Waste acceptance documents (e.g., waste profile) from disposal facility and provides to generating department to be included with Hazardous Waste shipment, as needed.</li> <li>• Identifies and approves disposal, reuse or recycling method and disposal, reuse, or recycling facility.</li> <li>• Obtains and provides EPA generator identification number.</li> <li>• Identifies and/or manages companies providing Hazardous Waste management services (for sampling, hauling, and disposal) depending on District departmental needs.</li> <li>• Provides training and guidance to unit or project staff on Hazardous Waste handling and disposal requirements and Hazardous Waste manifest completion requirements.</li> <li>• Reviews completed and signed Hazardous Waste manifests prior to submittal to Department of Toxic Substances Control.</li> <li>• Tracks manifest in a database and generates reports and summaries as needed.</li> <li>• Provides other information as needed.</li> </ul>

**APPENDIX C**

---

**AIR QUALITY, ENERGY, AND GREENHOUSE GAS EMISSION  
MODELING AND CALCULATIONS**

Table. Fuel Use Calculations

PhaseName	OffRoad Equipment Type	Off Road Equipment Unit Amount	Usage Hours per Day	Horsepower	Load Factor	Number of Construction Days	Amount of Horsepower Use (gal/hp-hr)	Gallons of Diesel Use
Sediment and Debris Removal	Excavators	1	8	158	0.38	10	12640	595
Sediment and Debris Removal	Off-Highway Trucks	2	8	402	0.38	10	32160	3028
Sediment and Debris Removal	Tractors/Loaders/Backhoes	1	8	97	0.37	10	7760	365
Vegetation Management	Off-Highway Trucks	2	8	402	0.38	20	64320	6057
Vegetation Management	Tractors/Loaders/Backhoes	1	8	97	0.37	20	15520	731
Maintenance and Repair of Culverts etc	Off-Highway Trucks	2	8	402	0.38	20	64320	6057
Maintenance and Repair of Culverts etc	Tractors/Loaders/Backhoes	1	8	97	0.37	20	15520	731
Bank and Levee Repair and Protection	Off-Highway Trucks	3	8	402	0.38	10	32160	4543
Bank and Levee Repair and Protection	Tractors/Loaders/Backhoes	1	8	97	0.37	10	7760	365
<b>TOTAL:</b>							<b>22,106</b>	

gallons of diesel



EBMUD Mokelumne Aqueduct Routine Maintenance Agreement Renewal Project - San Joaquin County, Annual

**EBMUD Mokelumne Aqueduct Routine Maintenance Agreement Renewal Project**  
**San Joaquin County, Annual**

**1.0 Project Characteristics**

---

**1.1 Land Usage**

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

**1.2 Other Project Characteristics**

<b>Urbanization</b>	Rural	<b>Wind Speed (m/s)</b>	2.7	<b>Precipitation Freq (Days)</b>	51
<b>Climate Zone</b>	2			<b>Operational Year</b>	2021
<b>Utility Company</b>	Pacific Gas & Electric Company				
<b>CO2 Intensity (lb/MW hr)</b>	641.35	<b>CH4 Intensity (lb/MW hr)</b>	0.029	<b>N2O Intensity (lb/MW hr)</b>	0.006

**1.3 User Entered Comments & Non-Default Data**

Project Characteristics -

Land Use -

Construction Phase - Based on Pers Comms

Off-road Equipment - Based on Pers Comms

Off-road Equipment - Based on Pers Comms

Off-road Equipment - Based on Pers Comms

Off-road Equipment - Based on Pers Comm

Trips and VMT - Based on Pers Comms

Grading - Based on Pers Comms

EBMUD Mokelumne Aqueduct Routine Maintenance Agreement Renewal Project - San Joaquin County, Annual

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	0.00	10.00
tblConstructionPhase	NumDays	0.00	20.00
tblConstructionPhase	NumDays	0.00	20.00
tblConstructionPhase	NumDays	0.00	10.00
tblGrading	AcresOfGrading	5.00	0.00
tblGrading	MaterialExported	0.00	300.00
tblGrading	MaterialExported	0.00	200.00
tblGrading	MaterialExported	0.00	200.00
tblGrading	MaterialExported	0.00	200.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	3.00
tblOffRoadEquipment	PhaseName		Sediment and Debris Removal
tblOffRoadEquipment	PhaseName		Bank and Levee Repair and Protection
tblOffRoadEquipment	PhaseName		Sediment and Debris Removal
tblOffRoadEquipment	PhaseName		Vegetation Management
tblOffRoadEquipment	PhaseName		Maintenance and Repair of Culverts etc
tblOffRoadEquipment	PhaseName		Bank and Levee Repair and Protection
tblOffRoadEquipment	PhaseName		Sediment and Debris Removal

EBMUD Mokelumne Aqueduct Routine Maintenance Agreement Renewal Project - San Joaquin County, Annual

tblOffRoadEquipment	PhaseName		Maintenance and Repair of Culverts etc
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblTripsAndVMT	WorkerTripLength	16.80	20.00
tblTripsAndVMT	WorkerTripLength	16.80	20.00
tblTripsAndVMT	WorkerTripLength	16.80	20.00
tblTripsAndVMT	WorkerTripLength	16.80	20.00
tblTripsAndVMT	WorkerTripNumber	13.00	10.00

**2.0 Emissions Summary**

---







EBMUD Mokelumne Aqueduct Routine Maintenance Agreement Renewal Project - San Joaquin County, Annual

**2.2 Overall Operational**

**Mitigated Operational**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
<b>Total</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

**3.0 Construction Detail**

**Construction Phase**

EBMUD Mokelumne Aqueduct Routine Maintenance Agreement Renewal Project - San Joaquin County, Annual

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Sediment and Debris Removal	Site Preparation	6/1/2019	6/14/2019	5	10	
2	Vegetation Management	Site Preparation	6/15/2019	7/12/2019	5	20	
3	Maintenance and Repair of Culverts etc	Site Preparation	7/13/2019	8/9/2019	5	20	
4	Bank and Levee Repair and Protection	Site Preparation	8/10/2019	8/23/2019	5	10	

**Acres of Grading (Site Preparation Phase): 0**

**Acres of Grading (Grading Phase): 0**

**Acres of Paving: 0**

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

**OffRoad Equipment**

EBMUD Mokelumne Aqueduct Routine Maintenance Agreement Renewal Project - San Joaquin County, Annual

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Sediment and Debris Removal	Excavators	1	8.00	158	0.38
Sediment and Debris Removal	Graders	0	8.00	187	0.41
Sediment and Debris Removal	Off-Highway Trucks	2	8.00	402	0.38
Sediment and Debris Removal	Rubber Tired Dozers	0	1.00	247	0.40
Sediment and Debris Removal	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Vegetation Management	Graders	0	8.00	187	0.41
Vegetation Management	Off-Highway Trucks	2	8.00	402	0.38
Vegetation Management	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Maintenance and Repair of Culverts etc	Graders	0	8.00	187	0.41
Maintenance and Repair of Culverts etc	Off-Highway Trucks	2	8.00	402	0.38
Maintenance and Repair of Culverts etc	Rubber Tired Dozers	0	1.00	247	0.40
Maintenance and Repair of Culverts etc	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Bank and Levee Repair and Protection	Forklifts	0	6.00	89	0.20
Bank and Levee Repair and Protection	Graders	0	8.00	187	0.41
Bank and Levee Repair and Protection	Off-Highway Trucks	3	8.00	402	0.38
Bank and Levee Repair and Protection	Tractors/Loaders/Backhoes	1	8.00	97	0.37

**Trips and VMT**

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Sediment and Debris Removal	5	10.00	0.00	38.00	20.00	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Vegetation Management	3	8.00	0.00	25.00	20.00	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Maintenance and Repair of Culverts etc	3	8.00	0.00	25.00	20.00	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Bank and Levee Repair and Protection	4	10.00	0.00	25.00	20.00	6.60	20.00	LD_Mix	HDT_Mix	HHDT

**3.1 Mitigation Measures Construction**

EBMUD Mokelumne Aqueduct Routine Maintenance Agreement Renewal Project - San Joaquin County, Annual

**3.2 Sediment and Debris Removal - 2019**

**Unmitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					2.0000e-005	0.0000	2.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	9.5700e-003	0.0970	0.0678	1.7000e-004		4.0400e-003	4.0400e-003		3.7200e-003	3.7200e-003	0.0000	15.5770	15.5770	4.9300e-003	0.0000	15.7002
<b>Total</b>	<b>9.5700e-003</b>	<b>0.0970</b>	<b>0.0678</b>	<b>1.7000e-004</b>	<b>2.0000e-005</b>	<b>4.0400e-003</b>	<b>4.0600e-003</b>	<b>0.0000</b>	<b>3.7200e-003</b>	<b>3.7200e-003</b>	<b>0.0000</b>	<b>15.5770</b>	<b>15.5770</b>	<b>4.9300e-003</b>	<b>0.0000</b>	<b>15.7002</b>

**Unmitigated Construction Off-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.7000e-004	5.6800e-003	8.5000e-004	2.0000e-005	3.2000e-004	2.0000e-005	3.5000e-004	9.0000e-005	2.0000e-005	1.1000e-004	0.0000	1.4611	1.4611	7.0000e-005	0.0000	1.4628
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.5000e-004	2.8000e-004	2.6700e-003	1.0000e-005	7.4000e-004	0.0000	7.4000e-004	2.0000e-004	0.0000	2.0000e-004	0.0000	0.6657	0.6657	2.0000e-005	0.0000	0.6662
<b>Total</b>	<b>5.2000e-004</b>	<b>5.9600e-003</b>	<b>3.5200e-003</b>	<b>3.0000e-005</b>	<b>1.0600e-003</b>	<b>2.0000e-005</b>	<b>1.0900e-003</b>	<b>2.9000e-004</b>	<b>2.0000e-005</b>	<b>3.1000e-004</b>	<b>0.0000</b>	<b>2.1267</b>	<b>2.1267</b>	<b>9.0000e-005</b>	<b>0.0000</b>	<b>2.1290</b>

EBMUD Mokelumne Aqueduct Routine Maintenance Agreement Renewal Project - San Joaquin County, Annual

**3.2 Sediment and Debris Removal - 2019**

**Mitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					2.0000e-005	0.0000	2.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	9.5700e-003	0.0970	0.0678	1.7000e-004		4.0400e-003	4.0400e-003		3.7200e-003	3.7200e-003	0.0000	15.5769	15.5769	4.9300e-003	0.0000	15.7001
<b>Total</b>	<b>9.5700e-003</b>	<b>0.0970</b>	<b>0.0678</b>	<b>1.7000e-004</b>	<b>2.0000e-005</b>	<b>4.0400e-003</b>	<b>4.0600e-003</b>	<b>0.0000</b>	<b>3.7200e-003</b>	<b>3.7200e-003</b>	<b>0.0000</b>	<b>15.5769</b>	<b>15.5769</b>	<b>4.9300e-003</b>	<b>0.0000</b>	<b>15.7001</b>

**Mitigated Construction Off-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.7000e-004	5.6800e-003	8.5000e-004	2.0000e-005	3.2000e-004	2.0000e-005	3.5000e-004	9.0000e-005	2.0000e-005	1.1000e-004	0.0000	1.4611	1.4611	7.0000e-005	0.0000	1.4628
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.5000e-004	2.8000e-004	2.6700e-003	1.0000e-005	7.4000e-004	0.0000	7.4000e-004	2.0000e-004	0.0000	2.0000e-004	0.0000	0.6657	0.6657	2.0000e-005	0.0000	0.6662
<b>Total</b>	<b>5.2000e-004</b>	<b>5.9600e-003</b>	<b>3.5200e-003</b>	<b>3.0000e-005</b>	<b>1.0600e-003</b>	<b>2.0000e-005</b>	<b>1.0900e-003</b>	<b>2.9000e-004</b>	<b>2.0000e-005</b>	<b>3.1000e-004</b>	<b>0.0000</b>	<b>2.1267</b>	<b>2.1267</b>	<b>9.0000e-005</b>	<b>0.0000</b>	<b>2.1290</b>

EBMUD Mokelumne Aqueduct Routine Maintenance Agreement Renewal Project - San Joaquin County, Annual

**3.3 Vegetation Management - 2019**

**Unmitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					1.0000e-005	0.0000	1.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0165	0.1672	0.1030	3.0000e-004		6.7900e-003	6.7900e-003		6.2500e-003	6.2500e-003	0.0000	26.5171	26.5171	8.3900e-003	0.0000	26.7268
<b>Total</b>	<b>0.0165</b>	<b>0.1672</b>	<b>0.1030</b>	<b>3.0000e-004</b>	<b>1.0000e-005</b>	<b>6.7900e-003</b>	<b>6.8000e-003</b>	<b>0.0000</b>	<b>6.2500e-003</b>	<b>6.2500e-003</b>	<b>0.0000</b>	<b>26.5171</b>	<b>26.5171</b>	<b>8.3900e-003</b>	<b>0.0000</b>	<b>26.7268</b>

**Unmitigated Construction Off-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.1000e-004	3.7400e-003	5.6000e-004	1.0000e-005	2.1000e-004	1.0000e-005	2.3000e-004	6.0000e-005	1.0000e-005	7.0000e-005	0.0000	0.9612	0.9612	5.0000e-005	0.0000	0.9624
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.6000e-004	4.5000e-004	4.2700e-003	1.0000e-005	1.1800e-003	1.0000e-005	1.1900e-003	3.1000e-004	1.0000e-005	3.2000e-004	0.0000	1.0651	1.0651	3.0000e-005	0.0000	1.0659
<b>Total</b>	<b>6.7000e-004</b>	<b>4.1900e-003</b>	<b>4.8300e-003</b>	<b>2.0000e-005</b>	<b>1.3900e-003</b>	<b>2.0000e-005</b>	<b>1.4200e-003</b>	<b>3.7000e-004</b>	<b>2.0000e-005</b>	<b>3.9000e-004</b>	<b>0.0000</b>	<b>2.0263</b>	<b>2.0263</b>	<b>8.0000e-005</b>	<b>0.0000</b>	<b>2.0282</b>



EBMUD Mokelumne Aqueduct Routine Maintenance Agreement Renewal Project - San Joaquin County, Annual

**3.3 Vegetation Management - 2019**

**Mitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					1.0000e-005	0.0000	1.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0165	0.1672	0.1030	3.0000e-004		6.7900e-003	6.7900e-003		6.2500e-003	6.2500e-003	0.0000	26.5170	26.5170	8.3900e-003	0.0000	26.7268
<b>Total</b>	<b>0.0165</b>	<b>0.1672</b>	<b>0.1030</b>	<b>3.0000e-004</b>	<b>1.0000e-005</b>	<b>6.7900e-003</b>	<b>6.8000e-003</b>	<b>0.0000</b>	<b>6.2500e-003</b>	<b>6.2500e-003</b>	<b>0.0000</b>	<b>26.5170</b>	<b>26.5170</b>	<b>8.3900e-003</b>	<b>0.0000</b>	<b>26.7268</b>

**Mitigated Construction Off-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.1000e-004	3.7400e-003	5.6000e-004	1.0000e-005	2.1000e-004	1.0000e-005	2.3000e-004	6.0000e-005	1.0000e-005	7.0000e-005	0.0000	0.9612	0.9612	5.0000e-005	0.0000	0.9624
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.6000e-004	4.5000e-004	4.2700e-003	1.0000e-005	1.1800e-003	1.0000e-005	1.1900e-003	3.1000e-004	1.0000e-005	3.2000e-004	0.0000	1.0651	1.0651	3.0000e-005	0.0000	1.0659
<b>Total</b>	<b>6.7000e-004</b>	<b>4.1900e-003</b>	<b>4.8300e-003</b>	<b>2.0000e-005</b>	<b>1.3900e-003</b>	<b>2.0000e-005</b>	<b>1.4200e-003</b>	<b>3.7000e-004</b>	<b>2.0000e-005</b>	<b>3.9000e-004</b>	<b>0.0000</b>	<b>2.0263</b>	<b>2.0263</b>	<b>8.0000e-005</b>	<b>0.0000</b>	<b>2.0282</b>

EBMUD Mokelumne Aqueduct Routine Maintenance Agreement Renewal Project - San Joaquin County, Annual

**3.4 Maintenance and Repair of Culverts etc - 2019**

**Unmitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					1.0000e-005	0.0000	1.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0165	0.1672	0.1030	3.0000e-004		6.7900e-003	6.7900e-003		6.2500e-003	6.2500e-003	0.0000	26.5171	26.5171	8.3900e-003	0.0000	26.7268
<b>Total</b>	<b>0.0165</b>	<b>0.1672</b>	<b>0.1030</b>	<b>3.0000e-004</b>	<b>1.0000e-005</b>	<b>6.7900e-003</b>	<b>6.8000e-003</b>	<b>0.0000</b>	<b>6.2500e-003</b>	<b>6.2500e-003</b>	<b>0.0000</b>	<b>26.5171</b>	<b>26.5171</b>	<b>8.3900e-003</b>	<b>0.0000</b>	<b>26.7268</b>

**Unmitigated Construction Off-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.1000e-004	3.7400e-003	5.6000e-004	1.0000e-005	2.1000e-004	1.0000e-005	2.3000e-004	6.0000e-005	1.0000e-005	7.0000e-005	0.0000	0.9612	0.9612	5.0000e-005	0.0000	0.9624
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.6000e-004	4.5000e-004	4.2700e-003	1.0000e-005	1.1800e-003	1.0000e-005	1.1900e-003	3.1000e-004	1.0000e-005	3.2000e-004	0.0000	1.0651	1.0651	3.0000e-005	0.0000	1.0659
<b>Total</b>	<b>6.7000e-004</b>	<b>4.1900e-003</b>	<b>4.8300e-003</b>	<b>2.0000e-005</b>	<b>1.3900e-003</b>	<b>2.0000e-005</b>	<b>1.4200e-003</b>	<b>3.7000e-004</b>	<b>2.0000e-005</b>	<b>3.9000e-004</b>	<b>0.0000</b>	<b>2.0263</b>	<b>2.0263</b>	<b>8.0000e-005</b>	<b>0.0000</b>	<b>2.0282</b>

EBMUD Mokelumne Aqueduct Routine Maintenance Agreement Renewal Project - San Joaquin County, Annual

**3.4 Maintenance and Repair of Culverts etc - 2019**

**Mitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					1.0000e-005	0.0000	1.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0165	0.1672	0.1030	3.0000e-004		6.7900e-003	6.7900e-003		6.2500e-003	6.2500e-003	0.0000	26.5170	26.5170	8.3900e-003	0.0000	26.7268
<b>Total</b>	<b>0.0165</b>	<b>0.1672</b>	<b>0.1030</b>	<b>3.0000e-004</b>	<b>1.0000e-005</b>	<b>6.7900e-003</b>	<b>6.8000e-003</b>	<b>0.0000</b>	<b>6.2500e-003</b>	<b>6.2500e-003</b>	<b>0.0000</b>	<b>26.5170</b>	<b>26.5170</b>	<b>8.3900e-003</b>	<b>0.0000</b>	<b>26.7268</b>

**Mitigated Construction Off-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.1000e-004	3.7400e-003	5.6000e-004	1.0000e-005	2.1000e-004	1.0000e-005	2.3000e-004	6.0000e-005	1.0000e-005	7.0000e-005	0.0000	0.9612	0.9612	5.0000e-005	0.0000	0.9624
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.6000e-004	4.5000e-004	4.2700e-003	1.0000e-005	1.1800e-003	1.0000e-005	1.1900e-003	3.1000e-004	1.0000e-005	3.2000e-004	0.0000	1.0651	1.0651	3.0000e-005	0.0000	1.0659
<b>Total</b>	<b>6.7000e-004</b>	<b>4.1900e-003</b>	<b>4.8300e-003</b>	<b>2.0000e-005</b>	<b>1.3900e-003</b>	<b>2.0000e-005</b>	<b>1.4200e-003</b>	<b>3.7000e-004</b>	<b>2.0000e-005</b>	<b>3.9000e-004</b>	<b>0.0000</b>	<b>2.0263</b>	<b>2.0263</b>	<b>8.0000e-005</b>	<b>0.0000</b>	<b>2.0282</b>

EBMUD Mokelumne Aqueduct Routine Maintenance Agreement Renewal Project - San Joaquin County, Annual

**3.5 Bank and Levee Repair and Protection - 2019**

**Unmitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					1.0000e-005	0.0000	1.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0118	0.1195	0.0715	2.1000e-004		4.7000e-003	4.7000e-003		4.3300e-003	4.3300e-003	0.0000	19.1903	19.1903	6.0700e-003	0.0000	19.3421
<b>Total</b>	<b>0.0118</b>	<b>0.1195</b>	<b>0.0715</b>	<b>2.1000e-004</b>	<b>1.0000e-005</b>	<b>4.7000e-003</b>	<b>4.7100e-003</b>	<b>0.0000</b>	<b>4.3300e-003</b>	<b>4.3300e-003</b>	<b>0.0000</b>	<b>19.1903</b>	<b>19.1903</b>	<b>6.0700e-003</b>	<b>0.0000</b>	<b>19.3421</b>

**Unmitigated Construction Off-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.1000e-004	3.7400e-003	5.6000e-004	1.0000e-005	2.1000e-004	1.0000e-005	2.3000e-004	6.0000e-005	1.0000e-005	7.0000e-005	0.0000	0.9612	0.9612	5.0000e-005	0.0000	0.9624
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.5000e-004	2.8000e-004	2.6700e-003	1.0000e-005	7.4000e-004	0.0000	7.4000e-004	2.0000e-004	0.0000	2.0000e-004	0.0000	0.6657	0.6657	2.0000e-005	0.0000	0.6662
<b>Total</b>	<b>4.6000e-004</b>	<b>4.0200e-003</b>	<b>3.2300e-003</b>	<b>2.0000e-005</b>	<b>9.5000e-004</b>	<b>1.0000e-005</b>	<b>9.7000e-004</b>	<b>2.6000e-004</b>	<b>1.0000e-005</b>	<b>2.7000e-004</b>	<b>0.0000</b>	<b>1.6269</b>	<b>1.6269</b>	<b>7.0000e-005</b>	<b>0.0000</b>	<b>1.6285</b>

EBMUD Mokelumne Aqueduct Routine Maintenance Agreement Renewal Project - San Joaquin County, Annual

**3.5 Bank and Levee Repair and Protection - 2019**

**Mitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					1.0000e-005	0.0000	1.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0118	0.1195	0.0715	2.1000e-004		4.7000e-003	4.7000e-003		4.3300e-003	4.3300e-003	0.0000	19.1903	19.1903	6.0700e-003	0.0000	19.3421
<b>Total</b>	<b>0.0118</b>	<b>0.1195</b>	<b>0.0715</b>	<b>2.1000e-004</b>	<b>1.0000e-005</b>	<b>4.7000e-003</b>	<b>4.7100e-003</b>	<b>0.0000</b>	<b>4.3300e-003</b>	<b>4.3300e-003</b>	<b>0.0000</b>	<b>19.1903</b>	<b>19.1903</b>	<b>6.0700e-003</b>	<b>0.0000</b>	<b>19.3421</b>

**Mitigated Construction Off-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.1000e-004	3.7400e-003	5.6000e-004	1.0000e-005	2.1000e-004	1.0000e-005	2.3000e-004	6.0000e-005	1.0000e-005	7.0000e-005	0.0000	0.9612	0.9612	5.0000e-005	0.0000	0.9624
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.5000e-004	2.8000e-004	2.6700e-003	1.0000e-005	7.4000e-004	0.0000	7.4000e-004	2.0000e-004	0.0000	2.0000e-004	0.0000	0.6657	0.6657	2.0000e-005	0.0000	0.6662
<b>Total</b>	<b>4.6000e-004</b>	<b>4.0200e-003</b>	<b>3.2300e-003</b>	<b>2.0000e-005</b>	<b>9.5000e-004</b>	<b>1.0000e-005</b>	<b>9.7000e-004</b>	<b>2.6000e-004</b>	<b>1.0000e-005</b>	<b>2.7000e-004</b>	<b>0.0000</b>	<b>1.6269</b>	<b>1.6269</b>	<b>7.0000e-005</b>	<b>0.0000</b>	<b>1.6285</b>

**4.0 Operational Detail - Mobile**

---

EBMUD Mokelumne Aqueduct Routine Maintenance Agreement Renewal Project - San Joaquin County, Annual

**4.1 Mitigation Measures Mobile**

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

**4.2 Trip Summary Information**

Land Use	Average Daily Trip Rate			Unmitigated	Mitigated
	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
User Defined Recreational	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

**4.3 Trip Type Information**

Land Use	Miles			Trip %			Trip Purpose %		
	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
User Defined Recreational	14.70	6.60	6.60	0.00	0.00	0.00	0	0	0

**4.4 Fleet Mix**

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
User Defined Recreational	0.552050	0.036079	0.182449	0.124563	0.019215	0.004844	0.016098	0.055414	0.001187	0.001496	0.005121	0.000613	0.000871







EBMUD Mokelumne Aqueduct Routine Maintenance Agreement Renewal Project - San Joaquin County, Annual

**5.3 Energy by Land Use - Electricity**

**Unmitigated**

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
User Defined Recreational	0	0.0000	0.0000	0.0000	0.0000
<b>Total</b>		<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>

**Mitigated**

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
User Defined Recreational	0	0.0000	0.0000	0.0000	0.0000
<b>Total</b>		<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>

**6.0 Area Detail**

**6.1 Mitigation Measures Area**



EBMUD Mokelumne Aqueduct Routine Maintenance Agreement Renewal Project - San Joaquin County, Annual

**6.2 Area by SubCategory**

**Mitigated**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
<b>Total</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>		<b>0.0000</b>	<b>0.0000</b>		<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>

**7.0 Water Detail**

---

**7.1 Mitigation Measures Water**

EBMUD Mokelumne Aqueduct Routine Maintenance Agreement Renewal Project - San Joaquin County, Annual

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

**7.2 Water by Land Use**

**Unmitigated**

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
User Defined Recreational	0 / 0	0.0000	0.0000	0.0000	0.0000
<b>Total</b>		<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>

EBMUD Mokelumne Aqueduct Routine Maintenance Agreement Renewal Project - San Joaquin County, Annual

**7.2 Water by Land Use**

**Mitigated**

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
User Defined Recreational	0 / 0	0.0000	0.0000	0.0000	0.0000
<b>Total</b>		<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>

**8.0 Waste Detail**

---

**8.1 Mitigation Measures Waste**

**Category/Year**

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

EBMUD Mokelumne Aqueduct Routine Maintenance Agreement Renewal Project - San Joaquin County, Annual

**8.2 Waste by Land Use**

**Unmitigated**

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
User Defined Recreational	0	0.0000	0.0000	0.0000	0.0000
<b>Total</b>		<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>

**Mitigated**

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
User Defined Recreational	0	0.0000	0.0000	0.0000	0.0000
<b>Total</b>		<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>

**9.0 Operational Offroad**

---

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type
----------------	--------	-----------	-----------	-------------	-------------	-----------

EBMUD Mokelumne Aqueduct Routine Maintenance Agreement Renewal Project - San Joaquin County, Annual

**10.0 Stationary Equipment**

---

**Fire Pumps and Emergency Generators**

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type
----------------	--------	-----------	------------	-------------	-------------	-----------

**Boilers**

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type
----------------	--------	----------------	-----------------	---------------	-----------

**User Defined Equipment**

Equipment Type	Number
----------------	--------

**11.0 Vegetation**

---

EBMUD Mokelumne Aqueduct Routine Maintenance Agreement Renewal Project - San Joaquin County, Summer

**EBMUD Mokelumne Aqueduct Routine Maintenance Agreement Renewal Project**  
**San Joaquin County, Summer**

**1.0 Project Characteristics**

---

**1.1 Land Usage**

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

**1.2 Other Project Characteristics**

<b>Urbanization</b>	Rural	<b>Wind Speed (m/s)</b>	2.7	<b>Precipitation Freq (Days)</b>	51
<b>Climate Zone</b>	2			<b>Operational Year</b>	2021
<b>Utility Company</b>	Pacific Gas & Electric Company				
<b>CO2 Intensity (lb/MW hr)</b>	641.35	<b>CH4 Intensity (lb/MW hr)</b>	0.029	<b>N2O Intensity (lb/MW hr)</b>	0.006

**1.3 User Entered Comments & Non-Default Data**

Project Characteristics -

Land Use -

Construction Phase - Based on Pers Comms

Off-road Equipment - Based on Pers Comms

Off-road Equipment - Based on Pers Comms

Off-road Equipment - Based on Pers Comms

Off-road Equipment - Based on Pers Comm

Trips and VMT - Based on Pers Comms

Grading - Based on Pers Comms



EBMUD Mokelumne Aqueduct Routine Maintenance Agreement Renewal Project - San Joaquin County, Summer

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	0.00	10.00
tblConstructionPhase	NumDays	0.00	20.00
tblConstructionPhase	NumDays	0.00	20.00
tblConstructionPhase	NumDays	0.00	10.00
tblGrading	AcresOfGrading	5.00	0.00
tblGrading	MaterialExported	0.00	300.00
tblGrading	MaterialExported	0.00	200.00
tblGrading	MaterialExported	0.00	200.00
tblGrading	MaterialExported	0.00	200.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	3.00
tblOffRoadEquipment	PhaseName		Sediment and Debris Removal
tblOffRoadEquipment	PhaseName		Bank and Levee Repair and Protection
tblOffRoadEquipment	PhaseName		Sediment and Debris Removal
tblOffRoadEquipment	PhaseName		Vegetation Management
tblOffRoadEquipment	PhaseName		Maintenance and Repair of Culverts etc
tblOffRoadEquipment	PhaseName		Bank and Levee Repair and Protection
tblOffRoadEquipment	PhaseName		Sediment and Debris Removal

EBMUD Mokelumne Aqueduct Routine Maintenance Agreement Renewal Project - San Joaquin County, Summer

tblOffRoadEquipment	PhaseName		Maintenance and Repair of Culverts etc
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblTripsAndVMT	WorkerTripLength	16.80	20.00
tblTripsAndVMT	WorkerTripLength	16.80	20.00
tblTripsAndVMT	WorkerTripLength	16.80	20.00
tblTripsAndVMT	WorkerTripLength	16.80	20.00
tblTripsAndVMT	WorkerTripNumber	13.00	10.00

**2.0 Emissions Summary**

---



EBMUD Mokelumne Aqueduct Routine Maintenance Agreement Renewal Project - San Joaquin County, Summer

**2.2 Overall Operational**

**Unmitigated Operational**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
<b>Total</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>		<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>

**Mitigated Operational**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
<b>Total</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>		<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>

## EBMUD Mokelumne Aqueduct Routine Maintenance Agreement Renewal Project - San Joaquin County, Summer

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

### 3.0 Construction Detail

---

#### Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Sediment and Debris Removal	Site Preparation	6/1/2019	6/14/2019	5	10	
2	Vegetation Management	Site Preparation	6/15/2019	7/12/2019	5	20	
3	Maintenance and Repair of Culverts etc	Site Preparation	7/13/2019	8/9/2019	5	20	
4	Bank and Levee Repair and Protection	Site Preparation	8/10/2019	8/23/2019	5	10	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

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

OffRoad Equipment

EBMUD Mokelumne Aqueduct Routine Maintenance Agreement Renewal Project - San Joaquin County, Summer

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Sediment and Debris Removal	Excavators	1	8.00	158	0.38
Sediment and Debris Removal	Graders	0	8.00	187	0.41
Sediment and Debris Removal	Off-Highway Trucks	2	8.00	402	0.38
Sediment and Debris Removal	Rubber Tired Dozers	0	1.00	247	0.40
Sediment and Debris Removal	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Vegetation Management	Graders	0	8.00	187	0.41
Vegetation Management	Off-Highway Trucks	2	8.00	402	0.38
Vegetation Management	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Maintenance and Repair of Culverts etc	Graders	0	8.00	187	0.41
Maintenance and Repair of Culverts etc	Off-Highway Trucks	2	8.00	402	0.38
Maintenance and Repair of Culverts etc	Rubber Tired Dozers	0	1.00	247	0.40
Maintenance and Repair of Culverts etc	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Bank and Levee Repair and Protection	Forklifts	0	6.00	89	0.20
Bank and Levee Repair and Protection	Graders	0	8.00	187	0.41
Bank and Levee Repair and Protection	Off-Highway Trucks	3	8.00	402	0.38
Bank and Levee Repair and Protection	Tractors/Loaders/Backhoes	1	8.00	97	0.37

**Trips and VMT**

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Sediment and Debris Removal	5	10.00	0.00	38.00	20.00	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Vegetation Management	3	8.00	0.00	25.00	20.00	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Maintenance and Repair of Culverts etc	3	8.00	0.00	25.00	20.00	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Bank and Levee Repair and Protection	4	10.00	0.00	25.00	20.00	6.60	20.00	LD_Mix	HDT_Mix	HHDT

**3.1 Mitigation Measures Construction**

EBMUD Mokelumne Aqueduct Routine Maintenance Agreement Renewal Project - San Joaquin County, Summer

**3.2 Sediment and Debris Removal - 2019**

**Unmitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					4.4300e-003	0.0000	4.4300e-003	6.7000e-004	0.0000	6.7000e-004			0.0000			0.0000
Off-Road	1.9133	19.3984	13.5595	0.0347		0.8083	0.8083		0.7436	0.7436		3,434.1305	3,434.1305	1.0865		3,461.2936
<b>Total</b>	<b>1.9133</b>	<b>19.3984</b>	<b>13.5595</b>	<b>0.0347</b>	<b>4.4300e-003</b>	<b>0.8083</b>	<b>0.8127</b>	<b>6.7000e-004</b>	<b>0.7436</b>	<b>0.7443</b>		<b>3,434.1305</b>	<b>3,434.1305</b>	<b>1.0865</b>		<b>3,461.2936</b>

**Unmitigated Construction Off-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0327	1.1088	0.1624	3.0900e-003	0.0665	4.4400e-003	0.0710	0.0182	4.2500e-003	0.0225		324.9394	324.9394	0.0145		325.3009
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0743	0.0510	0.6167	1.6000e-003	0.1520	9.8000e-004	0.1530	0.0403	9.0000e-004	0.0412		159.7549	159.7549	4.7200e-003		159.8730
<b>Total</b>	<b>0.1070</b>	<b>1.1598</b>	<b>0.7790</b>	<b>4.6900e-003</b>	<b>0.2186</b>	<b>5.4200e-003</b>	<b>0.2240</b>	<b>0.0586</b>	<b>5.1500e-003</b>	<b>0.0637</b>		<b>484.6942</b>	<b>484.6942</b>	<b>0.0192</b>		<b>485.1738</b>

EBMUD Mokelumne Aqueduct Routine Maintenance Agreement Renewal Project - San Joaquin County, Summer

**3.2 Sediment and Debris Removal - 2019**

**Mitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					4.4300e-003	0.0000	4.4300e-003	6.7000e-004	0.0000	6.7000e-004			0.0000			0.0000
Off-Road	1.9133	19.3984	13.5595	0.0347		0.8083	0.8083		0.7436	0.7436	0.0000	3,434.1305	3,434.1305	1.0865		3,461.2935
<b>Total</b>	<b>1.9133</b>	<b>19.3984</b>	<b>13.5595</b>	<b>0.0347</b>	<b>4.4300e-003</b>	<b>0.8083</b>	<b>0.8127</b>	<b>6.7000e-004</b>	<b>0.7436</b>	<b>0.7443</b>	<b>0.0000</b>	<b>3,434.1305</b>	<b>3,434.1305</b>	<b>1.0865</b>		<b>3,461.2935</b>

**Mitigated Construction Off-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0327	1.1088	0.1624	3.0900e-003	0.0665	4.4400e-003	0.0710	0.0182	4.2500e-003	0.0225		324.9394	324.9394	0.0145		325.3009
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0743	0.0510	0.6167	1.6000e-003	0.1520	9.8000e-004	0.1530	0.0403	9.0000e-004	0.0412		159.7549	159.7549	4.7200e-003		159.8730
<b>Total</b>	<b>0.1070</b>	<b>1.1598</b>	<b>0.7790</b>	<b>4.6900e-003</b>	<b>0.2186</b>	<b>5.4200e-003</b>	<b>0.2240</b>	<b>0.0586</b>	<b>5.1500e-003</b>	<b>0.0637</b>		<b>484.6942</b>	<b>484.6942</b>	<b>0.0192</b>		<b>485.1738</b>



EBMUD Mokelumne Aqueduct Routine Maintenance Agreement Renewal Project - San Joaquin County, Summer

**3.3 Vegetation Management - 2019**

**Unmitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.4800e-003	0.0000	1.4800e-003	2.2000e-004	0.0000	2.2000e-004			0.0000			0.0000
Off-Road	1.6526	16.7165	10.2962	0.0295		0.6789	0.6789		0.6246	0.6246		2,923.0049	2,923.0049	0.9248		2,946.1251
<b>Total</b>	<b>1.6526</b>	<b>16.7165</b>	<b>10.2962</b>	<b>0.0295</b>	<b>1.4800e-003</b>	<b>0.6789</b>	<b>0.6804</b>	<b>2.2000e-004</b>	<b>0.6246</b>	<b>0.6248</b>		<b>2,923.0049</b>	<b>2,923.0049</b>	<b>0.9248</b>		<b>2,946.1251</b>

**Unmitigated Construction Off-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0108	0.3647	0.0534	1.0200e-003	0.0219	1.4600e-003	0.0233	6.0000e-003	1.4000e-003	7.4000e-003		106.8880	106.8880	4.7600e-003		107.0069
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0594	0.0408	0.4933	1.2800e-003	0.1216	7.8000e-004	0.1224	0.0323	7.2000e-004	0.0330		127.8039	127.8039	3.7800e-003		127.8984
<b>Total</b>	<b>0.0702</b>	<b>0.4055</b>	<b>0.5467</b>	<b>2.3000e-003</b>	<b>0.1435</b>	<b>2.2400e-003</b>	<b>0.1458</b>	<b>0.0383</b>	<b>2.1200e-003</b>	<b>0.0404</b>		<b>234.6919</b>	<b>234.6919</b>	<b>8.5400e-003</b>		<b>234.9053</b>

EBMUD Mokelumne Aqueduct Routine Maintenance Agreement Renewal Project - San Joaquin County, Summer

**3.3 Vegetation Management - 2019**

**Mitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.4800e-003	0.0000	1.4800e-003	2.2000e-004	0.0000	2.2000e-004			0.0000			0.0000
Off-Road	1.6526	16.7165	10.2962	0.0295		0.6789	0.6789		0.6246	0.6246	0.0000	2,923.0049	2,923.0049	0.9248		2,946.1251
<b>Total</b>	<b>1.6526</b>	<b>16.7165</b>	<b>10.2962</b>	<b>0.0295</b>	<b>1.4800e-003</b>	<b>0.6789</b>	<b>0.6804</b>	<b>2.2000e-004</b>	<b>0.6246</b>	<b>0.6248</b>	<b>0.0000</b>	<b>2,923.0049</b>	<b>2,923.0049</b>	<b>0.9248</b>		<b>2,946.1251</b>

**Mitigated Construction Off-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0108	0.3647	0.0534	1.0200e-003	0.0219	1.4600e-003	0.0233	6.0000e-003	1.4000e-003	7.4000e-003		106.8880	106.8880	4.7600e-003		107.0069
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0594	0.0408	0.4933	1.2800e-003	0.1216	7.8000e-004	0.1224	0.0323	7.2000e-004	0.0330		127.8039	127.8039	3.7800e-003		127.8984
<b>Total</b>	<b>0.0702</b>	<b>0.4055</b>	<b>0.5467</b>	<b>2.3000e-003</b>	<b>0.1435</b>	<b>2.2400e-003</b>	<b>0.1458</b>	<b>0.0383</b>	<b>2.1200e-003</b>	<b>0.0404</b>		<b>234.6919</b>	<b>234.6919</b>	<b>8.5400e-003</b>		<b>234.9053</b>

EBMUD Mokelumne Aqueduct Routine Maintenance Agreement Renewal Project - San Joaquin County, Summer

**3.4 Maintenance and Repair of Culverts etc - 2019**

**Unmitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.4800e-003	0.0000	1.4800e-003	2.2000e-004	0.0000	2.2000e-004			0.0000			0.0000
Off-Road	1.6526	16.7165	10.2962	0.0295		0.6789	0.6789		0.6246	0.6246		2,923.0049	2,923.0049	0.9248		2,946.1251
<b>Total</b>	<b>1.6526</b>	<b>16.7165</b>	<b>10.2962</b>	<b>0.0295</b>	<b>1.4800e-003</b>	<b>0.6789</b>	<b>0.6804</b>	<b>2.2000e-004</b>	<b>0.6246</b>	<b>0.6248</b>		<b>2,923.0049</b>	<b>2,923.0049</b>	<b>0.9248</b>		<b>2,946.1251</b>

**Unmitigated Construction Off-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0108	0.3647	0.0534	1.0200e-003	0.0219	1.4600e-003	0.0233	6.0000e-003	1.4000e-003	7.4000e-003		106.8880	106.8880	4.7600e-003		107.0069
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0594	0.0408	0.4933	1.2800e-003	0.1216	7.8000e-004	0.1224	0.0323	7.2000e-004	0.0330		127.8039	127.8039	3.7800e-003		127.8984
<b>Total</b>	<b>0.0702</b>	<b>0.4055</b>	<b>0.5467</b>	<b>2.3000e-003</b>	<b>0.1435</b>	<b>2.2400e-003</b>	<b>0.1458</b>	<b>0.0383</b>	<b>2.1200e-003</b>	<b>0.0404</b>		<b>234.6919</b>	<b>234.6919</b>	<b>8.5400e-003</b>		<b>234.9053</b>

EBMUD Mokelumne Aqueduct Routine Maintenance Agreement Renewal Project - San Joaquin County, Summer

**3.4 Maintenance and Repair of Culverts etc - 2019**

**Mitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.4800e-003	0.0000	1.4800e-003	2.2000e-004	0.0000	2.2000e-004			0.0000			0.0000
Off-Road	1.6526	16.7165	10.2962	0.0295		0.6789	0.6789		0.6246	0.6246	0.0000	2,923.0049	2,923.0049	0.9248		2,946.1251
<b>Total</b>	<b>1.6526</b>	<b>16.7165</b>	<b>10.2962</b>	<b>0.0295</b>	<b>1.4800e-003</b>	<b>0.6789</b>	<b>0.6804</b>	<b>2.2000e-004</b>	<b>0.6246</b>	<b>0.6248</b>	<b>0.0000</b>	<b>2,923.0049</b>	<b>2,923.0049</b>	<b>0.9248</b>		<b>2,946.1251</b>

**Mitigated Construction Off-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0108	0.3647	0.0534	1.0200e-003	0.0219	1.4600e-003	0.0233	6.0000e-003	1.4000e-003	7.4000e-003		106.8880	106.8880	4.7600e-003		107.0069
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0594	0.0408	0.4933	1.2800e-003	0.1216	7.8000e-004	0.1224	0.0323	7.2000e-004	0.0330		127.8039	127.8039	3.7800e-003		127.8984
<b>Total</b>	<b>0.0702</b>	<b>0.4055</b>	<b>0.5467</b>	<b>2.3000e-003</b>	<b>0.1435</b>	<b>2.2400e-003</b>	<b>0.1458</b>	<b>0.0383</b>	<b>2.1200e-003</b>	<b>0.0404</b>		<b>234.6919</b>	<b>234.6919</b>	<b>8.5400e-003</b>		<b>234.9053</b>

EBMUD Mokelumne Aqueduct Routine Maintenance Agreement Renewal Project - San Joaquin County, Summer

**3.5 Bank and Levee Repair and Protection - 2019**

**Unmitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.9500e-003	0.0000	2.9500e-003	4.5000e-004	0.0000	4.5000e-004			0.0000			0.0000
Off-Road	2.3625	23.9061	14.2930	0.0427		0.9404	0.9404		0.8652	0.8652		4,230.7364	4,230.7364	1.3386		4,264.2004
<b>Total</b>	<b>2.3625</b>	<b>23.9061</b>	<b>14.2930</b>	<b>0.0427</b>	<b>2.9500e-003</b>	<b>0.9404</b>	<b>0.9433</b>	<b>4.5000e-004</b>	<b>0.8652</b>	<b>0.8656</b>		<b>4,230.7364</b>	<b>4,230.7364</b>	<b>1.3386</b>		<b>4,264.2004</b>

**Unmitigated Construction Off-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0215	0.7294	0.1068	2.0400e-003	0.0438	2.9200e-003	0.0467	0.0120	2.8000e-003	0.0148		213.7759	213.7759	9.5100e-003		214.0137
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0743	0.0510	0.6167	1.6000e-003	0.1520	9.8000e-004	0.1530	0.0403	9.0000e-004	0.0412		159.7549	159.7549	4.7200e-003		159.8730
<b>Total</b>	<b>0.0958</b>	<b>0.7805</b>	<b>0.7235</b>	<b>3.6400e-003</b>	<b>0.1958</b>	<b>3.9000e-003</b>	<b>0.1997</b>	<b>0.0523</b>	<b>3.7000e-003</b>	<b>0.0560</b>		<b>373.5308</b>	<b>373.5308</b>	<b>0.0142</b>		<b>373.8867</b>

EBMUD Mokelumne Aqueduct Routine Maintenance Agreement Renewal Project - San Joaquin County, Summer

**3.5 Bank and Levee Repair and Protection - 2019**

**Mitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.9500e-003	0.0000	2.9500e-003	4.5000e-004	0.0000	4.5000e-004			0.0000			0.0000
Off-Road	2.3625	23.9061	14.2930	0.0427		0.9404	0.9404		0.8652	0.8652	0.0000	4,230.7364	4,230.7364	1.3386		4,264.2004
<b>Total</b>	<b>2.3625</b>	<b>23.9061</b>	<b>14.2930</b>	<b>0.0427</b>	<b>2.9500e-003</b>	<b>0.9404</b>	<b>0.9433</b>	<b>4.5000e-004</b>	<b>0.8652</b>	<b>0.8656</b>	<b>0.0000</b>	<b>4,230.7364</b>	<b>4,230.7364</b>	<b>1.3386</b>		<b>4,264.2004</b>

**Mitigated Construction Off-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0215	0.7294	0.1068	2.0400e-003	0.0438	2.9200e-003	0.0467	0.0120	2.8000e-003	0.0148		213.7759	213.7759	9.5100e-003		214.0137
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0743	0.0510	0.6167	1.6000e-003	0.1520	9.8000e-004	0.1530	0.0403	9.0000e-004	0.0412		159.7549	159.7549	4.7200e-003		159.8730
<b>Total</b>	<b>0.0958</b>	<b>0.7805</b>	<b>0.7235</b>	<b>3.6400e-003</b>	<b>0.1958</b>	<b>3.9000e-003</b>	<b>0.1997</b>	<b>0.0523</b>	<b>3.7000e-003</b>	<b>0.0560</b>		<b>373.5308</b>	<b>373.5308</b>	<b>0.0142</b>		<b>373.8867</b>

**4.0 Operational Detail - Mobile**

EBMUD Mokelumne Aqueduct Routine Maintenance Agreement Renewal Project - San Joaquin County, Summer

**4.1 Mitigation Measures Mobile**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

**4.2 Trip Summary Information**

Land Use	Average Daily Trip Rate			Unmitigated	Mitigated
	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
User Defined Recreational	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

**4.3 Trip Type Information**

Land Use	Miles			Trip %			Trip Purpose %		
	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
User Defined Recreational	14.70	6.60	6.60	0.00	0.00	0.00	0	0	0

**4.4 Fleet Mix**

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
User Defined Recreational	0.552050	0.036079	0.182449	0.124563	0.019215	0.004844	0.016098	0.055414	0.001187	0.001496	0.005121	0.000613	0.000871

EBMUD Mokelumne Aqueduct Routine Maintenance Agreement Renewal Project - San Joaquin County, Summer

**5.0 Energy Detail**

Historical Energy Use: N

**5.1 Mitigation Measures Energy**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000



EBMUD Mokelumne Aqueduct Routine Maintenance Agreement Renewal Project - San Joaquin County, Summer

**5.2 Energy by Land Use - NaturalGas**

**Unmitigated**

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
User Defined Recreational	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
<b>Total</b>		<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>		<b>0.0000</b>	<b>0.0000</b>		<b>0.0000</b>	<b>0.0000</b>		<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>

**Mitigated**

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
User Defined Recreational	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
<b>Total</b>		<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>		<b>0.0000</b>	<b>0.0000</b>		<b>0.0000</b>	<b>0.0000</b>		<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>

**6.0 Area Detail**

**6.1 Mitigation Measures Area**

EBMUD Mokelumne Aqueduct Routine Maintenance Agreement Renewal Project - San Joaquin County, Summer

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
<b>Total</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>		<b>0.0000</b>	<b>0.0000</b>		<b>0.0000</b>	<b>0.0000</b>		<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>		<b>0.0000</b>

EBMUD Mokelumne Aqueduct Routine Maintenance Agreement Renewal Project - San Joaquin County, Summer

**6.2 Area by SubCategory**

**Mitigated**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
<b>Total</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>		<b>0.0000</b>	<b>0.0000</b>		<b>0.0000</b>	<b>0.0000</b>		<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>		<b>0.0000</b>

**7.0 Water Detail**

---

**7.1 Mitigation Measures Water**

**8.0 Waste Detail**

---

**8.1 Mitigation Measures Waste**

**9.0 Operational Offroad**

---

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type
----------------	--------	-----------	-----------	-------------	-------------	-----------

**10.0 Stationary Equipment**

---

**Fire Pumps and Emergency Generators**

EBMUD Mokelumne Aqueduct Routine Maintenance Agreement Renewal Project - San Joaquin County, Summer

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type
----------------	--------	-----------	------------	-------------	-------------	-----------

**Boilers**

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type
----------------	--------	----------------	-----------------	---------------	-----------

**User Defined Equipment**

Equipment Type	Number
----------------	--------

**11.0 Vegetation**

---

EBMUD Mokelumne Aqueduct Routine Maintenance Agreement Renewal Project - San Joaquin County, Winter

**EBMUD Mokelumne Aqueduct Routine Maintenance Agreement Renewal Project**  
**San Joaquin County, Winter**

**1.0 Project Characteristics**

**1.1 Land Usage**

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

**1.2 Other Project Characteristics**

<b>Urbanization</b>	Rural	<b>Wind Speed (m/s)</b>	2.7	<b>Precipitation Freq (Days)</b>	51
<b>Climate Zone</b>	2			<b>Operational Year</b>	2021
<b>Utility Company</b>	Pacific Gas & Electric Company				
<b>CO2 Intensity (lb/MW hr)</b>	641.35	<b>CH4 Intensity (lb/MW hr)</b>	0.029	<b>N2O Intensity (lb/MW hr)</b>	0.006

**1.3 User Entered Comments & Non-Default Data**

Project Characteristics -

Land Use -

Construction Phase - Based on Pers Comms

Off-road Equipment - Based on Pers Comms

Off-road Equipment - Based on Pers Comms

Off-road Equipment - Based on Pers Comms

Off-road Equipment - Based on Pers Comm

Trips and VMT - Based on Pers Comms

Grading - Based on Pers Comms

EBMUD Mokelumne Aqueduct Routine Maintenance Agreement Renewal Project - San Joaquin County, Winter

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	0.00	10.00
tblConstructionPhase	NumDays	0.00	20.00
tblConstructionPhase	NumDays	0.00	20.00
tblConstructionPhase	NumDays	0.00	10.00
tblGrading	AcresOfGrading	5.00	0.00
tblGrading	MaterialExported	0.00	300.00
tblGrading	MaterialExported	0.00	200.00
tblGrading	MaterialExported	0.00	200.00
tblGrading	MaterialExported	0.00	200.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	3.00
tblOffRoadEquipment	PhaseName		Sediment and Debris Removal
tblOffRoadEquipment	PhaseName		Bank and Levee Repair and Protection
tblOffRoadEquipment	PhaseName		Sediment and Debris Removal
tblOffRoadEquipment	PhaseName		Vegetation Management
tblOffRoadEquipment	PhaseName		Maintenance and Repair of Culverts etc
tblOffRoadEquipment	PhaseName		Bank and Levee Repair and Protection
tblOffRoadEquipment	PhaseName		Sediment and Debris Removal

EBMUD Mokelumne Aqueduct Routine Maintenance Agreement Renewal Project - San Joaquin County, Winter

tblOffRoadEquipment	PhaseName		Maintenance and Repair of Culverts etc
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblTripsAndVMT	WorkerTripLength	16.80	20.00
tblTripsAndVMT	WorkerTripLength	16.80	20.00
tblTripsAndVMT	WorkerTripLength	16.80	20.00
tblTripsAndVMT	WorkerTripLength	16.80	20.00
tblTripsAndVMT	WorkerTripNumber	13.00	10.00

**2.0 Emissions Summary**

---





EBMUD Mokelumne Aqueduct Routine Maintenance Agreement Renewal Project - San Joaquin County, Winter

**2.2 Overall Operational**

**Unmitigated Operational**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
<b>Total</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>		<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>

**Mitigated Operational**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
<b>Total</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>		<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>

EBMUD Mokelumne Aqueduct Routine Maintenance Agreement Renewal Project - San Joaquin County, Winter

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

### 3.0 Construction Detail

#### Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Sediment and Debris Removal	Site Preparation	6/1/2019	6/14/2019	5	10	
2	Vegetation Management	Site Preparation	6/15/2019	7/12/2019	5	20	
3	Maintenance and Repair of Culverts etc	Site Preparation	7/13/2019	8/9/2019	5	20	
4	Bank and Levee Repair and Protection	Site Preparation	8/10/2019	8/23/2019	5	10	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

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

#### OffRoad Equipment

EBMUD Mokelumne Aqueduct Routine Maintenance Agreement Renewal Project - San Joaquin County, Winter

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Sediment and Debris Removal	Excavators	1	8.00	158	0.38
Sediment and Debris Removal	Graders	0	8.00	187	0.41
Sediment and Debris Removal	Off-Highway Trucks	2	8.00	402	0.38
Sediment and Debris Removal	Rubber Tired Dozers	0	1.00	247	0.40
Sediment and Debris Removal	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Vegetation Management	Graders	0	8.00	187	0.41
Vegetation Management	Off-Highway Trucks	2	8.00	402	0.38
Vegetation Management	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Maintenance and Repair of Culverts etc	Graders	0	8.00	187	0.41
Maintenance and Repair of Culverts etc	Off-Highway Trucks	2	8.00	402	0.38
Maintenance and Repair of Culverts etc	Rubber Tired Dozers	0	1.00	247	0.40
Maintenance and Repair of Culverts etc	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Bank and Levee Repair and Protection	Forklifts	0	6.00	89	0.20
Bank and Levee Repair and Protection	Graders	0	8.00	187	0.41
Bank and Levee Repair and Protection	Off-Highway Trucks	3	8.00	402	0.38
Bank and Levee Repair and Protection	Tractors/Loaders/Backhoes	1	8.00	97	0.37

**Trips and VMT**

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Sediment and Debris Removal	5	10.00	0.00	38.00	20.00	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Vegetation Management	3	8.00	0.00	25.00	20.00	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Maintenance and Repair of Culverts etc	3	8.00	0.00	25.00	20.00	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Bank and Levee Repair and Protection	4	10.00	0.00	25.00	20.00	6.60	20.00	LD_Mix	HDT_Mix	HHDT

**3.1 Mitigation Measures Construction**

EBMUD Mokelumne Aqueduct Routine Maintenance Agreement Renewal Project - San Joaquin County, Winter

**3.2 Sediment and Debris Removal - 2019**

**Unmitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					4.4300e-003	0.0000	4.4300e-003	6.7000e-004	0.0000	6.7000e-004			0.0000			0.0000
Off-Road	1.9133	19.3984	13.5595	0.0347		0.8083	0.8083		0.7436	0.7436		3,434.1305	3,434.1305	1.0865		3,461.2936
<b>Total</b>	<b>1.9133</b>	<b>19.3984</b>	<b>13.5595</b>	<b>0.0347</b>	<b>4.4300e-003</b>	<b>0.8083</b>	<b>0.8127</b>	<b>6.7000e-004</b>	<b>0.7436</b>	<b>0.7443</b>		<b>3,434.1305</b>	<b>3,434.1305</b>	<b>1.0865</b>		<b>3,461.2936</b>

**Unmitigated Construction Off-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0338	1.1403	0.1823	3.0300e-003	0.0665	4.5400e-003	0.0711	0.0182	4.3400e-003	0.0226		318.1938	318.1938	0.0161		318.5958
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0776	0.0621	0.5254	1.4300e-003	0.1520	9.8000e-004	0.1530	0.0403	9.0000e-004	0.0412		142.6654	142.6654	4.1800e-003		142.7699
<b>Total</b>	<b>0.1114</b>	<b>1.2024</b>	<b>0.7077</b>	<b>4.4600e-003</b>	<b>0.2186</b>	<b>5.5200e-003</b>	<b>0.2241</b>	<b>0.0586</b>	<b>5.2400e-003</b>	<b>0.0638</b>		<b>460.8592</b>	<b>460.8592</b>	<b>0.0203</b>		<b>461.3657</b>

EBMUD Mokelumne Aqueduct Routine Maintenance Agreement Renewal Project - San Joaquin County, Winter

**3.2 Sediment and Debris Removal - 2019**

**Mitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					4.4300e-003	0.0000	4.4300e-003	6.7000e-004	0.0000	6.7000e-004			0.0000			0.0000
Off-Road	1.9133	19.3984	13.5595	0.0347		0.8083	0.8083		0.7436	0.7436	0.0000	3,434.1305	3,434.1305	1.0865		3,461.2935
<b>Total</b>	<b>1.9133</b>	<b>19.3984</b>	<b>13.5595</b>	<b>0.0347</b>	<b>4.4300e-003</b>	<b>0.8083</b>	<b>0.8127</b>	<b>6.7000e-004</b>	<b>0.7436</b>	<b>0.7443</b>	<b>0.0000</b>	<b>3,434.1305</b>	<b>3,434.1305</b>	<b>1.0865</b>		<b>3,461.2935</b>

**Mitigated Construction Off-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0338	1.1403	0.1823	3.0300e-003	0.0665	4.5400e-003	0.0711	0.0182	4.3400e-003	0.0226		318.1938	318.1938	0.0161		318.5958
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0776	0.0621	0.5254	1.4300e-003	0.1520	9.8000e-004	0.1530	0.0403	9.0000e-004	0.0412		142.6654	142.6654	4.1800e-003		142.7699
<b>Total</b>	<b>0.1114</b>	<b>1.2024</b>	<b>0.7077</b>	<b>4.4600e-003</b>	<b>0.2186</b>	<b>5.5200e-003</b>	<b>0.2241</b>	<b>0.0586</b>	<b>5.2400e-003</b>	<b>0.0638</b>		<b>460.8592</b>	<b>460.8592</b>	<b>0.0203</b>		<b>461.3657</b>

EBMUD Mokelumne Aqueduct Routine Maintenance Agreement Renewal Project - San Joaquin County, Winter

**3.3 Vegetation Management - 2019**

**Unmitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.4800e-003	0.0000	1.4800e-003	2.2000e-004	0.0000	2.2000e-004			0.0000			0.0000
Off-Road	1.6526	16.7165	10.2962	0.0295		0.6789	0.6789		0.6246	0.6246		2,923.0049	2,923.0049	0.9248		2,946.1251
<b>Total</b>	<b>1.6526</b>	<b>16.7165</b>	<b>10.2962</b>	<b>0.0295</b>	<b>1.4800e-003</b>	<b>0.6789</b>	<b>0.6804</b>	<b>2.2000e-004</b>	<b>0.6246</b>	<b>0.6248</b>		<b>2,923.0049</b>	<b>2,923.0049</b>	<b>0.9248</b>		<b>2,946.1251</b>

**Unmitigated Construction Off-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0111	0.3751	0.0600	1.0000e-003	0.0219	1.4900e-003	0.0234	6.0000e-003	1.4300e-003	7.4300e-003		104.6690	104.6690	5.2900e-003		104.8013
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0621	0.0497	0.4203	1.1500e-003	0.1216	7.8000e-004	0.1224	0.0323	7.2000e-004	0.0330		114.1323	114.1323	3.3400e-003		114.2159
<b>Total</b>	<b>0.0732</b>	<b>0.4248</b>	<b>0.4803</b>	<b>2.1500e-003</b>	<b>0.1435</b>	<b>2.2700e-003</b>	<b>0.1458</b>	<b>0.0383</b>	<b>2.1500e-003</b>	<b>0.0404</b>		<b>218.8013</b>	<b>218.8013</b>	<b>8.6300e-003</b>		<b>219.0172</b>

EBMUD Mokelumne Aqueduct Routine Maintenance Agreement Renewal Project - San Joaquin County, Winter

**3.3 Vegetation Management - 2019**

**Mitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.4800e-003	0.0000	1.4800e-003	2.2000e-004	0.0000	2.2000e-004			0.0000			0.0000
Off-Road	1.6526	16.7165	10.2962	0.0295		0.6789	0.6789		0.6246	0.6246	0.0000	2,923.0049	2,923.0049	0.9248		2,946.1251
<b>Total</b>	<b>1.6526</b>	<b>16.7165</b>	<b>10.2962</b>	<b>0.0295</b>	<b>1.4800e-003</b>	<b>0.6789</b>	<b>0.6804</b>	<b>2.2000e-004</b>	<b>0.6246</b>	<b>0.6248</b>	<b>0.0000</b>	<b>2,923.0049</b>	<b>2,923.0049</b>	<b>0.9248</b>		<b>2,946.1251</b>

**Mitigated Construction Off-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0111	0.3751	0.0600	1.0000e-003	0.0219	1.4900e-003	0.0234	6.0000e-003	1.4300e-003	7.4300e-003		104.6690	104.6690	5.2900e-003		104.8013
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0621	0.0497	0.4203	1.1500e-003	0.1216	7.8000e-004	0.1224	0.0323	7.2000e-004	0.0330		114.1323	114.1323	3.3400e-003		114.2159
<b>Total</b>	<b>0.0732</b>	<b>0.4248</b>	<b>0.4803</b>	<b>2.1500e-003</b>	<b>0.1435</b>	<b>2.2700e-003</b>	<b>0.1458</b>	<b>0.0383</b>	<b>2.1500e-003</b>	<b>0.0404</b>		<b>218.8013</b>	<b>218.8013</b>	<b>8.6300e-003</b>		<b>219.0172</b>

EBMUD Mokelumne Aqueduct Routine Maintenance Agreement Renewal Project - San Joaquin County, Winter

**3.4 Maintenance and Repair of Culverts etc - 2019**

**Unmitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.4800e-003	0.0000	1.4800e-003	2.2000e-004	0.0000	2.2000e-004			0.0000			0.0000
Off-Road	1.6526	16.7165	10.2962	0.0295		0.6789	0.6789		0.6246	0.6246		2,923.0049	2,923.0049	0.9248		2,946.1251
<b>Total</b>	<b>1.6526</b>	<b>16.7165</b>	<b>10.2962</b>	<b>0.0295</b>	<b>1.4800e-003</b>	<b>0.6789</b>	<b>0.6804</b>	<b>2.2000e-004</b>	<b>0.6246</b>	<b>0.6248</b>		<b>2,923.0049</b>	<b>2,923.0049</b>	<b>0.9248</b>		<b>2,946.1251</b>

**Unmitigated Construction Off-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0111	0.3751	0.0600	1.0000e-003	0.0219	1.4900e-003	0.0234	6.0000e-003	1.4300e-003	7.4300e-003		104.6690	104.6690	5.2900e-003		104.8013
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0621	0.0497	0.4203	1.1500e-003	0.1216	7.8000e-004	0.1224	0.0323	7.2000e-004	0.0330		114.1323	114.1323	3.3400e-003		114.2159
<b>Total</b>	<b>0.0732</b>	<b>0.4248</b>	<b>0.4803</b>	<b>2.1500e-003</b>	<b>0.1435</b>	<b>2.2700e-003</b>	<b>0.1458</b>	<b>0.0383</b>	<b>2.1500e-003</b>	<b>0.0404</b>		<b>218.8013</b>	<b>218.8013</b>	<b>8.6300e-003</b>		<b>219.0172</b>



EBMUD Mokelumne Aqueduct Routine Maintenance Agreement Renewal Project - San Joaquin County, Winter

**3.4 Maintenance and Repair of Culverts etc - 2019**

**Mitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.4800e-003	0.0000	1.4800e-003	2.2000e-004	0.0000	2.2000e-004			0.0000			0.0000
Off-Road	1.6526	16.7165	10.2962	0.0295		0.6789	0.6789		0.6246	0.6246	0.0000	2,923.0049	2,923.0049	0.9248		2,946.1251
<b>Total</b>	<b>1.6526</b>	<b>16.7165</b>	<b>10.2962</b>	<b>0.0295</b>	<b>1.4800e-003</b>	<b>0.6789</b>	<b>0.6804</b>	<b>2.2000e-004</b>	<b>0.6246</b>	<b>0.6248</b>	<b>0.0000</b>	<b>2,923.0049</b>	<b>2,923.0049</b>	<b>0.9248</b>		<b>2,946.1251</b>

**Mitigated Construction Off-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0111	0.3751	0.0600	1.0000e-003	0.0219	1.4900e-003	0.0234	6.0000e-003	1.4300e-003	7.4300e-003		104.6690	104.6690	5.2900e-003		104.8013
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0621	0.0497	0.4203	1.1500e-003	0.1216	7.8000e-004	0.1224	0.0323	7.2000e-004	0.0330		114.1323	114.1323	3.3400e-003		114.2159
<b>Total</b>	<b>0.0732</b>	<b>0.4248</b>	<b>0.4803</b>	<b>2.1500e-003</b>	<b>0.1435</b>	<b>2.2700e-003</b>	<b>0.1458</b>	<b>0.0383</b>	<b>2.1500e-003</b>	<b>0.0404</b>		<b>218.8013</b>	<b>218.8013</b>	<b>8.6300e-003</b>		<b>219.0172</b>

EBMUD Mokelumne Aqueduct Routine Maintenance Agreement Renewal Project - San Joaquin County, Winter

**3.5 Bank and Levee Repair and Protection - 2019**

**Unmitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.9500e-003	0.0000	2.9500e-003	4.5000e-004	0.0000	4.5000e-004			0.0000			0.0000
Off-Road	2.3625	23.9061	14.2930	0.0427		0.9404	0.9404		0.8652	0.8652		4,230.7364	4,230.7364	1.3386		4,264.2004
<b>Total</b>	<b>2.3625</b>	<b>23.9061</b>	<b>14.2930</b>	<b>0.0427</b>	<b>2.9500e-003</b>	<b>0.9404</b>	<b>0.9433</b>	<b>4.5000e-004</b>	<b>0.8652</b>	<b>0.8656</b>		<b>4,230.7364</b>	<b>4,230.7364</b>	<b>1.3386</b>		<b>4,264.2004</b>

**Unmitigated Construction Off-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0222	0.7502	0.1200	1.9900e-003	0.0438	2.9900e-003	0.0468	0.0120	2.8600e-003	0.0149		209.3381	209.3381	0.0106		209.6025
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0776	0.0621	0.5254	1.4300e-003	0.1520	9.8000e-004	0.1530	0.0403	9.0000e-004	0.0412		142.6654	142.6654	4.1800e-003		142.7699
<b>Total</b>	<b>0.0998</b>	<b>0.8123</b>	<b>0.6454</b>	<b>3.4200e-003</b>	<b>0.1958</b>	<b>3.9700e-003</b>	<b>0.1998</b>	<b>0.0523</b>	<b>3.7600e-003</b>	<b>0.0561</b>		<b>352.0035</b>	<b>352.0035</b>	<b>0.0148</b>		<b>352.3724</b>

EBMUD Mokelumne Aqueduct Routine Maintenance Agreement Renewal Project - San Joaquin County, Winter

**3.5 Bank and Levee Repair and Protection - 2019**

**Mitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.9500e-003	0.0000	2.9500e-003	4.5000e-004	0.0000	4.5000e-004			0.0000			0.0000
Off-Road	2.3625	23.9061	14.2930	0.0427		0.9404	0.9404		0.8652	0.8652	0.0000	4,230.7364	4,230.7364	1.3386		4,264.2004
<b>Total</b>	<b>2.3625</b>	<b>23.9061</b>	<b>14.2930</b>	<b>0.0427</b>	<b>2.9500e-003</b>	<b>0.9404</b>	<b>0.9433</b>	<b>4.5000e-004</b>	<b>0.8652</b>	<b>0.8656</b>	<b>0.0000</b>	<b>4,230.7364</b>	<b>4,230.7364</b>	<b>1.3386</b>		<b>4,264.2004</b>

**Mitigated Construction Off-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0222	0.7502	0.1200	1.9900e-003	0.0438	2.9900e-003	0.0468	0.0120	2.8600e-003	0.0149		209.3381	209.3381	0.0106		209.6025
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0776	0.0621	0.5254	1.4300e-003	0.1520	9.8000e-004	0.1530	0.0403	9.0000e-004	0.0412		142.6654	142.6654	4.1800e-003		142.7699
<b>Total</b>	<b>0.0998</b>	<b>0.8123</b>	<b>0.6454</b>	<b>3.4200e-003</b>	<b>0.1958</b>	<b>3.9700e-003</b>	<b>0.1998</b>	<b>0.0523</b>	<b>3.7600e-003</b>	<b>0.0561</b>		<b>352.0035</b>	<b>352.0035</b>	<b>0.0148</b>		<b>352.3724</b>

**4.0 Operational Detail - Mobile**

EBMUD Mokelumne Aqueduct Routine Maintenance Agreement Renewal Project - San Joaquin County, Winter

**4.1 Mitigation Measures Mobile**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

**4.2 Trip Summary Information**

Land Use	Average Daily Trip Rate			Unmitigated	Mitigated
	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
User Defined Recreational	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

**4.3 Trip Type Information**

Land Use	Miles			Trip %			Trip Purpose %		
	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
User Defined Recreational	14.70	6.60	6.60	0.00	0.00	0.00	0	0	0

**4.4 Fleet Mix**

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
User Defined Recreational	0.552050	0.036079	0.182449	0.124563	0.019215	0.004844	0.016098	0.055414	0.001187	0.001496	0.005121	0.000613	0.000871

EBMUD Mokelumne Aqueduct Routine Maintenance Agreement Renewal Project - San Joaquin County, Winter

**5.0 Energy Detail**

Historical Energy Use: N

**5.1 Mitigation Measures Energy**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

EBMUD Mokelumne Aqueduct Routine Maintenance Agreement Renewal Project - San Joaquin County, Winter

**5.2 Energy by Land Use - NaturalGas**

**Unmitigated**

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e	
Land Use	kBTU/yr	lb/day										lb/day						
User Defined Recreational	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
<b>Total</b>		<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>		<b>0.0000</b>	<b>0.0000</b>		<b>0.0000</b>	<b>0.0000</b>		<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>

**Mitigated**

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e	
Land Use	kBTU/yr	lb/day										lb/day						
User Defined Recreational	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
<b>Total</b>		<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>		<b>0.0000</b>	<b>0.0000</b>		<b>0.0000</b>	<b>0.0000</b>		<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>

**6.0 Area Detail**

**6.1 Mitigation Measures Area**

EBMUD Mokelumne Aqueduct Routine Maintenance Agreement Renewal Project - San Joaquin County, Winter

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
<b>Total</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>		<b>0.0000</b>	<b>0.0000</b>		<b>0.0000</b>	<b>0.0000</b>		<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>		<b>0.0000</b>

EBMUD Mokelumne Aqueduct Routine Maintenance Agreement Renewal Project - San Joaquin County, Winter

**6.2 Area by SubCategory**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
<b>Total</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>		<b>0.0000</b>	<b>0.0000</b>		<b>0.0000</b>	<b>0.0000</b>		<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>		<b>0.0000</b>

**7.0 Water Detail**

---

**7.1 Mitigation Measures Water**

**8.0 Waste Detail**

---

**8.1 Mitigation Measures Waste**

**9.0 Operational Offroad**

---

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type
----------------	--------	-----------	-----------	-------------	-------------	-----------

**10.0 Stationary Equipment**

---

Fire Pumps and Emergency Generators



EBMUD Mokelumne Aqueduct Routine Maintenance Agreement Renewal Project - San Joaquin County, Winter

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type
----------------	--------	-----------	------------	-------------	-------------	-----------

**Boilers**

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type
----------------	--------	----------------	-----------------	---------------	-----------

**User Defined Equipment**

Equipment Type	Number
----------------	--------

**11.0 Vegetation**

---



Appendix D Mitigation Monitoring and Reporting Plan

Impacts Being Mitigated	Mitigation Measure	Responsible for Implementation	Responsible for Monitoring and/or Enforcement	Timing of Implementation	Applicable Location
<b>Biological Resources</b>					
a) Have a substantial adverse impact, either directly or through habitat modifications on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations or by the California Dept. of Fish & Wildlife or U.S. Fish & Wildlife Service?	<p><b>Mitigation Measure BIO-1</b></p> <p>A qualified biologist shall hold an annual training session for maintenance staff responsible for performing routine maintenance activities. The training will include a description of special-status species and their habitats and protective measures to ensure that such species are not adversely impacted by routine maintenance activities (e.g., pre-activity surveys, installation of exclusion fencing when special-status species identified in an area). If special-status species are known or suspected to occur at the work site, a biologist or trained maintenance staff person shall be formally appointed as a biological monitor to ensure that appropriate protective measures are implemented. Each morning prior to commencement of project work, the biological monitor shall inspect the work site, including holes and depressions, to ensure that special-status species identified as potentially present are not within the project work area.</p>	EBMUD	EBMUD	Prior to and during maintenance activities	All project sites
	<p><b>Mitigation Measure BIO-2</b></p> <p>Equipment and materials staging areas shall be located at least 30 feet from the top of bank, within paved or gravel areas, if feasible. Vegetation disturbance shall be limited to the immediate maintenance footprint and a single access pathway.</p>	EBMUD	EBMUD	During maintenance activities	All project sites
	<p><b>Mitigation Measure BIO-3</b></p> <p>Soils imported to the maintenance work site for bank fill shall be similar in pH to native soils. Imported soils should be cleansed of pathogens and weed seeds prior to use through heating, solarization, or other appropriate methods.</p>	EBMUD	EBMUD	During maintenance activities	All project sites
	<p><b>Mitigation Measure BIO-4</b></p> <p>If there is potential for rare plants to occur at a maintenance work site (i.e., the site supports either previously undisturbed native vegetation or vegetation disturbance has not occurred for at least three years in a location that is also suitable for rare plants known to occur in the region), a qualified botanist shall conduct pre-activity special-status plant surveys during the appropriate blooming period, prior to initiation of routine maintenance activities. Any observed sensitive plants species shall be mapped and flagged for avoidance where feasible. EBMUD shall notify CDFW or CNPS upon discovery of any sensitive plant species. If sensitive plant species are discovered, the following measures shall be implemented:</p> <ul style="list-style-type: none"> <li>• Sensitive plant species shall be avoided or minimized by limiting ground disturbance where sensitive plants occur.</li> <li>• If plant species that are listed on the federal or California Endangered Species Lists or plants ranked with 1B.1 or 1B.2 CNPS ranking cannot be avoided, EBMUD will salvage the affected plants and transplant them to a similar habitat in the Project vicinity. The re-established population should achieve a 1:1 ratio (transplanted: re-established) after 2 years. If this performance criterion cannot be met, the appropriate agencies (e.g., USFWS, CDFW) will be consulted for additional options, such as payment of an in-lieu fee to the state CNPS program.</li> <li>• If any additional sensitive plant species are discovered on-site that cannot be avoided, the appropriate agencies (e.g., USFWS, CDFW) shall be consulted by EBMUD to determine the appropriate species-specific mitigation measures.</li> <li>• Species-specific mitigation may include repairing, rehabilitating, or restoring the impacted area; preserving in-situ populations on-site; or by providing off-site compensation. Off-site compensation may include the permanent protection of an off-site population through a conservation easement or the purchase of mitigation banking credits at a 2:1 ratio (mitigation: impacted population).</li> </ul>	EBMUD	EBMUD	Prior to and during maintenance activities	Areas with potential for rare plant occurrences as defined in the measure
	<p><b>Mitigation Measure BIO-5</b></p> <p>Within ten days prior to commencement of maintenance work, the maintenance site shall be surveyed for the presence of elderberry bushes. Within the boundaries of the EBMUD's Safe Harbor Agreement (SHA) (SHA# 81420-2009-F-0106) with the USFWS, EBMUD shall work around identified elderberry bushes and all requirements set forth by the SHA agreement shall be followed. If an elderberry bush is discovered outside of the SHA boundaries, the US Fish and Wildlife Service Framework for Assessing Impacts to the Valley Elderberry Longhorn Beetle (USFWS 2017) shall be followed. To protect any elderberry bush (naturally occurring or enhanced), no heavy equipment operations shall occur within 20 feet of the dripline of</p>	EBMUD	EBMUD	Prior to and during maintenance activities	All project sites

Impacts Being Mitigated	Mitigation Measure	Responsible for Implementation	Responsible for Monitoring and/or Enforcement	Timing of Implementation	Applicable Location
	<p>any elderberry bush. No equipment fueling shall occur within 165 feet of the elderberry bush.</p> <p><b>Mitigation Measure BIO-6</b></p> <p>EBMUD shall complete habitat assessments to determine the occupancy of habitat within and immediately adjacent to maintenance work sites by special-status species prior to the commencement of maintenance activity at the work site. Habitat assessments shall include a desktop review site vegetation characteristics and review of current extant occurrence records (CNDDDB, USFWS Official Species Lists) followed by field review to determine if suitable habitat conditions exist.</p> <p>When habitat assessments confirm the presence or potential presence of special-status species, or that habitat for special-status species exist at a work site and such species are known to exist within reasonable dispersal distance of the work area, a qualified biologist shall conduct a reconnaissance-level survey within 48 hours prior to the commencement of routine maintenance activities, including all areas where heavy equipment will be operated, such as adjacent upland access routes and staging areas. If special-status species are found, work shall be halted until the individual leaves the work area under its volition, or pending coordination with the appropriate agencies (i.e., CDFW, USFWS, NMFS) for State or federally listed species. Species that are not State or federally listed as endangered or threatened may be relocated by the qualified biologist if unable to leave on their own or found to be in danger. EBMUD shall not take or disturb any State or federally listed endangered or threatened species without applicable permission from the appropriate wildlife agency.</p> <p>When habitat assessments confirm the presence or potential presence of State or federally listed species and maintenance activities will impact occupied or potentially occupied habitat, and EBMUD determines those impacts cannot be avoided, EBMUD shall consult with a qualified biologist to identify appropriate mitigation actions to ensure that impacts to habitat are less than significant. EBMUD shall consider the following mitigation strategies for permanent and temporary impacts:</p> <ol style="list-style-type: none"> <li>1) habitat restoration,</li> <li>2) habitat enhancement,</li> <li>3) habitat preservation, and/or</li> <li>4) mitigation credit purchase from an agency-approved bank with suitable credits and service area coverage of the impact location at a 2:1 ratio.</li> </ol> <p>Habitat restoration, preservation and enhancement areas will require the development and implementation of a habitat management plan with the following success criteria to ensure the preserved and/or enhanced area is managed as suitable habitat for the target species in perpetuity.</p> <ul style="list-style-type: none"> <li>• Conduct biological monitoring surveys to confirm suitable habitat conditions for the target species and document habitat performance metrics (e.g., vegetation presence, cover, and maturity) for a period of 10 years.</li> <li>• Perform routine eradication of invasive vegetation species to maintain the intended vegetation diversity and structural components consistent with the target species' habitat requirements.</li> <li>• Restrict deeds to maintain and manage the preserve for the target species in perpetuity, with the ability to grant the preserve to a habitat conservancy, public agency, or other local habitat management entity.</li> <li>• Preserve funding and maintenance reserves.</li> <li>• Compensatory habitat mitigation is inclusive of other applicable habitat restoration and revegetation.</li> </ul>	EBMUD	EBMUD	Prior to, during and after maintenance activities	All project sites
	<p><b>Mitigation Measure BIO-7</b></p> <p>A qualified biologist shall check the maintenance site location for all life stages of special-status amphibians (e.g., California tiger salamander, California red-legged frog, foothill yellow-legged frog, or western spadefoot), 10 days or less prior to the start of the project. In addition, all field crew personnel shall visually check for special-status amphibians under parked vehicles, equipment, or staged materials prior to moving the vehicle, equipment, or materials. Project activities shall be halted if a significant rain event occurs. In the event of a significant rain event, the site shall be cleared of special-status amphibians by a qualified biologist before work activities can resume. If at any time special-status amphibians are detected, all work shall be suspended until the individual leaves the work area under its volition, or the USFWS and/or CDFW shall be notified and consulted with prior to commencing with the maintenance activity.</p>	EBMUD	EBMUD	Prior to and during maintenance activities	All project sites

Impacts Being Mitigated	Mitigation Measure	Responsible for Implementation	Responsible for Monitoring and/or Enforcement	Timing of Implementation	Applicable Location
	<p><b>Mitigation Measure BIO-8</b></p> <p>To minimize adverse impacts to special-status species and their habitats, work within streams with natural (earthen or rock-lined) bottoms and/or banks shall be conducted only between June 1 and October 15. Work within concrete-lined channels shall be conducted only between April 15 and October 15. No equipment shall be operated in wetted portions of the stream (including ponded, flowing, or wetland areas) at any time except as necessary to dewater the immediate maintenance work site (surface flows only) or divert water flow around the work site.</p> <p>Flow diversions shall be done in a manner that prevents pollution and/or siltation and that provides flows to downstream reaches. Flows to downstream reaches shall mimic natural flows necessary to support aquatic life. Said flows shall be of sufficient quality and quantity and appropriate temperature to support fish and other aquatic life both above and below the diversion structure. Normal flow shall be restored to the affected stream immediately upon completion of work at that location.</p> <p>Coffer dam and other water diversion designs shall be submitted to CDFW for approval prior to commencement of maintenance activities. Coffer dams shall be constructed with clean river gravel or sand bags, and may be sealed with sheet plastic. Sand bags and any sheet plastic shall be removed from the stream upon project completion. Clean river gravel may be left in the stream, but the coffer dams must be breached to return the stream flow to its natural channel. The water diversion shall be constructed with the least amount of disruption to the channel.</p> <p>In-channel maintenance activities shall not be initiated if maintenance work cannot be completed prior to the onset of a storm event predicted by 72-hour weather forecasts from the National Weather Service. All equipment shall be removed from the channel at least 12 hours before such an event occurs. If an unanticipated storm event occurs, EBMUD shall inspect active maintenance work sites for indications of bank erosion and/or channel sedimentation; if noticeable erosion or sedimentation has occurred, EBMUD shall implement appropriate erosion control best management practices (BMPs). Erosion control BMPs shall consist of wildlife-friendly plastic-free (including bio-degradable plastic) materials such as jute netting, coconut fiber blanket, or similar erosion control blanket.</p> <p>Non-living vegetation and debris not anchored to a bank or the channel bed by sediment may be removed at any time if necessary to prevent imminent flooding. Restorative maintenance activities such as revegetation above the mean high-water level may be completed outside of the specified work period if appropriate erosion control BMPs are implemented.</p>	EBMUD	EBMUD	Prior to and during maintenance activities	All project sites
	<p><b>Mitigation Measure BIO-9</b></p> <p>Staging and storage areas for equipment, materials, fuels, lubricants and solvents shall be located outside of the stream channel and banks. Stationary equipment such as motors, pumps, generators, compressors and welders, located adjacent to the stream, shall be positioned over drip-pans. If necessary, vehicles shall be moved away from the stream prior to refueling and lubrication. Any equipment or vehicles driven and/or operated in proximity to the stream shall be checked and maintained daily to prevent the release of contaminants.</p> <p>Any hazardous or toxic materials that could be deleterious to aquatic life shall be contained in watertight containers or removed from the project site. Such materials include, but are not limited to, debris soil, silt, bark, rubbish, creosote treated wood, raw cement/concrete or washings thereof, asphalt, paint or other coating material, and oil or other petroleum products. These materials shall be prevented from contaminating the soil and/or entering state or federal waters, including wetlands.</p>	EBMUD	EBMUD	During maintenance activities	All project sites
	<p><b>Mitigation Measure BIO-10</b></p> <p>Water that has come in contact with uncured concrete shall not be allowed to enter the stream channel until the pH is between 6.5 and 8.0 pH units. Containment of leachate shall adhere to the following Best Management Practices:</p> <ul style="list-style-type: none"> <li>• Concrete structures shall be allowed to cure (dry) for at least 28 days before coming into contact with channel flows, Flows contaminated with leachate shall be separated from the main stream flows via a diversion structure until the pH falls within the range specified above.</li> <li>• If the 28-day curing period is infeasible, EBMUD shall institute a minimum 7-day curing period and apply a sealant designed for use in aquatic environments, such as Deep Seal™ or Elasto Deck™. The sealant shall be allowed to cure for a minimum of 72 hours.</li> <li>• Wash-down water from concrete delivery trucks, concrete pumping equipment, and other tools and equipment shall not</li> </ul>	EBMUD	EBMUD	During maintenance activities	Project sites involving new concrete installation

Impacts Being Mitigated	Mitigation Measure	Responsible for Implementation	Responsible for Monitoring and/or Enforcement	Timing of Implementation	Applicable Location
	be allowed to enter the stream channel and should be removed from the site for treatment following construction. No dry concrete shall be placed on the banks or in a location where it could be carried into the channel by wind or runoff.				
	<p><b>Mitigation Measure BIO-11</b></p> <p>Maintenance work or tree removal shall be conducted between September 1 and January 31, outside of the nesting bird season, where feasible. However, if maintenance work or tree removal is scheduled to occur during the nesting bird season, between February 1 and August 31, a qualified biologist (as determined by a combination of academic training and professional experience in biological sciences and related resource management activities) shall conduct reconnaissance-level surveys for nesting birds no more than one week prior to routine maintenance activities. Surveys shall include upland access routes and equipment and materials staging areas in addition to each work site.</p> <p>If this survey finds evidence of nesting birds, work in the immediate area shall be postponed until September 1 and an avoidance buffer shall be implemented to avoid nest disturbance. The avoidance buffer is based on the nest location, topography, cover and species' tolerance to disturbance and is determined by a qualified biologist upon consultation with CDFW or USFWS. If an avoidance buffer is not achievable, a qualified biologist shall monitor the nest(s) to document that no take of the nest (nest failure) has occurred. Active nests cannot be taken or destroyed under the Migratory Bird Treaty Act and, for raptors, under the CDFW Code. If it is determined that construction activity is resulting in nest disturbance, work should cease immediately and CDFW should be contacted. If a lapse in project-related work of 5 days or longer occurs, another focused survey and if required, consultation with CDFW and USFWS, shall be required before project work can be reinitiated.</p> <p>If preconstruction surveys indicate that nests are inactive or potential habitat is unoccupied during the maintenance work period, no further action is required. Trees and shrubs within the footprint that are determined to be unoccupied by special-status birds or that are located outside the no-disturbance buffer for active nests may be removed. Nests initiated during work (while significant disturbance from maintenance activities persist) may be presumed to be unaffected, and only a minimal buffer would be necessary.</p> <p>In order to protect nesting birds and other breeding wildlife species, mowing, disking, and/or burning of levees shall only occur from July 1st through March 1st. If burrowing owls are observed or known to occur in the area, CDFW shall be contacted for appropriate protection measures.</p>	EBMUD	EBMUD	Prior to and during maintenance activities	All project sites
	<p><b>Mitigation Measure BIO-12</b></p> <p>Between February 15th and August 15th, project activities are prohibited within 0.5 miles of a nesting Swainson's hawk without consultation with CDFW under the California Endangered Species Act (CESA).</p>	EBMUD	EBMUD	During maintenance activities	All project sites
	<p><b>Mitigation Measure BIO-13</b></p> <p>A qualified biologist shall conduct a pre-construction take avoidance survey for the burrowing owl prior to initiating maintenance-related ground disturbance activities in or near grassland habitats. In areas where owl presence is not found, construction may proceed without further mitigation. If western burrowing owl occupancy onsite is confirmed during pre-construction take avoidance surveys, EBMUD shall develop and implement a CDFW-approved Burrowing Owl Monitoring and Mitigation Plan in coordination with CDFW.</p>	EBMUD	EBMUD	Prior to and during maintenance activities	All project sites in or near grassland habitats
	<p><b>Mitigation Measure BIO-14</b></p> <p>Maintenance work shall be conducted between August 1 and February 28 to avoid the bat maternity period, where feasible. However, if maintenance work occurs between August 1 and February 28, a preconstruction survey for roosting bats shall be conducted by a qualified biologist within two weeks prior to construction to ensure that no roosting bats are disturbed during maintenance activities.</p> <p>If roosting surveys are inconclusive, 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 an active work area, a qualified biologist shall conduct focused day- and/or night-emergence surveys as appropriate.</p> <p>If active maternity roosts or day roosts are found in areas that would be removed or modified as part of maintenance work, activities shall commence before maternity colonies form (before March 1) or after young are flying (after July 31). Disturbance-free buffer zones (determined by a qualified biologist in coordination with CDFW) shall be observed during the</p>	EBMUD	EBMUD	Prior to and during maintenance activities	All project sites

Impacts Being Mitigated	Mitigation Measure	Responsible for Implementation	Responsible for Monitoring and/or Enforcement	Timing of Implementation	Applicable Location
	<p>maternity roost season (March 1 through July 31) for any active maternity colony identified during the surveys to protect maternity roosts.</p> <p>If a non-breeding bat roost is found in a structure anticipated for modification or removal, the individual(s) shall be safely evicted, under the direction of a qualified biologist in such a way that ensures individuals are not injured.</p> <p>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 no-disturbance buffer for active roosting sites may be removed. Roosting initiated during construction is presumed to be unaffected, and no buffer would be necessary.</p>				
	<p><b>Mitigation Measure BIO-15</b></p> <p>EBMUD shall implement the following avoidance or minimization measures for the San Francisco dusky-footed woodrat:</p> <ul style="list-style-type: none"> <li>• A preconstruction survey shall be performed by a qualified biologist within seven days prior to the start of ground-disturbing activities to identify the locations of active San Francisco dusky-footed woodrat nests within the Project boundary. Any woodrat nests detected would be mapped and flagged for avoidance by the qualified biologist.</li> <li>• If active nests are determined to be present, avoidance measures shall be implemented first. Because San Francisco dusky-footed woodrats are year-round residents, avoidance mitigation is limited to restricting Project activities to avoid direct impacts to San Francisco dusky-footed woodrats and their active nests to the extent feasible. A minimum ten-foot buffer should be maintained between Project construction activities and each nest to avoid disturbance. In some situations, a smaller buffer may be allowed if, in the opinion of a qualified biologist, removing the nest would be a greater impact than that anticipated as a result of Project activities.</li> <li>• If an unoccupied woodrat nest is found within the Project site and it cannot be avoided, the nest should be disassembled by hand by a qualified biologist. The nest materials should be relocated off site outside of the wildlife exclusion fencing to prevent rebuilding.</li> <li>• If occupied nests are found within the Project site, and a litter of young is found or suspected, the nest shall be left alone for two to three weeks before a recheck to verify that young are capable of independent survival before proceeding with nest dismantling. Dismantling shall be done by hand, allowing any animals to escape either along existing woodrat trails or toward other available habitat.</li> <li>• EBMUD shall notify CDFW of any nests, unoccupied or occupied, before they are dismantled.</li> </ul>	EBMUD	EBMUD	Prior to and during maintenance activities	All project sites
	<p><b>Mitigation Measure BIO-16</b></p> <p>If a possible San Joaquin kit fox or American badger den is found during implementation of pre-activity surveys, EBMUD shall implement the following avoidance or minimization measures for San Joaquin kit fox and American badger:</p> <ul style="list-style-type: none"> <li>• Project activities shall not occur within 100 feet of a potential den (defined per 2011 USFWS Guidance as a subterranean hole within the species' range possessing sufficient entrance dimensions but evidence is insufficient to conclude that it is being used by a kit fox) during the natal period (February 1 to September 30).</li> <li>• Project activities shall not occur within 200 feet of a known den (defined per 2011 USFWS Guidance as any natural den or built structure used by San Joaquin kit fox based on past data collected), or natal or pupping den (defined per 2011 USFWS Guidance as any den used, currently or previously, by kit foxes to rear pups typically with tracks, scat, and prey remains) during the natal period (February 1 to September 30).</li> </ul>	EBMUD	EBMUD	Prior to and during maintenance activities	All project sites
	<p><b>Mitigation Measure BIO-17</b></p> <p>In areas subject to dewatering, EBMUD shall check daily for stranded aquatic life as the water level drops. All reasonable efforts shall be made to capture and move all stranded aquatic life observed in the dewatered areas. Capture methods may include fish landing nets, dip nets, buckets and by hand. Captured aquatic life shall be released immediately in the body of water closest to the work site.</p>	EBMUD	EBMUD	During maintenance activities	Project sites that are dewatered
	<b>Mitigation Measure HAZ-1 (see description below)</b>				

Impacts Being Mitigated	Mitigation Measure	Responsible for Implementation	Responsible for Monitoring and/or Enforcement	Timing of Implementation	Applicable Location
	<b>Mitigation Measure HYD-1 (see description below)</b>				
	<b>Mitigation Measure HYD-2 (see description below)</b>				
b) Have a substantial adverse impact on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Dept. of Fish & Wildlife or U.S. Fish & Wildlife Service?	<b>Mitigation Measure BIO-18</b> Any trees which must be cut shall be cut at ground level, leaving the root mass in place to maintain bank stability. Any live native trees greater than 4 inches DBH removed shall be replaced at a 3:1 ratio, and exposed/disturbed areas shall be revegetated per MMs BIO-21, and BIO-22 below.	EBMUD	EBMUD	During maintenance activities	All project sites
	<b>Mitigation Measure BIO-19</b> All exposed/ disturbed areas and access points within the stream zone left barren of vegetation following maintenance activities shall be revegetated with a blend of erosion control grass seeds using only native grass species. The seed mix shall be certified weed-free. Seeded areas shall be mulched. All other areas of disturbed soil which drain towards the stream channel shall be seeded with native erosion control grass seeds. Revegetation shall be completed immediately (within two weeks) after maintenance activities cease or before a significant rain event. Seeding placed after October 15 must be covered with broadcast straw, jute netting, coconut fiber blanket or similar erosion control blanket. Erosion control blankets with plastic monofilament or woven plastic strands, including biodegradable plastics, shall not be used.	EBMUD	EBMUD	After maintenance activities	All project sites
	<b>Mitigation Measure BIO-20</b> To ensure a successful revegetation effort, all plants shall be monitored and maintained as necessary for five years. The following success criteria shall apply: <ul style="list-style-type: none"> <li>• All plantings shall have a minimum of 80% survival at the end of 5 years.</li> <li>• Plants shall attain 70% cover after three years and 75% coverage after 5 years.</li> <li>• If the survival and/or cover requirements are not meeting these goals, EBMUD is responsible for replacement planting, additional watering, weeding, invasive exotic eradication, or any other practice, to achieve these requirements. Replacement plants shall be monitored with the same survival and growth requirements for five years after planting.</li> </ul> Revegetation monitoring shall be conducted annually for a period of five (5) years to determine whether these goals have been met, and an annual report shall be provided to CDFW regarding revegetation status.	EBMUD	EBMUD	After maintenance activities	Project areas where revegetation occurs
	<b>Mitigation Measure BIO-21</b> All live native trees greater than 4 inches DBH removed as a result of proposed maintenance activities shall be replaced at a 3:1 ratio (replacement trees : removed trees) to mitigate for permanent net loss of canopy cover. Replacement trees shall consist of 5-gallon saplings and shall be native species adapted to the lighting, soil and hydrological conditions at the replanting site. If replanting within the work area is infeasible due to slope steepness or other physical constraints, replacement trees may be planted at an alternate location along the stream corridor.	EBMUD	EBMUD	During and after maintenance activities	All project sites
	<b>Mitigation Measure BIO-22</b> When riprap is placed for bank slope protection on a previously vegetated bank, it shall not be grouted or mortared. Interstitial spaces between rocks shall be backfilled with clean native soils or imported fill and planted with trees, shrubs, or other vegetation to minimize habitat loss. If revegetation of the riprap is not feasible, EBMUD shall plant compensatory vegetation at an off-site location at a 3:1 ratio.  Only rocks and boulders free of organic material and soil that could carry weeds or pathogens from other areas shall be used for the project. Riprap shall be properly keyed into the bank and be of sufficient size to remain in place and withstand the highest velocity of water anticipated within the stream channel.	EBMUD	EBMUD	During maintenance activities	Project sites where riprap is used for bank slope protection
		<b>Mitigation Measure HAZ-1 (see description below)</b>			
	<b>Mitigation Measure HYD-1 (see description below)</b>				
	<b>Mitigation Measure HYD-2 (see description below)</b>				



Impacts Being Mitigated	Mitigation Measure	Responsible for Implementation	Responsible for Monitoring and/or Enforcement	Timing of Implementation	Applicable Location
c) Have a substantial adverse impact 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?	<p><b>Mitigation Measure BIO-23</b></p> <p>Prior to the implementation of any Project that shall result in a net “loss” of waters of the U.S. and/or State, EBMUD shall coordinate with and obtain permits from the U.S. Army Corps of Engineers and the Regional Water Quality Control Board as appropriate. Compensatory mitigation for the loss of waters of the U.S. and/or State shall occur at a minimum 1:1 ratio for permanent impacts. Compensatory mitigation options may include restoration, enhancement, and preservation on- or off-site, or the purchase of mitigation credits at an approved mitigation bank.</p>	EBMUD	EBMUD	Prior to maintenance activities	All project sites
<b>Cultural Resources</b>					
b) Cause a substantial adverse change in the significance of a unique archaeological resource as defined in Section 15064.5?	<p><b>Mitigation Measure CR-1</b></p> <p>All EBMUD maintenance personnel shall attend a cultural resources training course. The training program will be completed in person or by watching a video conducted by a qualified archaeologist. The program will discuss cultural resources awareness within the project work limits, including the responsibilities of maintenance personnel, applicable mitigation measures, confidentiality, and notification requirements. Prior to accessing or performing maintenance work, all EBMUD personnel shall sign an attendance sheet by the qualified archaeologist 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”; and shall comply with all project environmental requirements.</p> <p>In the event that potential cultural resources are discovered at a maintenance site, all maintenance activities shall immediately cease at the location of discovery and within 100 feet of the discovery. EBMUD will retain a qualified archaeologist to inspect the findings within 24 hours of discovery. If it is determined that maintenance activities 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], maintenance activities 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.</p>	EBMUD	EBMUD	Prior to and during maintenance activities	All project sites
	<p><b>Mitigation Measure CR-2</b></p> <p>In the event that human remains are discovered, all maintenance activities shall immediately cease at the location of discovery and within 100 feet of the discovery. 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.</p>	EBMUD	EBMUD	During maintenance activities	All project sites
	<p><b>Mitigation Measure CR-3</b></p> <p>Prior to initiating maintenance activities in a given year, EBMUD shall review the Archaeological Resources GIS database for all locations where ground-disturbing maintenance activities within previously undisturbed soils (excluding sediment removal areas in drainages) are anticipated. A qualified archaeologist shall conduct a review and assessment of those maintenance sites that overlap with newly recorded resources within the last year to determine the potential for affecting significant cultural resources. If a location identified for maintenance activities that require ground disturbance has not previously been surveyed for archaeological resources, a qualified archaeologist shall conduct a field review to determine if surficial evidence of a resource is present. Further archival record search and literature review (including a review of the Sacred Lands Inventory of the Native American Heritage Commission) shall be conducted, as appropriate.</p> <p>Identified cultural resources that may be impacted by a proposed maintenance activity shall be evaluated for eligibility for listing on the CRHR, or as a unique archaeological site or TCR, if they can’t be avoided by maintenance activities. Cultural resources that are eligible for the CRHR are considered to be significant cultural resources, as are unique archaeological sites and TCRs. Cultural resources that are identified within Project areas subject to federal approval, permits, or funding shall also be evaluated for eligibility for listing on the NRHP. Cultural resources determined to be eligible for listing on the NRHP are</p>	EBMUD	EBMUD	Prior to and during maintenance activities	All project sites

Impacts Being Mitigated	Mitigation Measure	Responsible for Implementation	Responsible for Monitoring and/or Enforcement	Timing of Implementation	Applicable Location
	<p>automatically eligible for listing on the CRHR and are considered to be significant cultural resources.</p> <p>A cultural resources report summarizing the results of the assessment and indicating appropriate management actions for individual maintenance sites (e.g., no action, monitoring during construction, presence/absence testing for subsurface resources; data recovery, etc.) shall be developed. The management actions shall be implemented to avoid significant effects to cultural resources.</p>				
	<p><b>Mitigation Measure CR-4</b></p> <p>Archaeological Data Recovery. If it is infeasible to avoid impacts on archaeological sites that have been determined to be eligible for listing on the CRHR or the NRHP, additional research including, but not necessarily limited to, archaeological excavation shall be conducted (California Code of Regulations [CCR] Section 15126.4 (b)(3)(C)). This work shall be conducted by a qualified archaeologist and shall include preparation of a research design; additional archival and historical research; archaeological excavation; analysis of artifacts, features, and other attributes of the resource; and preparation of a technical report documenting the methods and results of the investigation in accordance with the California Office of Historic Preservation Guidelines for Archaeological Research Design (1991). The purpose of this work is to recover a sufficient quantity of data to compensate for damage to or destruction of the resource. The procedures to be employed in this data recovery program shall be determined in consultation with responsible agencies and interested parties, as appropriate. Where necessary, EBMUD would seek Native American input and consultation.</p>	EBMUD	EBMUD	Prior to and during maintenance activities	All project sites
c) Disturb any human remains, including those interred outside of formal cemeteries?	<b>Mitigation Measure CR-1 (see description above)</b>				
	<b>Mitigation Measure CR-2 (see description above)</b>				
	<b>Mitigation Measure CR-3 (see description above)</b>				
	<b>Mitigation Measure CR-4 (see description above)</b>				
<b>Geology and Soils</b>					
b) Result in substantial soil erosion or the loss of topsoil?	<b>Mitigation Measure HYD-1 (see description below)</b>				
f) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	<p><b>Mitigation Measure GEO-1</b></p> <p>If items of paleontological interest are accidentally discovered during maintenance, work shall be immediately suspended at, and within 100 feet of the discovery site. 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 (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 maintenance activities could damage a paleontological resource as defined by the Society of Vertebrate Paleontology guidelines (Society of Vertebrate Paleontology 2010), maintenance activities 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 maintenance activity can resume.</p>	EBMUD	EBMUD	During maintenance activities	All project sites
<b>Hazards and Hazardous Materials</b>					
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	<p><b>Mitigation Measure HAZ-1</b></p> <p>Prior to the start of maintenance activities, EBMUD shall establish a Contingency Plan detailing the procedures and countermeasures that will be implemented when an accidental release of hazardous materials occurs in order to prevent the release from entering navigable waters. The Contingency Plan shall include a list of the hazardous substances typically used for maintenance activities, including petroleum products, and countermeasures that shall be taken to prevent spills, monitor hazardous substances, and provide immediate response to spills. Spill response measures shall address notification of the appropriate agencies including phone numbers; spill-related worker, public health, and safety issues; spill control, and spill cleanup. All EBMUD maintenance staff shall be familiar with Contingency Plan procedures and countermeasures for preventing and controlling the spilling of known hazardous substances used on the jobsite or staging areas.</p>	EBMUD	EBMUD	Prior to maintenance activities	All project sites

Impacts Being Mitigated	Mitigation Measure	Responsible for Implementation	Responsible for Monitoring and/or Enforcement	Timing of Implementation	Applicable Location
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the likely release of hazardous materials into the environment?	<b>Mitigation Measure HAZ-1 (see description above)</b>				
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	<b>Mitigation Measure HAZ-1 (see description above)</b>				
g) Expose people or structures, either directly or indirectly, to the risk of loss, injury or death involving wildland fires?	<b>Mitigation Measure WILD-1 (see description below)</b>				
<b>Hydrology and Water Quality</b>					
a) Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?	<p><b>Mitigation Measure HYD-1</b></p> <p>All exposed soils within the work area shall be stabilized immediately following the completion of earthmoving activities to prevent erosion into the stream channel. Erosion control BMPs, such as silt fences, straw hay bales, gravel or rock-lined ditches, water check bars, and broadcasted straw will be used. Monofilament based erosion control blankets will not be used within the stream zone or riparian areas. Erosion control BMPs shall be monitored during and after each storm event for effectiveness. Modifications, repairs, and improvements to Erosion control BMPs shall be made as needed to protect water quality. Silt laden runoff will not be allowed to enter the stream or be directed to an area that may enter the stream at any point.</p> <p>All non-biodegradable silt barriers (e.g., plastic silt fencing, netting surrounding coil logs or rolls) shall be removed after areas have stabilized with erosion control vegetation (usually after the first growing season).</p>	EBMUD	EBMUD	During maintenance activities	All project sites
	<p><b>Mitigation Measure HYD-2</b></p> <p>When work in streams with water is unavoidable, streamflow shall be diverted around the work area by construction of temporary instream fences or other barriers. The following measures shall be implemented to minimize impacts to water quality associated with dewatering activities:</p> <ul style="list-style-type: none"> <li>• The area to be dewatered shall encompass the minimum area necessary to perform the maintenance activity.</li> <li>• Construction of instream barriers shall begin in the upstream area and continue in a downstream direction, and the flow shall be diverted only when construction of instream barriers is complete.</li> <li>• Instream barriers shall be installed both upstream and downstream, not more than 100 feet from the extent of the work areas.</li> <li>• Streamflows shall be allowed to travel by gravity flow around or through the work site through pipes.</li> <li>• A qualified biologist shall be present to ensure that fish and other aquatic vertebrates are not stranded during construction and implementation of channel dewatering.</li> <li>• Downstream flows adequate to prevent fish or vertebrate stranding shall be maintained at all time during dewatering activities.</li> <li>• Diverted and stored water shall be protected from maintenance activity-related pollutants, such as soils, equipment</li> </ul>			During maintenance activities	All in-stream work

Impacts Being Mitigated	Mitigation Measure	Responsible for Implementation	Responsible for Monitoring and/or Enforcement	Timing of Implementation	Applicable Location
	<p>lubricants, and fuels.</p> <ul style="list-style-type: none"> <li>• If necessary, discharged water shall pass over some form of energy dissipater to prevent erosion of the downstream channel. Silt bags will be attached to the end of discharge hoses and pipes to remove sediment from discharged water.</li> <li>• When maintenance is completed, the temporary instream barrier shall be removed as soon as possible but no later than 48 hours after work is completed. Impounded water shall be released at a reduced velocity to minimize erosion, turbidity, and harm to downstream habitat.</li> <li>• When diversion structures are removed, to the extent practicable, the ponded flows shall be directed into the low-flow channel within the work site to minimize downstream water quality impacts.</li> <li>• The area disturbed by installation of instream structures shall be restored at the completion of the maintenance activity.</li> </ul> <p><b>Mitigation Measure BIO-8 (see description above)</b></p> <p><b>Mitigation Measure BIO-9 (see description above)</b></p> <p><b>Mitigation Measure BIO-10 (see description above)</b></p> <p><b>Mitigation Measure HAZ-1 (see description above)</b></p>				
<p>c) Substantially alter the existing drainage pattern of the site 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:</p> <p>i) Result in substantial erosion or siltation on- or off-site;</p>	<p><b>Mitigation Measure HYD-1 (see description above)</b></p> <p><b>Mitigation Measure BIO-8 (see description above)</b></p>				
<b>Noise</b>					
<p>a) 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?</p>	<p><b>Mitigation Measure NOI-1</b></p> <p>EBMUD shall implement the following noise-reducing practices to minimize disturbances to residential areas surrounding work sites:</p> <ul style="list-style-type: none"> <li>• Work or activity of any kind shall be limited to the hours from 8:00 a.m. to 5:00 p.m. Monday through Friday. Activities in residential areas shall not occur on Saturdays, Sundays, or EBMUD observed holidays except during emergencies, or with advance notification of surrounding residents.</li> <li>• Advanced notification about the estimated duration of the activity shall be provided at least one week prior to the start of maintenance adjacent properties within 40 feet of the proposed Project’s sites where heavy equipment shall be used.</li> <li>• Powered equipment (vehicles, heavy equipment, and hand equipment such as chainsaws) shall be equipped with adequate mufflers. Best available noise control techniques (e.g., mufflers, intake silencers, ducts, engine enclosures, and acoustically attenuating shields or shrouds) shall be used for all equipment and trucks, as necessary.</li> <li>• 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 when feasible) shall be used. Enclosure opening or venting shall face away from sensitive receptors.</li> <li>• EBMUD shall use hydraulically or electrically powered equipment 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</li> </ul>	<p>EBMUD</p>	<p>EBMUD</p>	<p>Prior to and during maintenance activities</p>	<p>All project sites</p>

Impacts Being Mitigated	Mitigation Measure	Responsible for Implementation	Responsible for Monitoring and/or Enforcement	Timing of Implementation	Applicable Location
	exhaust by up to about ten dB). External jackets on the tools themselves shall be used, where feasible, which could achieve a reduction of five dB.				
<b>Tribal Cultural Resources</b>					
<p>a) Would the project cause a substantial adverse change in the significance of a tribal cultural resource, 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, and that is:</p> <p>ii) 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 Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of the Public Resource Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.</p>	<b>Mitigation Measure CR-1 (see description above)</b>				
	<b>Mitigation Measure CR-2 (see description above)</b>				
	<b>Mitigation Measure CR-3 (see description above)</b>				
	<b>Mitigation Measure CR-4 (see description above)</b>				
<b>Wildfire</b>					
<p>b) Due to slope, prevailing winds, or other factors, exacerbate wildfire risks, and thereby expose project occupants to, pollutant concentrations from wildfire or the uncontrolled spread of a wildfire?</p>	<p><b>Mitigation Measure WILD-1</b></p> <p>The following measures shall be implemented to reduce the potential for and spread of a wildfire:</p> <ul style="list-style-type: none"> <li>• All maintenance sites shall be supplied and maintained with adequate fire-fighting equipment capable of extinguishing incipient fires.</li> <li>• All earthmoving and portable equipment with internal combustion engines shall be equipped with a spark arrestor to reduce the potential for igniting a wildfire. Such equipment shall be maintained to ensure proper functioning of spark arrestor.</li> <li>• Combustible materials shall be removed from the maintenance site once maintenance is complete.</li> <li>• Approved access for firefighting shall be maintained during maintenance work.</li> </ul>	EBMUD	EBMUD	Prior to and during maintenance activities	All project sites
<p>c) Require the installation or maintenance of associated infrastructure (such as roads,</p>	<b>Mitigation Measure WILD-1 (see description above)</b>				

Impacts Being Mitigated	Mitigation Measure	Responsible for Implementation	Responsible for Monitoring and/or Enforcement	Timing of Implementation	Applicable Location
fuel breaks, emergency water sources, power line or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?					